

# **Occupational, Business and Vocational Technology Education**

**Class - 7**

Government of Nepal  
Ministry of Education  
**Curriculum Development Centre**

**Publisher:** Government of Nepal  
Ministry of Education  
Curriculum Development Centre  
Sanothimi, Bhaktapur

**ISBN :**

**© Publisher**

**Revised Edition : 2017**

**Price : 66/-**

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any other form or by any means for commercial purpose without the prior permission in writing of Curriculum Development Centre.

## *Preface*

The curriculum and curricular materials have been developed and revised on a regular basis with the aim of making education purposeful, practical, relevant and job-oriented. It is necessary to instill the feeling of nationalism, national integrity and democratic spirit in students and equip them with morality, discipline and self-reliance so as to develop in them social and personal skills as well as the basic competencies of language, science, occupation, information and communication technology, environment and health, and life skills. It is also necessary to enable them to appreciate, preserve and promote arts and aesthetics, social norms and values and ideals. Moreover, in order to develop an equitable society, it is necessary to inculcate students with respect for ethnicity, gender, disabilities, languages, religions, cultures and regional diversity. Likewise, education should also help them to be well-informed of human rights and social norms and values so as to make them capable of playing the role of responsible citizens. This textbook has been developed in this form based on the Basic Education Curriculum 2069 (Grade 6 to 8), incorporating the feedback obtained from teachers, students, parents and other stakeholders during its piloting.

This textbook was translated and edited by Dhananjay Paudel, Shankar Prasad Neupane, Dipendra Pokharel and Khilanath Dhamala. In bringing out this text book in this form, the contribution of the Executive Director of CDC Mr. Diwakar Dhungel, Deputy Director Dr. Balkrishna Ranjit, Sarita Bajracharya, Bijaya Muli, Anil Acharya is highly commendable.

Language of this book was edited by Nim Prakash Sing Rathaur and Parshuram Tiwari. The layout design of the book was done by Jayaram Kuikel. The illustration of the book was done by Sunil Ranjit and Gautam Manandhar. CDC extends sincere thanks to all those who have contributed in the development and revision of this text book.

Textbook is considered as an important tool of learning. Experienced teachers and curious students can use various learning resources and tools to achieve the competencies targeted by the curriculum. An attempt is made to make this textbook activity oriented and interested as far as possible. The teachers, students and other stakeholders are expected to make constructive comments and suggestions to make this book a more useful learning material.

Government of Nepal  
Ministry of Education  
**Curriculum Development Centre**

# Content

SN	Topics	Page number
<b>Unit - 1</b>	<b>Professional Education</b>	<b>1</b>
Lesson: 1	Profession and Professional Education	1
Lesson: 2	Classifications of Profession	3
Lesson: 3	Relations between Profession and Training	6
Lesson: 4	Technical Profession	8
Lesson: 5	Profession and Human Resources Related to Health Science	10
Lesson: 6	Engineering related Profession and Human Resource	13
Lesson: 7	Profession related to Agriculture/Forestry and Human Resource	16
Lesson: 8	Profession Related to Finance Sector and Human Resource	19
Lesson: 9	Tourism sector-related Profession and Human Resource	20
Lesson: 10	Teaching service related Profession and Human Resource	22
Lesson: 11	Public service sector based Profession and Human Resource	24
<b>Unit - 2</b>	<b>Employment, Training and Education</b>	<b>26</b>
Lesson: 1	Introduction and Importance of Regional and National level Employment	26
Lesson: 2	Types of General and Professional Training	28
Lesson: 3	Technical Education and Vocational Training	31
Lesson: 4	Technical Education and Vocational Training Institutions	33
<b>Unit - 3</b>	<b>Information about Employment</b>	<b>38</b>
Lesson 1:	Sources of Information for Regional and National Level Employment	38
<b>Unit -4</b>	<b>General vocational skills</b>	<b>42</b>
Lesson: 1	Introduction and Importance of General Vocational Skill	42
Unit - 5	Kinds of Business	45
Lesson: 1	Small, Medium and Large Scale Business	45
Lesson 2:	Basic Elements of Business Operation	47
Lesson: 3	Businesses Operating at Local Level	49
Lesson: 4	Selection, Management and Operation of a Business	51
<b>Unit - 6</b>	<b>Trade and Market Management</b>	<b>53</b>
Lesson: 1	Relationship between Trade and Business	53
Lesson: 2	Searching of Trade and Collaboration Skills	54

Lesson: 3	Modernization of Trade Skills	56
Lesson: 4	Search for Agricultural Based Trade and Collaborative Skill	58
Lesson: 5	Price Fixing Techniques of Goods and Services	60
<b>Unit - 7</b>	<b>Vegetable Farming</b>	<b>62</b>
Lesson 1:	Seasonal and Off-seasonal Vegetable Farming	62
Lesson 2:	Organic and Chemical Fertilizer	64
Lesson 3:	Vermiculture	<b>67</b>
Lesson 4:	Method of Compost Preparation	69
Lesson 5:	Introduction and Use of Drip Irrigation	71
Lesson 6:	Seasonal care and management of kitchen garden	73
Lesson 7:	Protection from Harmful Diseases and Insects	<b>75</b>
<b>Unit - 8</b>	<b>Fruit Cultivation</b>	<b>77</b>
Lesson 1:	Fruit Nursery	77
Lesson 2:	Identification of Local and Improved Fruit Varieties	79
Lesson 3:	Time and Method of Fruit Harvesting	81
Lesson 4:	Method of Fruit Preservation	82
Lesson 5:	Tools and methods of picking fruits	83
Lesson 6 :	Local Technology of Fruit Storage	84
Lesson 7:	Method of Packaging and Transportation	85
Lesson 8:	Diseases and Insects on Fruits and Control Method	86
<b>Unit - 9</b>	<b>Dry Vegetables, Fruits and Food Materials</b>	<b>87</b>
Lesson 1:	Production, Processing and Storage of Dry Vegetables	87
Lesson 2:	Production, Processing and Storage of Dry Fruits	89
Lesson 3:	Introduction and Study of Recipe	91
Lesson 4:	Production Processing and Safe Storage of Pickle, Chuck, Tofu, Chhurpi and Juice	94
Lesson 5:	Production, Processing and Safe Storage of Turmeric, Ginger and Masyaura	97
<b>Unit - 10</b>	<b>Flower and Medicinal Herbs Farming</b>	<b>100</b>
Lesson 1:	Flower Cultivation	100
Lesson 2:	Medicinal Herb Farming	103
<b>Unit - 11</b>	<b>Livestock Care</b>	<b>108</b>
Lesson 1:	Sheep, Goat and Chyangra (Mountain Goat) Rearing	108

Lesson 2:	Cattle Farming	114
Lesson 3:	Poultry Farming	119
Lesson 4:	Swine Farming	124
Lesson 5:	Fish Farming	128
Lesson 6:	Bee keeping	132
<b>Unit: 12</b>	<b>Craftmanship</b>	<b>135</b>
Lesson: 1	Preparation of Different Things from Paper	135
Lesson: 2	Origami and Kirigami	140
Lesson: 3	Preparation of Materials from Bamboo, Straw, Wheat straw and Grass (Babiyo)	144
Lesson: 4	Preparation of Materials from Waste Object	146
Lesson: 5	Simple Carving on Wood and Stone	149
Lesson: 6	Coloring Works on Prepared Objects	151
<b>Unit: 13</b>	<b>Clay Works</b>	<b>152</b>
Lesson: 1	Preparation of Different Geometrical Shapes from Clay	152
Lesson: 2	Preparation of Fruits, Vegetables, Animal and Household Materials from Clay	154
<b>Unit: 14</b>	<b>Sewing and Knitting</b>	<b>156</b>
Lesson: 1	Decorative sewing Stitch	156
Lesson: 2	Method of Making Handkerchief	159
Lesson: 3	Hand Knitting	160
Lesson: 4	Fabric Painting	162
<b>Unit: 15</b>	<b>Local Technology</b>	<b>164</b>
Lesson: 1	Interrelationship between Local and Modern Technology	164
Lesson: 2	Safety Measures of Daily Used Equipment	166
Lesson: 3	Principles of Some Indigenous Technologies	168
<b>Unit: 16</b>	<b>Modern Technology</b>	<b>170</b>
Lesson: 1	Utilization of Electricity in Household Purposes	170
Lesson: 2	Modern Household Equipment and their use	174
Lesson: 3	Introduction of Technology and its Importance	178
Lesson: 4	Radios, F.M., and Television Broadcasting Process	179
Lesson: 5	Computers as a communication Device	182
Lesson: 6	Alternative Energy	187

**Profession and Professional Education**

Professions have evolved with the progress of civilization, science, technology and society. Professional education, training and technology are required to modernize our professions. Some common professions in Nepal are construction, medicine, agriculture, forestry and teaching sectors. Likewise, tourism, finance, and public service sector are also considered as the prime professions in Nepal.

We can group and each sector professions of each sector into three levels: basic, mid and high or specialized levels. For example, Village Health Worker (VHW), Maternal Child Health Worker (MCHW), Assistant Health Worker (AHW), Assistant Nursing Midwife (ANM) etc. are the basic level professional workers in medicine. Health Assistant (HA), Staff Nurse, and Lab Technician etc. are mid level professionals whereas and Doctor, Lab Technologist, Surgeon, and Specialists etc. are high level professionals.

Professions differ from one another depending on their sector, level, and nature. But, commonality of all professions is the requirement of competent, skillful and creative persons. It requires profession related study and training that people build their capacity and skill to fit themselves into their chosen professions. For this, study programmes and trainings are designed based on the subject area, level and nature of each profession. For example, a VHW should take up six month training, and an AHW requires ten-month training in their professional field. Likewise, an HA must study and get trained for at least three years while a doctor needs at least five years of study and training.

This kind of profession related study/training is known as professional education. Which provides us necessary theoretical knowledge and practical skills to involve ourselves in the chosen professions.

**Need and Importance of Professional Education**

Professional education refines our profession. It provides people updated knowledge, skills and competence needed for their profession. This would enable people involved in production sectors to produce goods of high quality. Those working under service sectors can better deal with their clients or service holders supported by relevant training and exposure.

Therefore, there is a high demand of professional education worldwide. For example, it receives high priority in Japan, South Korea, America, and European countries. It is a key factor behind their progress. On the contrary, many countries still hold the status of either underdeveloped or developing countries because they have attached

with less emphasis on professional education. Moreover, professional education prepares competent and skillful human resources. Such professionals have high demands in international job markets such as Arabian, European and Asian countries.

In short, professional education offers many-fold benefits to individuals and their professions. People get profession-relevant knowledge and skills, which prepares them to polish and commercialize their profession. This would ensure their employments and income for survival. Furthermore, it enhances their capacity to start and run their own business and thus contributes to their overall career development. Without professional education, no capable and skillful human resources can be produced. This is why, professional education is highly necessary.

### **Activity**

Consult people involved in different professions in your family and community and share the information with your friends in the classroom.

S.No.	Name of Persons	Profession	Works related to Profession	Professional Education	Service holders
1					
2					
3					

### **Exercise**

**Answer the following questions.**

1. What are the main professions in Nepal? Name them.
2. Write the importance of professional education.
3. What is the difference between profession and professional workers?
4. Why is training essential for professional worker?
5. Why is it necessary for us to have professional education?



## Classifications of Profession

People get engaged on certain work, business or enterprise for earning their living. They are called professions. People adopt a particular profession as per their interest, capacity and skills. Each profession involves specific duties and tasks. For example, farmers engage on farming; teachers do teaching; and doctors treat patients. Some people follow the professions their forefathers did while others take up new professions for their livelihood. Therefore, we can classify professions into different types such as teaching, nursing, medical, agriculture based on their field. Such divisions can also be made depending on the level and nature of services involved in professions. Despite their differences, it should be considered that all professions are equally important, and deserve equal respect. We should not regard one profession being inferior or superior to another profession. We must treat them equally.

Professions can mainly be classified into three different types as per the sector, level and natural of services:

1. Sector	2. Level	3. Nature of services
i. Agriculture and forestry	i. Basic level	i. Production oriented
ii. Construction	ii. Mid level	ii. Service oriented
iii. Medical	iii. Specialized or higher level	
iv. Teaching		
v. Tourism		
vi. Public services		
vii. Finance		

### 1. Sector wise Profession

There are different types of sector-wise professions. Agriculture, forestry, construction, teaching, medicine and tourism are some sectors. We can also group professions coming under a particular sector into different sub-sectors. For example, agriculture and forestry related professions have sub-sectors such as floriculture, pisciculture, horticulture, fishery, animal husbandry, herbal, forest etc. There are technical and non-technical professions in each level as well.

### 2. Level wise Profession

We can divide professions into three levels whether we talk about general professions or specialized ones. They are: basic, mid and specialized levels. People must have skills and knowledge that their levels of profession demand. Each level

is briefly described below:

### **(a) Basic level profession**

Professions that are essential for people to generate resources, money or goods to fulfill their daily needs are basic professions. These include works relating to farming, tailoring, black smith, cobblers, carpentry, animal husbandry, agriculture etc.

### **(b) Mid level profession**

These professions require more additional knowledge, skills and abilities compared to basic professions. Trained human resources are involved in these professions. It includes both technical and non technical human resources. They must possess minimum qualifications of proficiency certificate level or equivalent to it. For example, medium level technical professions include those who work as Health Assistant, Staff Nurses, Overseers, or Sub-engineers, Junior technicians, computer operators etc. Likewise, nontechnical jobs under this category are office assistants, non-gazetted officers, accountants etc.



### **(c) Specialized or high level profession**

Both technical and nontechnical jobs come under high level professions. Technical jobs in this category are engineers, agricultural specialists, doctors etc. Non-technical jobs include administrative officers, education specialists, sociologists, researchers etc. At least four years of professional education and training is required for a person to undertake these jobs. High level professionals are expected to solve any specific problems arising in their fields. This is why they are called experts as well.



## **3. Profession based on service nature**

Profession can be categorized in terms of the nature of services rendered. They include production and service oriented professions.

### **(a) Production oriented profession**

Production oriented professions are meant for producing goods. Agriculture,

industry, wood, stone carving, metal work etc. are some examples of production sectors. Carpenters, masons, painters, welders, designers, machine operators, loaders etc. get involved in these sectors.

**(b) Service oriented profession**

Service-oriented professions are focused on providing different kinds of services to people. Banking, teaching, hospitality, plumbing, electrical repairing are service sectors. Bankers, teachers, cashiers, doctors, shopkeepers, nurses are service providers. These professions are getting refined and modified along with a pace of development.

***Activity***

*Find different kinds of professions which people have adopted near your school and community. Classify the professions you found, present them in table and discuss them in the class.*

**Exercise**

**Answer the following questions:**

1. What do you mean by profession? What is its type? List them down.
2. How many professions are there as per their levels? What are they? Write them with examples.
3. Define production oriented and service oriented profession with examples.
4. What factors lead people to select their professions? Discuss.
5. Differentiate the basic and specialized/higher level profession.

Professional training is defined as a process of providing people necessary knowledge skills and competency to build their capacity to run any profession or occupation efficiently. These trainings could be of short or long term duration based on the nature of profession concerned.

We can not ensure quality of assigned tasks unless we are trained in our profession. For

instance, professionals under medical science could not render effective services to their clients without adequate training. Training provides people contents, knowledge, skills and capability required for their professions. In order to remain updated with new ideas and skills, we require refresher trainings relevant to our professions as well. Hence, regular training is essential to enhance quality of our professions and modernize and uplift our professions.



Moreover, professional training develops our skills. It refines our working style. With required skills and knowledge, we can conduct our profession confidently and effectively. For example, if we join carpenter training, we will be taught skills of making furniture such as measuring, cutting, drilling and painting of woodwork. This would enable us to prepare furniture items that our customers have demanded. Trained human resources can design and produce high quality goods, and offer effective services to their consumers. Thus, professional training polishes, refines, and upgrades our profession.

The relations between training and profession are point-wise presented as below point wise:

1. No profession can ensure quality and effective services without relevant trainings to human resources involved in it.
2. Relevant education and training, is required for any sector and level wise professions.
3. Training should be in line with relevant profession, and be focused on upgrading the profession.

4. Training provides subject matter, knowledge, skills and competence required for our profession.
5. Relevant advanced level trainings upgrade our professions.

Moreover, technical education and training have converted traditional professions into advanced ones by applying new concepts, technology and skills. For example, making and using mattock, spade, sickle etc are traditional professions. Mechanical engineering is the modern form of these professions. Unlike in the past, iron materials are produced in a short time period because of modern technology.

**Activity**

1. Complete the table below by asking people involved in technical professions in your community. Discuss it in the class.

S.N.	Name of technicians	Name of Profession	Training	Relation between profession and training	Remarks

2. Identify any five professions that are common in your community. Ask people involved in about trainings related to their professions. Discuss the conclusions in your class.

**Exercise**

**Answer the following questions.**

1. List down any two professions and explain how these professions and their relevant training are related.
2. What is the relationship between training and profession? Explain it with examples.

Technology is a system of producing a huge quantity of goods with minimum efforts and investment. People who have knowledge and skills of creating and handling technological devices are normally called technicians or technical human resources. It is the technical human resources who design and construct houses, bridges, aeroplanes, trains, buses including many other simple machines. They also serve the society as doctors, nurses, engineers etc. The kinds of professions that require technical human resources and the use of different kinds of technology are called technical professions. People require having technical knowledge and skills relevant to their chosen professions to get engaged on these professions. There are courses on technical education and training packages for this.



Technical professions have diverse areas involving different specific jobs and categories within them. For example, mechanical engineering is a technical profession under the construction sector. Welding is one job related to this sector. Welding, further, includes sub-categories like gas welding, arch welding, tig-bhig welding, overhead welding and so on. Another example is the medical field. Doctor are technical professionals under it. As per their field of expertise, they can be related to different sub-sectors such as ear, nose, throat, neuro, surgery and heart. In other words, they would get specialized in different sectors.

One technical profession differs from another in terms of its sector and level. In the medical sector, Assistant Health Worker (AHW) is a basic level professional. Health Assistants (HA) are mid level and the doctors are the high level professionals.

### **Importance of Technical Profession**

Technical professions involve the use of technology and technicians. Each component has its own roles. Technology makes our life comfortable and fast. We can solve complicated problems in a short period of time by using technology. Similarly, we cannot imagine modern society without technical human resources such as nurses, doctors, electricians, mechanics, engineers, farming experts etc.

The growth of technical professions enables individuals to generate income for their survival. Many doors of employment opportunities open up in production

and service sectors when such professions flourish. In order to cash them, people equip themselves with proper knowledge and skills. Those who are already involved in certain technical professions refine and update their skills through trainings and experiences. Such skilled people do not remain unemployed. For example, nurses, electricians, auto mechanics and plumbers are highly demanded in national and international job markets. So, people can not only secure their livelihood, but also improve their living standard with technical professions at hand.

More technical professions in a nation could mean more technical human resources there. A country marches forward in the path of development rapidly with their technical knowledge, skills and expertise. It is possible to produce daily consumable goods within the country. Basic services in health, construction, repairing and other service sectors become easily available to people.

**Activity**

Consult three persons involved in technical professions in your community. Complete the following table asking the technical persons. Discuss it in the class.

S.N.	Name of technician	Name of technical professional	Technology used	Importance of the profession
1				
2				
3				

**Exercise**

**Answer the questions below.**

1. What is technical profession? Illustrate it with examples.
2. How are technology and technical profession related? Explain it with examples.
3. Why is technology important? Explain.
4. Choose any technical profession. List out technology and technicians involved in that profession. Also, write down points related to the importance of that profession.
5. How is technical profession important? Justify it with examples.

People go to nearby health centers or hospitals when they become sick. For this, health organizations are established in villages and towns. Health workers and doctors work in such institutions to look after sick people. It is a field of health science. This sector includes different professions at given levels. For example, a basic level profession includes that of Assistant Nursing Midwife (ANM) and Assistant Health Worker (AHW). Likewise, the jobs of Senior Assistant Health Worker (CAHW), Staff Nurse, Health Assistant etc. are considered medium level professions. Doctors, radiologists, physio-therapist, etc. are higher level professionals in this field.

Health science has different sub-sectors, each having specific professions within them. They include nursing, general medicine, laboratory, pharmacy, homeopathy, natural medicine science etc. In this chapter, we only talk about basic and medium level professions involved in nursing and general medical sectors. We also provide professional, educational and market related information about the job of a health assistant.

### 1. Nursing Profession

Nursing is one of the major technical professions under health science. The jobs of Assistant Nurse Midwife and staff nurse are basic and medium level professions respectively. Nurses care of sick people. Their major duties include: checking patients' blood pressure; taking their body temperature; serving them medicine; and provide maternity care and pre and post-natal care. They also provide health and sanitation related counseling to community people. For this, they also organize door to door visits. They offer home based services for managing child birth in rural areas. In case, pregnancy and child birth appear to be difficult for women, they advise her to get admitted to hospital in time. Nurses mainly carry out duties of this sort.

Nursing Profession- related Information

Nursing profession related educational information is provided in the table below:

SN.	Job title	Entry qualification	Subject areas and jobs	Duration	Degree/ certificate awarded
	ANM	10 class completed	body related knowledge; Pre and post natal care; managing child birth; medical support, medication	2 years+ 5 months and work experience	Technical SLC



2	ANM	SEE completed with prescribed grade in different subject	Human body, managing delivery, pre-natal care and post natal care.	15 months + 3 months and work experience	Technical SEE
3	Staff nurse	SEE completed with prescribed grade in different subject	Human body related knowledge; Pre and post natal care; managing child birth etc.	3 years	Proficiency Certificate level in Nursing

## 2. General Health Service Profession

Health sector services are considered major technical professions. Assistant Health Workers (AHW)/Community Medical Assistant (CMA) are basic level professionals whereas Health Assistants (HA) hold medium level positions in this field. CMAs and HAs examine general patients, offer them health related advice and medicine. They also conduct door to door visits to provide primary health services to community people. While any serious illness cannot be cured at home, they advise family members to take patients to hospital.



AHWs can become Senior AHWs by upgrading their qualifications through training and experience. For example, an AHW must take up 2.5 years' course after they get through Grade X. They get the qualification of Technical SLC. For becoming Senior AHWs, they should acquire a diploma level certificate with 3 years' plus 10 month's training of AHWs. In case of HA, an SLC level qualification is required for the entry and the course is of three years.

### Educational information

Educational and training requirements and other relevant information regarding general health sectors are provided in the table below:

<b>Profession</b>	<b>Entry qualification</b>	<b>Main subject</b>	<b>Duration</b>	<b>Degree awarded</b>
1. AHW	10 class completed	Medication, disease diagnosis and advice/counseling	2 years + 5 month's work experience	Technical SLC
2. AHW	SEE completed with prescribed grade in different subject	Community medication, treatment, diagnosis and counseling	15 months	Technical SLC
3. SAHW	AHW + 6 months training and work experience	Community medication, treatment, diagnosis and counseling	AHW + 10 months training 3years	Diploma level
4. Health assistant	securing atleast overall GPA'2' with at least C grade in compulsory Math, English and Science	General treatment	3 years'	Proficiency certificate

### **Activity**

Consult AHW/CMA, Senior AHW and HA working in your community. Collect various information about their profession as per the points given below. Discuss the outcomes in the class.

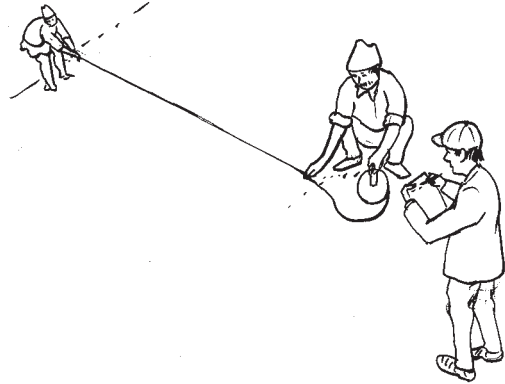
- a) Profession related information
- b) Main jobs and responsibilities involved in the profession
- c) Qualification requirements and duration
- d) Prospective areas for employments
- e) Conclusion

### **Exercise**

1. What are community level basic professions under health sector?
2. List out four major duties to be performed by AHW and ANM. Describe each of them briefly.
3. Briefly introduce staff nurse and health assistants. How do they differ?

## Profession and Human Resource related to Engineering

You must have seen people building a house, a school, a road or a bridge etc. One person can not do all sorts of work involved in it. Some set up a wall. Some mix up cement, gravels and sand to prepare raw materials to set them on the wall or on the floor. There are others who measure and fix (land) sections to build different parts of the house like rooms, doors, corridors etc based on the predesigned map. These are the basic professions under Engineering Civil, Mechanical, Architect, Information Technology, electronics etc. are the jobs under engineering profession. Some engineering related human resources are discussed below:



### 1. Land Surveyor:

In your locality, you might have seen some people who measure land plots and roads with measuring tapes. With the help of blueprint (map), they find out border points in all four directions of the land plot, and then calculate or check its area. When land area and boundaries are clear, selling and buying of land becomes easier and debate-free. Special skills are required for them to measure land area and keep its record. Persons with a training course on basic survey can do these tasks. They are called surveyors; and AMIN in Nepali.

### Educational Information

The educational information for the surveyor is presented herewith .

Entry level qualification	Subject included	Duration	Certificated awarded
SEE completed with prescribed grade in different subjects	Survey	1 year + 3 month work experience	Technical SLC

Note: The estimated cost may vary according to technical institution, private training center and locality.

### 2. Sub-overseer

Take a close view as to how construction work of a building goes on. You can see the land plot divided into different parts for constructing a building. It is done as per the

map designed before construction work starts. You can also see people measuring and setting walls as the work progresses. There are technicians who guide their co-workers as to what ratio they should mix up cement with sand. People who have skills and knowledge to carry out these tasks are called sub-overseers. They are basic human resources under the engineering field. As per their study area, there are sub-overseer on different sectors. Let's see different information about sub-overseers in the tabular form below:

SN	Areas of study	Entry level qualification	Subjects included for studies	Duration	Certificate awarded
1	Sub-overseer building	SEE completed with prescribed grade in different subjects	survey, drawing, construction science, construction related practical subjects	2 years+5 month work experience	TSLC
2	Sub-overseer: drinking water, and irrigation	SEE completed with prescribed grade in different subjects	survey, drawing, construction science, construction related practical subjects	2 years+3 year months	TSLC

### 3. Overseers or Assistant Engineers

Construction work of a house, a bridge or a school starts only after designing their appropriate maps. People involved in designing such maps and inspecting whether or not the construction work is going on as per the designed maps are known as overseers. The qualification acquired by overseers is regarded as a diploma or proficiency certificate level. Civil, mechanical and electrical overseers are some common branches within this field. It is a medium level job in the engineering field.

#### Educational information

SN	Areas of study	Entry level qualification	Subjects included for studies	Duration	Certificate awarded
1	Diploma or Certificate level (civil)	10 class completed	survey, drawing, road estimation, management	3 years	Diploma in civil engineering certificate level

2	Diploma or Certificate level (mechanical)	10 class completed	Technical drawing, construction science, machine and construction technology, management	3 years	Diploma/certificated level in Mechanical engineering
---	---	--------------------	--	---------	--

Besides, the above mentioned areas, electrical, computer engineering, electronics, architecture and information technology are fields within the overseer profession.

### ***Activity***

Consult sub overseers, overseers and land surveyor working in your locality. Based on it, prepare a short report including the following points:

- (a) Name of the profession
- (b) qualification required for the professions
- (c) main subject area studied
- (d) tasks performed
- (e) degrees earned

### **Exercise**

Answer the following questions.

1. What kinds of work do land surveyors and overseers do? Write down their differences.
2. List out the tasks of an overseer.
3. Make a list of different information (educational qualification, duration etc.) related to the posts of a land surveyor, a sub overseer and an overseer.

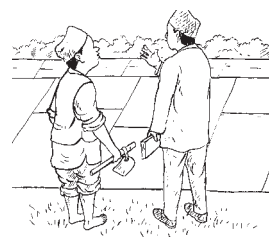
## Lesson: 7 Professions and Human Resource related to Agriculture, Forestry

You must have observed farmers transplanting rice plants, caring of them, and irrigating their fields. There are a number of jobs for farmers to do during cultivation. They must know how to use fertilizers to ensure proper growth of plants. They should have knowledge of using pesticides against pests and insects. Farmers must provide proper fodders to their animals. Sometimes, the animals they rear might become sick, and they have to give them medicine. It is not possible for them to have technical knowledge and skills to do all kinds of jobs. There are agriculture related technicians to support them in these matters. These technicians offer farmers valuable advice and guidance on seeds, farming time, fertilizers, and proper use of pesticides and rearing domestic animals as specified above. In agriculture field too, there are technicians with positions from basic to high levels. Junior Technical Assistant (JTA) is a basic job while Junior Technician (JT) is a medium level human resource.

### 1. Agriculture-related Profession and Human Resource

#### (a) Junior Technical Assistant (JTA)

A Junior Technical Assistant (JTA) is a technical human resource involved in agriculture profession. A JTA provides technical advice on solving farming related problems. As far as livestock farming is concerned, it is JTAs that farmers consult for treating their sick animals. Unless they are timely treated, animals might die. Nowadays, JTAs are also regarded as veterinary health workers (VAHW). In addition to livestock's treatment, they also offer farmers helpful advice on ways of farming, tackling diseases of crops, types of seeds needed, caring of plants/crops etc. Thus, JTAs are basic level technicians who support farmers in farming and managing farm animals.



Important information related to JTA is presented herewith.

S.N.	Study Area	Entry level qualification	Core subjects	Duration	Degree earned
1.	JTA (livestock)	Grade 10 completed	Animal Health etc.	15 months	Technical SLC
2.	JTA (Animal science)	Grade 10 completed	Animal Health etc.	2 year + 5 month work experience	Technical SIC

#### (b) Junior Technician (JT)

Junior Technician (JT) is a medium level technician involved in the agriculture field. JTs basically support farmers by giving them proper advice on irrigation system,

controlling pests and managing seasonal seeds for them. The following table contains information relevant to JTs:

## 2. Forestry related Profession and Human Resource

SN	Study area/ field	Entry level qualification	Core subject areas	Duration	Degree earned
1	Proficiency certificate intermediate in (botany) or diploma	SEE completed	- agronomy - horticulture - floriculture	3 years	ISC or diploma in agriculture
2.	Diploma or Intermediate level in veterinary/ animal science	SEE completed	Veterinary and other related subject	3 years	ISC or diploma in animal science
3.	Intermediate level or Diploma (Food and Dairy technology)	SEE completed	Dairy production and processing	3 years	ISC or diploma (food production and dairy technology)

A number of technical professionals get involved in order to save and care forests. Some of them are forest guards, rangers and forest experts. Them of, forest guards and rangers are basic and medium level human resources respectively. They work for forest and natural resource management.



Information related to forester and rangers are provided in the table below:

SN	Study area/ field	Entry level qualification	Core subject areas	Duration	Degree earned
1. Ranger	Diploma and Intermediate level (forestry)	SLC Passed	Forest management	3 years	Diploma or Intermediate level

2. Forester	Technical SLC  (forestry)	SEE completed with pre- scribed grade in different subjects	1 year	Forest man- agement	Technical SLC
----------------	------------------------------------	---	--------	------------------------	------------------

### **Activity**

1. Visit agriculture and forest service related offices. Prepare a report on services provided by these offices.
2. Consult persons who have studied agriculture and livestock science. Make a report including major information related to them.
3. Make a list of professions and job responsibilities related to the management of forest and discuss it in the class.
4. Discuss with a forester, and a ranger working in your locality. Make a report including relevant information about these professions.
5. Visit a forest office at a local level. Discuss with the concerned persons and prepare a report including these headings.
  - a) Name, post and job responsibility of staff members involved in forestry sector.
  - b) Minimum qualification required for these posts
  - c) Learning generated from the visit and discussion.
  - d) Conclusion

### **Exercise**

#### **Answer the following questions.**

1. What are common job titles in a forestry sector? Describe each of them briefly.
2. Which subjects should be studied to become a forester and a ranger?



Offices, co-operative organizations and industries employ staff members to work as managers, finance directors, officers, accountants, assistant accountants etc. These are common job titles in finance sectors. This unit discusses job related information about an accountant and an assistant accountant, who are medium level human resources in this sector.

### 1. Assistant Accountant

An assistant accountant keeps the record of income and expenditure of an organization, a business firm or an industry. An SLC level qualification is required for anyone to be eligible for this job. Besides this, they must have adequate knowledge and skills for performing finance related tasks as specified above. They gain such skills through training and experience. Government offices and private organizations employ assistant accountants to support the accountants in the office.

### 2. Accountant

Business houses, offices and organizations maintain book-keeping of their financial transactions. They keep records of income and expenditures in day books and post them into ledgers. To be accurate, they prepare balance sheets, trail balance and maintain other financial records as required. In addition, they also prepare a stock list of office equipment and goods. Skilled people are required for doing these jobs. It is by employing accountants that offices and company maintain their accounting and stock. Accountants are medium level professionals in finance sectors. A higher secondary or intermediate level degree with commerce background is the minimum academic qualification required for this job.

The important information related to the finance sector professions and presented herewith.

S.N.	Profession	Level of Study	Subject and area
1	Sub accountant	SEE completed with prescribed grade in different subjects	Account or Economics is SEE
2.	Accountant	Proficiency certificate level or 10+2 passed	Commerce

### Activity

How do offices and business houses keep record of their income and expenditure? Discuss and make its list.

### Exercise

Answer the following questions.

1. Mention the qualifications required for being an accountant.
2. Note down the job responsibilities of an accountant and an assistant accountant.

## Lesson: 9 Tourism sector-related Profession and Human Resource

Have you ever participated in an educational tour ? Have you visited historical or religious places Kathmandu ? Indeed, we travel to many places for fun, entertainment and gathering knowledge. Like us, foreigners also travel from one place to another. Some of them do it for enjoying natural scenes. Some want to gather historical, cultural and religious information about new places. Some others visit these for religious and study purposes. Such visitors are called tourists. In new places, tourists require various services such as food, lodging and people to guide them. Tourism business addresses this need by providing services and human resources to tourists. Some professionals related to tourism sectors are termed as a cook, a porter and a tourist guide.

### 1. The Cook

The cook is a professional involved in a tourism sector. The posts of cooks can range from basic to high levels. Cooks prepare different varieties of food items in hotels. In order to join a course for cooks, one needs to have either SLC or Grade X level qualification. the other important information regarding cook has been given below:

Entry qualification	Study Area	Duration
SLC passed/ SEE completed with prescribed grade in different subjects	Preparation of various dishes	2 years + 4 month cook experience
Grade 10 completed	Preparation of various dishes	1 years

The cost and duration of the cook study can also depend on the needs and demand of the hotels.

### 2. Guide

While we reach a new place as tourists, there must be someone to give us detailed descriptions of culture, customs, tradition, language common to that place. Tourist guides are there to help us in this matter. They provide tourists with such background information; guide them to reach their chosen places. They provide proper suggestions for tourists regarding different tourist destinations if they have no idea about it. Obviously, a tourist guide must have good background knowledge of history, geography and



cultural matters of places that tourists are interested in. Apart from this, he must be able to communicate with tourists in their languages. It is good to learn English, French, Japanese, Russian, Chinese and German languages because most tourists speak one or more of these languages. A person must have one year course after his or her SLC degree to be a tourist guide of basic level.

The information related to guide is given below:

Languages to have studied	Required qualification	Duration
English, Japanese, Russian, Chinese, Germany, French	SLC passed/SEE completed with prescribed grade in different subjects	1 year

### ***Activity***

1. Visit restaurants or hotels near your school. Discuss with cooks. Or, study the relevant materials to find out what tasks cooks should do. List them out.
2. Discuss with a tourist guide working in your community. Also, study the relevant material. List their job descriptions.

### **Exercise**

**Answer the following questions.**

1. What are the two major professions in tourism sectors described in this unit? Write about them briefly.
2. What kinds of professions are a cook and a guide? Explain them with examples.
3. Make a list of works to be done by a cook and a guide separately.

Students obtain information and gain knowledge of diverse fields from different sources. Teachers are one of the major sources for their learning. People involved in teaching profession are identified as teachers, facilitators, Gurus, professors and so on. The profession that helps to develop knowledge, skills and attitude to other is known as Teaching profession. It has been regarded as a very holy and respectful work. In Nepal, there are pre-primary, basic, secondary and university level teachers. Since teachers help students to acquire knowledge, good habits and practical skills, they deserve respect in the society. In this lesson, we shall briefly discuss the jobs related to teaching profession.

### **Facilitator**

Teachers who facilitate classes in child development centre, pre primary schools and non formal education are called facilitators. Facilitators are of two types:

#### **(a) Facilitator in Child Development Centre**

We can see small children singing, playing dancing and learning at early child development centers in our community. Persons who guide and help them to play and do different types of activities are called facilitators at pre-primary level.

#### **(b) Non formal Education Facilitator**

Some children drop out from their schools while others do not get admitted to school. Several reasons such as poverty, lack of schools and family conditions are responsible behind this problem. In order to ensure all children's access to school education, alternative programmes are in place. Mostly, non formal education system is adopted in a country to address this problem. This system includes a wide range of programmes such as adult literacy class, child education, female education etc. For facilitating these programmes, we need skilled and trained human resources. People who conduct such programmes are called non formal education facilitators.

### **Information related to Teaching Profession**

Teaching profession has got specific posts and ranks. We must have qualifications and training as specified in the country's education acts and policies to become a teacher at given levels. Look at the table below which give of details level-wise educational and training requirements for teachers.

S.N.	Teacher level	Qualification	Training and work Experience
1	Basic level teacher a) Class 1-8	Intermediate or equivalent	Ten month training, IEd. or Ten month training
2	(a) secondary level (9-10)	Bachelor's degree in related subject and trained with a teaching license	Ten months' training or Bachelor's degree in Education
	Higher secondary level (11-12)	Master's degree in related subjects	Training not mandatory
3	Facilitator in early child education	8 class passed, married woman	16 day training in related subject
4	Facilitator in non formal education	8 class passed	6-12 day training in related subjects

### **Activity**

1. What are teaching related professions in your community? List them out and discuss in the class.
2. Complete the following table with relevant information about teachers and facilitators in your community.

Teacher/ Facilitator's name	Qualification	Level	Training	Estimated study cost

### **Exercise**

#### **Answer the following questions.**

1. Briefly describe the teaching related professions with examples.
2. What kind of profession is teaching? Mention any two works of a teacher.
3. What does a facilitator do? Write down any two jobs of a facilitator.
4. Write down two similarities and two differences between a facilitator and a teacher.

**Lesson: 11****Public service sector related Profession and Human Resource**

Government offices and public corporations provide us basic services of different kinds. Our Village and municipalities keep records of births, marriages, deaths and migrations of their respective residents. They issue marriage certificates, recommendation letters for citizenship certificates, house construction permission letters etc to the concerned people. Nepal Electricity Authority (NEA) carries out the jobs of setting up electrical poles, wires, and meter reading in our locality. Similarly, Nepal Food Corporation ensures proper supply and delivery of food items in different parts of the country, especially the remote areas. These kinds of services provided to general people are called public services. For performing such administrative jobs, the government offices require human resources with different skills, capacity and levels. Some posts are the office head, the director, officers, the assistant staff, office assistants etc. This lesson describes the jobs of office assistant.

**Introduction and work of Office Assistant**

First class non-gazetted staff (Nayab subba) and second class non-gazetted staff (kharidar) are the office assistant level posts in government and public offices. Their job mostly requires them to keep records of letters, memos; dispatch letters; maintain files of office documents, prepare meeting minutes; assist the office chief and ensure direct services to the public. Every office provides detailed descriptions (TOR) of job duties to its staff members are below.

S.N.	Post of Assistant	Qualification	Study subject/areas
1.	Kharidar	SEE completed with prescribed GPA	The qualification from any subjects are acceptable in administrative sector. Technical post required the respective field of study.
2.	Nayab subba	Proficiency certificate level or 10 + 2 passed	The qualification from any subjects are acceptable in administrative sector. Technical post required the respective field of study.

Note: The cost of study for the above posts depends on type of college or school {private or public}, study place and subject.

**Activity**

1. Make a list of different jobs related to public service sector which are common in your locality.
2. Visit a government or nongovernmental office nearby. Discuss with at least two staff members involved in public service and prepare a report based on the given points:

- a) Descriptions of services under public service
- b) Descriptions of posts of assistant level staff members
- c) Job descriptions of the assistant level staff members
- d) Qualifications, training, salary and study cost for the mentioned posts
- e) Learning from the study visit
- f) Conclusions

### **Exercise**

**Answer the questions given below.**

1. Define the jobs related to public services with examples.
2. What kind of job is an office assistant? Mention any four job responsibility of this post.
3. What are the minimum qualifications required for 'Nayab Subba and Khaidar'?

**Introduction and Importance of Regional and National Level Employment**

In our locality, some people get engaged on household works while others work at government or non-government organizations. Some run business, some do farming, some work as priests, and some people tame domestic animals for their livelihood. Some people get involved in making goods from bamboo strips, iron wares and sell them in local markets. Many others work for these entrepreneurs or businessmen as wage-laborers. All these works come under professions. Profession enables us to manage resources and earn money for running our daily life.

Employment is a means of generating income. Employed people get engaged on certain work. Teachers teach at schools. Doctors treat patients at hospitals and clinics. Health assistant and nurses take care of sick people. Pilots fly aero planes. Drivers drive buses or cars. They all get paid for what they do. They can spend their earning on their health, children's education, improving their living conditions. On the contrary, some people do not get these kinds of jobs even after reaching the active age of generating income. The state of being not engaged on in any jobs is called unemployment.

Some people work for others. If people are employed by government offices, private institutions, factories, they are called staff members or employees. There are many people who do not work as staff members in others' office, factories. Instead, they create jobs for themselves. For example, hotel entrepreneurs run hotels; industrialists run factories; and some people run home based enterprises like cottage industries. From these professions, they generate income by themselves. This is called self-employment. People who run their own business to generate income are called self-employed people. Many reputed businessmen and industrialists in the world are products of self-employment. Bill Gates, Dhiru Bhai Ammani, Mahabir Pun, etc. remain in the list of such successful persons in the world.

In short, employment is a state of being employed in certain jobs or professions at home, offices or factories for generating income.

**Regional Level Employment**

Employment opportunities that we get at a particular part of our country are called regional level employments. Every region can have a unique landscape, natural resources and infrastructures to generate job opportunities for its people to engage on. While we take an example of farming, cardamom farming is done in certain parts of Koshi and Mechi zones. Apple farming is done in high hill districts like Manang, Mustang and Jumla. Professions such as tourist guides, mountain



climbing, trekking are common in mountainous region of Nepal. These are regional level jobs. These kinds of jobs promote economic, social and cultural growth of local people. Professions like cardamom and tea farming, tourism enterprise, apple farming have economically benefited local people of the specified regions. This has resulted educational, social and economic progress of that region. These professions are key to improving living standards of the concerned people.

### **National Level Employment**

Diverse professions based on health, education, industry, peace and security sectors are regarded as national level professions. Nationally, Nepal has high prospects for setting up industries and running business related to hydro, tourism, herb production and processing sectors. As national level employment covers the entire country, they have their own features and benefits. They are meant for developing a country as a whole, and improving economic, social and educational status of all the people living there.

### ***Activity***

1. Interact with fifteen employed people in our community. Ask them about their jobs. Divide them into two groups: self employed and employed for other offices, industries.
2. After preparing the list as mentioned above, consult with your teacher. Find out which are regional and which are national level professions.

### **Exercise**

#### **Answer the following questions.**

1. What do you mean by unemployment? What happens if people are unemployed?
2. What are the advantages of regional level professions? Discuss.
3. What kind of employment is regarded as national level employment? Mention it briefly.
4. Write down the similarities and differences between regional level and national level employment?

In order to join a job/profession of our choice, we must have knowledge and skills relevant to it. For example, if it is a technical job, we must first have an idea of the tools and equipment used in it. We should also acquire skills of handling them in safe manners. It is through training that we can gain such skills and knowledge. Having job related skills helps us to be employed easily, and it increases our income as well.

**Education and Training for Employment**

Education and training are prerequisites for employments. Most of the private and government sector jobs require us to attain certain level of educational qualifications to join them. The higher the qualifications, the better will be our chances of being employed. It is because the educated people obtain knowledge by studying various subjects related to their professions. In addition, they have better communication and problem solving skills. They are well informed of world's events, culture, history, life style and scientific knowledge. Education also equips people with knowledge and skills to handle their day to day practical problems: maintain records of their income and expenditure, deal with shopkeepers, know and handle tools etc. This kind of knowledge prepares us to get employed easily.

Meanwhile, only having educational degrees is not enough for being employed. We can see so many degree holders without jobs in Nepal. It is because they have only bookish knowledge. They lack practical skills necessary to get involved in their chosen profession. Therefore, along with education, we must acquire practical and technical skills. It is through continuous training and exposure that we gain such skills. Hence, training is equally necessary for us to cash job opportunities.

**General Education and Vocational Education and Training**

We have got two types of school education system: General and Vocational. In general school, there is emphasis on teaching general courses while vocational schools stress on vocational courses. Some vocational subjects are also taught within general schools. Mostly, subjects based on language, mathematics, science, social studies, moral education are taught under general courses. Vocational courses include subjects such as occupation and business, accountancy etc.

General education imparts knowledge, skills and information required for our life. Language course prepares us for effective communication. Science helps us to understand the way nature works and gives us varieties of information about our surroundings. Mathematics equips us with skills of counting and calculating needed in our daily life, for example, buying or selling things. We get knowledge and information about our society, life style, history, geography etc. from social studies. Moral education teaches us manners and ethics such as respecting seniors, loving juniors, showing empathy to the poor, helping others etc.

Vocational education teaches us importance of skills, prospective jobs, safety measures, and ways of performing tasks involved in our professions. Training enhances our knowledge and skills of adopting a stepwise procedure while performing a certain task; identifying, handling, repairing, utilizing and storing tools and equipments required for that task. Vocational education, thus, sets a foundation for any person for his or her profession. It helps them to choose any profession in future or start their own business.

Training is a process of learning skills that we don't have. It is also teaching of skills to others. Training is conducted to impart special skills to people as per their needs. For any training to be successful, trainees must be positive towards learning these skills. Trainings can be of different durations as per their objectives. We take trainings in any areas that are useful for our daily life and work. Trainings can also be taken for earning a livelihood. People also take vocational trainings to cash job opportunities. Some training helps us to be self employed, or start our own business.

### **Types of Training**

There are certain institutes that provide trainings. We can also learn skills informally. We learn certain skills by observing how other people work. For example when we work with a skillful person, we can learn skills involved in the work. We can obtain training as interns or trainees in an industry. We get theoretical knowledge and information required for different jobs in the classroom. But, we get practical skills at well-equipped institutions, actual industries and offices. Based on objectives, we can categorize trainings as follows:

#### **a) General Training**

We take general training to acquire knowledge of any subject we require. For instance, any training that provides us knowledge on co-operative management and its legal procedures comes under a general training.

#### **b) Skill based Training**

Most of the trainings are meant for providing skills to participants. Such trainings are called skill based trainings. They are of three types:

##### **(1) Income Generating Training**

Training that equips participants with skills of earning a living are called income generating trainings. The skills that participants acquire enable them to make their life comfortable as they would utilize the acquired skills to generate income. Candle, pickle and papad making trainings are the examples of such trainings.

## **(2) Job-oriented Training**

Job focused training programmes are those which prepare participants for getting employment opportunities at local, regional, national and international job markets. They also help them to be self employed. In other words, these trainings make participants skilled in their chosen fields, which enable them to get employed. These trainings are focused on imparting knowledge and skills required for a person to work in his or her chosen profession. Those who receive skill based trainings get employed in factories, industries, etc. This enables them to earn their living and uplift their living status.

## **(3) Self-employment oriented Training**

Trainings that enable us to create jobs for ourselves at local, regional, national or international job markets are self-employment oriented trainings. Participants acquire professional and entrepreneurship skills to be self employed. In other words, these trainings equip participants with knowledge and skills needed to work in their vocational areas. They inspire and motivate the trainees to get self employed. For example, they can run small-scale business, industry or factories of their own.

## **(c) Entrepreneurship (skills) Training**

Training that provide entrepreneurship skills to run business or enterprise are called entrepreneurship skill training. A wide range of contents are covered in these training. They include raw material management, firm registration process, accounting package, marketing management training etc. These sorts of training encourage us to explore our entrepreneurship capacity. They motivate us to start our own enterprises.

### ***Activity***

Are there people in your locality, Tole or village who have got tested their training skills for certification? Make notes of your findings and interact with your friends in classroom.

### **Exercise**

**Answer the following questions.**

1. How are job employment and education related? Explain.
2. What are the types of trainings? What is general training?
3. What do you mean by entrepreneurship business operation training? Explain.
4. What are the advantages of having self employment oriented training?
5. Can't we run business without training? Give reasons.

**Lesson: 3****Technical Education and Vocational Training**

In a society, there are people who acquire different types of education. Some get general education while others receive technical and vocational education. General education imparts us knowledge on diverse subjects. Technical and vocational education provides us skills that we need for doing our vocational job or work. Nowadays, vocational trainings are essential for every one because many jobs are based on technology and science. Technical and vocational trainings offer us required knowledge and skills to promote our enterprises, set up industries and factories; and thereby contribute to nation's development.

We have technical institutions, colleges and universities to teach many technical subjects such as construction work, nursing, agriculture profession, dairy production, pharmacy, x-ray technology, photography, electricity, land survey etc. This kind of education which involves teaching of technology related subjects is called technical education. There are different levels of education to become competent in technology. In technical subjects, theoretical knowledge and practical skills are equally important. Technical education can be of SLC, Intermediate, Diploma, Bachelor's and Masters' levels.

The purpose of technical education is to contribute to infrastructure development, development work, industrial production, maintenance and service related sectors by producing human resources with technical knowledge and skills for these jobs.

Technical education is essential for making human resources competent and capable for performing technical jobs at national and international levels. When we lack such human resources, planning, development works, industrial productions and other jobs as mentioned above cannot be carried out. For this reason, technical education is very essential at present.

There are various types of vocational works. They include constructing houses, caring and treating sick people, farming, processing herbs, pharmacy, radio repair, sewing and knitting, and so on. Vocational works also include taking x-rays, photography, electrical repairs, channel construction, driving. People require special skills to get involved in these jobs. Vocational trainings make people independent. They can earn a living by utilizing their skills.

Vocational trainings are the ones that are conducted for enhancing capacity and skills. They require these skills to run business, get employment or remain self-employed. These include trainings in engineering, health, tourism, development and management, farming and animal husbandry, forestry related fields. Vocational training involves teaching of practical skills to participants. Some level of theoretical knowledge is also provided.

Vocational trainings are essential for making human resources competent for doing skill-based work nationally and internationally. Trained and skilful human resources contribute to quality and standard work. So, vocational trainings are necessary.

The purpose of technical education is to prepare competent and skilful human resources needed for industry, development work and service sectors.

### **Activity**

1. What kinds of vocational works are performed in your locality? In what subject areas are these people trained on? Where do they get such trainings? Discuss it with the concerned people and make detailed notes in this regard.
2. What kinds of technical education do the people have in your community received? In which areas do they work? Ask your parents about it and make notes on it.

### **Exercise**

**Answer the following questions:**

1. What are the purposes of technical education?
2. What kinds of jobs are done by the people who got technical education? Write it briefly.
3. In which areas are the people you have met trained on? Make a list of such people and the trainings they have got.
4. Make a list of 10 vocational trainings. What kinds of jobs can people perform when they receive such trainings?

S.No.	Trained person	Name of Training	Works they have been doing

Schools and colleges for general education were started from many years ago. But, in the past there were not any institutions to provide technical education and vocational trainings and education. A technical college first was started in 2037 B.S. After that, many colleges and vocational institutions opened up and flourished.

Institutions that conduct technical education and vocational training in Nepal are as follows:

### **1. Institutes and colleges under council for Technical Education and Vocational Training (CTEVT)**

Council for Technical Education and Vocational Training (CTEVT) is an autonomous institution, which provides basic, medium and high level technical education. CTEVT's central office is located in Sanothimi, Bhaktapur. The programmes conducted under CTEVT are as follows.

#### **(a) Council's Constitute Technical Institutes**

CTEVT has expanded technical education programmes through its constituent colleges. These colleges run Technical SLC, Intermediate and Diploma programmes regularly. They also conduct demand-based short term trainings relating to livelihood, employment and self employment.

#### **(b) Anex Programme**

As per Nepal government's policy to expand technical education and vocational training, a technical SLC level program has been started in general high schools. This programme is termed as Annex programme. This programme has been extended in all districts, and employment oriented technical education and vocational training is provided through it.

#### **(c) CTEVT affiliated colleges and institutions**

CTEVT grants affiliation to private sector institutes for conducting technical education and vocational training. The affiliated colleges and institutes are running different programmes throughout Nepal.

#### **(d) Vocational Training Centre**

There are two vocational training centres of constitutes colleges run under CTEVT. They are set up for conducting vocational trainings. They are known as rural training centres. One of them is located in Khudi, Lamjung and the other in Vimadh, Tanahu. These training centre identify local training needs. As per local demands, they conduct trainings on construction work, agriculture and health sectors.

Technical SLC level courses include the courses related animal husbandry and agriculture, pharmacy, ANM, CMA, homeopathy and medical lab technology. Likewise, 'Amchi assistant, dental hygiene, construction work, mechanical, survey, electrical, sanitary, electronics and auto mechanics, are also taught. Air conditioning and refrigerators, office management, JTC, social mobilizer, textile and sericulture (JTA), entrepreneurship development facilitator courses have also been introduced.

Intermediate and diploma level courses include electronics, electrical, auto mechanics, nursing, general medicine, pharmacy, medicinal lab technology, dental hygiene etc. Likewise, at this level, homeopathy, ophthalmic, physio-therapy, radiology, hotel management, architecture, geometrics and survey related subjects are taught. Information technology (IT), computer, mechanical, food and dairy, forestry, acupuncture, acupressure and moxibution subjects are also taught.

As short term trainings, the council (CTEVT) organizes trainings for herbal technical assistants, rural veterinary workers, agronomy and care givers. Besides these, there are a number of areas such as dental lab mechanics, dental TRT, hotel management, commercial cook, cooking and baking, waiters, office secretary, library and information management, hair cutting, Montessori training, photography, beauty apprentice, telecommunication, outside/external plant technicians, computer technicians, basic computer application, construction technician, radio and TV repairing, web designers, computer operators, commercial e-commerce, web and e-Commerce, welders, mechanical, house wiring, plumbing, trail, bridge technicians, mobile repairing, AC technician and electrician subjects.

## **2. Department of cottage and small scale Industry**

Department of cottage and Small Industry runs various short term trainings in 27 districts in the Terai. These trainings are conducted to meet local demands.

## **3. Cottage and Small Industry Development Committee**

Cottage and Small Industry development committee runs various short term trainings in 48 hilly districts. These trainings are held as per local demands.

## **4. Skill Development Training Centre**

Skill Development Training Centre runs three types of trainings at local, national and international levels, which include short term, basic and specialized/ special skill based trainings. People who have received these trainings are employed locally, nationally and internationally. It provides various types of training.

## **5. Mechanical Training Centre**

Mechanical training centre comes under the department of Transportation and Roads. It is located at Patandhoka, Lalitpur. Different kinds of trainings related to auto mechanical fields are provided at this training centre.



## **6. Enhanced Vocational Education and Training Project**

Under Ministry of Education in Nepal, Enhanced Vocational Education and Training project has been managed since 2068 B.S. to offer vocational training. Like, Skill for Employment Project, it provides various job oriented training to youths.

## **7. Training Centre under other institution/organization/corporation**

### **(a) Telecom Training Centre**

Telecom Training Centre is located in Babarmahal, Katmandu. It conducts various job-oriented short term trainings related to telecom. Very often notices are published to invite participants to take part in trainings on outside technicians, telecom lane man, etc.

### **(b) Electricity Training Centre**

Electricity Training Centre is located at Kharipati, Bhaktapur. It conducts short term training related to electricity. It organizes different types of vocational trainings to prepare human resources required for electricity authority on a timely basis.

### **(c) Federation of Nepal Industry and Commerce (FNIC)**

Federation of Nepal chamber of commerce and industries runs training centres/ technical colleges in 9 districts to prepare skilled and competent human resources needed for industries. These training colleges provide job oriented trainings to meet market needs nationally. Also, they identify what skills human resources should possess to be fit for different industries.

### **(d) Sanothimi Technical Institute**

Sanothimi Technical Institute is located at Sanothimi, Bhaktapur. It was established to provide vocational training to orphans or helpless children. It provides sewing, knitting, welding, auto-mechanical and press related trainings.

## **8. Private Training Institutes**

Hundreds of private institutes have emerged in Nepal to provide diverse vocational trainings. These institutes aim at offering demand based, skill oriented trainings. Majority of private training institutes are city based. In recent years, they have started their services in rural areas as well. Nowadays, as there is an overflow of youths going to foreign countries for jobs, private institutes have opened up at different places of Nepal to provide trainings that these youths require.

As per market needs, private training centers are offering short term trainings to enhance practical and technical skills of participants. This enables trained people to get jobs or start their own business. A number of youths who aspire to work abroad have benefited from these training. Hence, private training institutes have played crucial roles to build capacity of youths and helped them to get jobs, in

Nepal or abroad. As a result, the income level and living conditions of the family have improved.

## **9. Non- governmental Organization**

### **(a) International Non- governmental Organization**

International non-governmental organizations (INGOs) are making huge investments on capacity building sectors in Nepal. They run skill oriented trainings with numerous objectives: prepare human resources required in local markets; enable people to generate income locally; prepare them for getting jobs abroad; and get self-employed.

United Nations, HELVITAS, Care Nepal, DFID, INF, UMN are some international organizations, which conduct trainings in partnership with local organizations in Nepal. The trainings are mostly focused on helping people to generate income and develop their skills for jobs.

### **(b) Non-governmental Organizations**

Non-governmental organizations (NGOs) in Nepal provide skill and job oriented trainings to community people. These organizations run such training with funding support from donor agencies, INGOs, government and corporate houses. There are a number of such organizations in Nepal to conduct training.

## **10. Technical Programmes run by Universities**

Universities run Bachelor's, Masters' and Ph.D. programmes. In health sectors, there are medicine, surgery, pharmacy, nursing, lab technology, radiography and dental related subjects. Similarly, Agriculture related subject areas include specialization in horticulture and livestock. In engineering field, subjects like civil, mechanical, electrical, sanitation, electronics, auto mechanics, refrigeration, architecture and information technology are taught. Human resources produced from university education contribute to formulating plans, generating knowledge, theories and implementing them.

### ***Activity***

1. Have you observed any training programmes conducted in your locality? If so, list any there types of training.
2. Find out training program conducted in your locality. Answer the following questions about the training. Discuss it in the class:
  - a) What kind of training is it?
  - b) Which organization or institute is conducting it?
  - c) How does the training support the participants and their community?

d) What impacts will the training have on the community?

### **Exercise**

#### **Answer the following questions.**

1. Name the programmes run by Council for Technical Education and Vocational Training (CTEVT).
2. What is Annex Programme?
3. Which programmes does CTEVT run in health sectors?
4. What kinds of training programmes does Telecom Training Centre run?
5. What kinds of training do Federation of Nepal Chamber of Commerce and Industries conduct?
6. What do you mean by private training centres? Describe briefly.
7. Which subject areas does training under vocational training centre include? Write about it briefly.

## UNIT: 3 Information about Employment

### Lesson 1: Sources of Information for Regional and National Level Employment

Employment and business are the means of livelihood for most of the people. Competent human resources are required for providing services in government, non-government and private sectors. Labour market supplies organizations with capable human resources as per their requirements. These organizations require skilled, semi-skilled and unskilled human resources. Human resources are required to provide services to the people. Opportunities are created by the labour market and human resources department of the organizations fulfill the vacancy of various types of manpower especially in private sectors. In the government sector, there is a separate constitutional body to fulfill the need of the human resources. It is the right of every citizen to get information on employment opportunity publicly. Therefore, these organizations publish notices for employment opportunities in newspapers, magazine as well as in their web pages at present. Similarly, such notices are published in the public places as well.

#### (a) Source of Information of Employment in government sector

##### 1. Public Service Commission

Public service commission exists to select staff members for civil service sectors through a competitive process. It announces advertisements, conducts exams, and selects qualified candidates to fill vacant positions in government offices. A sample vacancy notice published by public service commission is given below.

**Central Office, Anamnagar  
Information and Publishing Branch**

**Advertisement for the competitive written test for the post of non-gazette 2<sup>nd</sup> class (technician) internal competitions, inclusive, and open posts**

**Information No.368/068-69**

Eligible candidates are invited to submit a filled up application form recognized by the PSC for fulfilling the vacancies of the following posts with a competitive written test.

S. No.	Ad. No.	Post, Service, Group, Sub-group	Inhabitant, inclusive and open	Required Nos.	Date of written test, and Time
1.	201 068-69	Enumerator, Economic Planning and Statistics, Statistics	<i>Janajati</i>	1	2069/3/1, 4 PM
2.	202 068-69	Drinking water Assistant Engineer, Civil, Sanitary	<i>Janajati</i>	1	2069/3/10, 4 PM

3.	203 068-69	Drinking water Assistant Engineer, Civil, Sanitary	Open	1	2069/3/10,4 PM
4.	204 068-69	Surveyor (Amin), Eng., Survey	Dalit	1	2069/3/3, 4 PM
5.	205 068-69	Surveyor (Amin), Eng., Survey	Open	2	2069/3/3, 4 PM
6.	206 068-69	JTA, Agri. , Agri. extension	Open	1	2069/3/1, 4 PM

**Source: Translation from the Book**

## 2. State owned public Enterprises

State-owned public enterprises work as employers. They make public announcement through media to recruit human resources needed for different branches in these organizations. You can find vacancy notices published by public enterprises. Study one of them and discuss it in the class.

## 3. Private Employers

Private industry, business houses, development committee, hotels, tourism sectors etc. publish job notices to employ staff members they require. They do it both through print and electronic media.

## 4. Job related Notices in Educational Institutions

Teacher Service Commission and concerned schools publish vacancy notices to employ teachers. While teacher service commission recruits teachers for public school, private schools do it themselves by publishing job notices in national and local newspapers.

## 5. Media House

Media houses consist of different departments. They require human resources like journalists, editors and news readers. They publish job notices in newspapers and other mass media channels.

## 6. Ministry of Labour and Transportation

There is a Labour and Foreign Employment Department under this ministry. It publishes job notices that seek human resources to work nationally and internationally. Training centre also flow such notices to inform the public. It is the Ministry of Labour and Transportation, which is responsible for managing labour market.

### Vacancy

*A well managed child Home requires to fulfil the post of manager. Interested candidates can apply with bio-data with in five days.*

**Qualification** *Married graduate male/female candidate able to take care of children with good managerial skill computer litrate spoken and written english*

**Facility** *Salary, lodging, fooding, health*

**Note:** *The husband will be given fulltime job whereas the wife will be given parttime job. Both the candidates are required to stay in child home.*

## **7. Labour Market Information System**

Labour market information system is essential for providing information on employment, training and education. CTEVT is contributing to produce technical and vocational human resources. Within this council, there is a unit, which provides information and counseling on employment and training. This unit offers counseling on what training skills relate to which job areas to facilitate job seekers. Apart from this, we can also obtain job related information through personal contacts.

### **b) Sources of Job-related Information**

It is necessary for a person and an organization to have information. We can make our plans and strategy based on available information. It is especially important while we are seeking jobs. We can get job related notices and information through print and electronic media. Personal contacts are also the sources for the same. Radio, TV, the Internet and newspapers provide us job related information. Public sector offices advertise job notices in national and local level newspapers to inform public.

Electronic media are also means of publishing job notices. The radio is an effective medium for it. We can use the radio or FM radios to publicize job notices at regional and national levels. Both private and government offices can announce job-related information through the radio.

Some offices post job notices in their web portals. For example, [www.psc.gov.np](http://www.psc.gov.np) is the website of public service commission, which provides job information in public offices. Likewise, we can consult other websites ([merojob.com](http://merojob.com)) to get informed of vacant positions.

Job notices are also posted on notice boards of public offices and public places. Job vacancy notices are posted in offices like land registration, district administration, district development committee where people come for public services.

### **b) Employment at Private Sectors**

Government and private sectors are both the prospective areas for jobs. Competent and skilled persons can get jobs in these areas. Private institutions publish job notices through private media, electronic media, and personal contacts. Regional and national level mass media channels broadcast such job related information. Labour market contains skilled and capable human resources, who are seeking jobs at private and public sectors. They can get jobs through competition. The government offices and private companies provide equal job opportunities for all people. Private institutions must make job opportunities public to promote private employments. This ensures access to all people to job opportunities in private sectors.

### **Activity**

1. Involve your students to study job related notices in different newspapers. For example, public service commission publishes vacancy notices every Wednesdays.
  - a) Vacancy notice
  - b) Result of written test
  - c) Interview related information
2. In the advertisement you have collected, what kinds of persons are wanted for which posts? Discuss.
3. Listen to job announcements at local radio and F.M. radios. Answer the following questions:
  - a) Who is the advertiser? Which post is advertised?
  - b) What is the deadline for sending application?
  - c) What are the selection processes?
  - d) Is the job permanent, temporary or contract based?
4. Discuss with school administrators about vacant posts of a teacher. What is the vacant post? Which subject? What is the required qualification? Discuss it in the class.

### **Exercise**

#### **Answer the following questions.**

1. Name any two public offices that publicize job notices.
2. What are the examples of print media? Name any three print media?
3. Can we get job related information from means other than the mass media? How?
4. Visit a web portal of any private institutions. Study vacancy announcements posted in it and answer the questions given below:
  - (a) What is the advertised post?
  - (b) What is the minimum qualification required?
  - (c) How long should the candidate be experienced for?
  - (d) What are job responsibilities?
  - (e) Where to apply? How to apply?
5. Ask the following questions to persons working in private organizations or institutions in your locality
  - (a) What is the name of institution?
  - (b) What is the post? What are job responsibilities?
  - (c) How are vacant positions filled?
  - (d) What is the required qualification?

We need general vocational, entrepreneurship skills to run professions of our choice. Communication skill, problem identification skill, problem analysis and solution skill, constructive and creative skills are general vocational skills. These skills are called soft skill. Likewise, capacity and skills that we require for performing technical jobs are called technical and vocational skills. We require technical skills for producing goods and providing quality services. Technical and Vocational skills are also called hard skill. Entrepreneurship skill is the capacity to come up with creative and innovative ideas in producing goods and providing services. A person becomes an entrepreneur when he is competent in vocational and technical skills. Having general vocational skill has a great role in our life. Through this skill, technicians can enhance their coordination and leadership capacity and skills. General vocational skill also includes skills of operating office, leading the team, networking, relationship building, decision making ad so on. Thus, general vocational skill enables us to perform technical jobs.

### **Types of General Vocational Skills**

#### **(A) Organized Thinking Skill**

Thinking skill is regarded as mental work. First of all, we must have a clear concept or understanding of the job we are performing. This enables us to do our job efficiently and fast. Clear thinking and understanding help us to come up with effective plans to carry out the job. Organized thinking provides a guideline for our working system and procedure. Clear thought and concepts guide our work and performance. Right work and performance contributes to creativity in production. Creativity in a person encourages him or her to generate constructive ideas about his or her work. Organized thinking skill involves the following aspects:

##### **1. Concept of organized thinking**

Our thinking process helps us to analyze the existing situation related to our profession. When we make our thinking organized, it acts as a medium to create noble ideas and thoughts. Thinking skill helps us to raise questions about the subject matter, and have a clear concept of it.

##### **2. Ways of making thinking skill organized**

If a person is able to make his thinking skill organized, it promotes his productivity. It is necessary to have clear concept and understanding of our profession to refine our working style and performance. The process of making our thinking skill organized includes aspects such as having clear working system, developing habit of analyzing problems, developing leadership skill and self evaluation process.



### **(b) Constructive Skill**

The ultimate goal of thinking skill is to develop constructive skill. Newness in production is possible when we can organize our thinking skill. Constructive skill is a process of developing creative and new ideas in producing goods and delivering services. A person can bring a change in his or her working style by improving knowledge, skill and his ability. The improvement in working style and performance ensures improvement in products as well. It is necessary to bring changes in management for ensuring creativity in production and services when we try to create new ideas or goods out of what we already have. It develops our creative thinking habit. Therefore, having constructive skill means generating a new product or a service by utilizing our capacity. It also refers to innovative ideas that we generate at production level.

Developing creative skill is related to production. If we can offer quality service and good, it means that we have become creative. For developing constructive skill, we must promote organized thinking skill; change our working style; keep ourselves updated with new ideas and products related to our field of work; become devoted and committed and seek for conducive working environment.

### **(c) Leadership Skill**

Leadership is a process of motivating others towards their jobs. Leadership skill is a must for achieving production and service targets. A person in leadership position should understand expectations of persons under him/her and motivate them to work. As we know, many people work together in a profession. Leadership skill is required for motivating these people to work with common interests. It is the responsibility of a leader to coordinate among co-workers to perform different jobs. A manager or a person in leadership position requires a decision making capacity in his or her profession. Leadership skill must be developed in a person to enable him or her to make decision involving staff members.

Various people are involved while performing a job. It is the job of leaders to motivate all his or her co-workers. Leadership skill is needed for making decisions with the help of colleagues and coworkers. It is also required for implementing the decisions made. Leadership skill is equally necessary for establishing conducive relationships among staff members. A leader must aware of interests and capacity of staff members and provide them job responsibilities accordingly. Based on their performance, they should be given incentives or encouragement. Besides these, leadership skills are essential for ensuring collective work, good coordination among staff members to achieve their common goal. We can take the following measures to develop leadership skills:

- I. develop interpersonal skills
- II. develop coordination and communication skills

- III. Encourage him or her to carry out responsibility.
- IV. Motivate staff members to work in team for common interests.
- V. Set goal/outcome oriented tasks.
- VI. Develop constructive and creative thinking skill
- VII. Develop appropriate working strategy and get every staff member to perform their job responsibility.
- VIII. Guide and direct team members with a long term vision

### ***Activity***

- 1. What general skills are required for a teacher to carry out his/her job building good rapport with his students? Make a list after a discussion.
- 2. Study how a flower is grown in a garden. Answer the following questions:
  - (a) What kinds of flowers are blooming in the garden?
  - (b) What should be done to grow a flower?
  - (c) What additional efforts are required for that job?
- 3. In your community, who are producing goods using constructive skills? Discuss it in the class and make a list of such persons.

### **Exercise**

#### **Answer the following questions.**

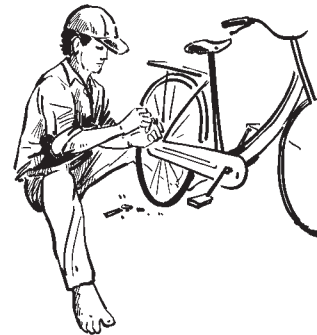
- 1. What three skills are needed for running an enterprise or a business?
- 2. What do you mean by general vocational skills?
- 3. Which three general vocational skills are required for a teacher to make his or her profession respected?
- 4. What factors should we consider to develop organized thinking skill?
- 5. How does understanding or thinking affect our work and performance? Explain.
- 6. What is a constructive skill? Explain it with examples.
- 7. How are thinking and constructive skills interrelated?
- 8. What is a leadership skill? What factors should we consider to develop it?
- 9. "Developing team spirit among staff members demands a special skill." Justify it with your arguments.

Business is a form of work that provides a means of livelihood and income for people in urban and rural areas both. Business involves production and exchange of goods or services. Poultry farming, vegetable and fruit farming, noodles factories, furniture factories etc, are production related business adopted by people while setting up grocery's, fancy stores, hotels, tailoring centre, printing press, grill/shutter making industries, motor service centers etc. are service oriented business. These businesses help people to generate income for their living.

Business can be of different nature and kinds. It can be handled by a single person. There can be a family based business involving more than one member of the family. People can do business in partnership with people other than the family members. People set up companies and run industries and factories. Therefore, business can be divided into different categories in terms of scale of investment, production and service coverage, and number of people involved in them. They are as follows:

### 1. Small scale Business

A small scale business is set up with a low investment. Normally, a single person or the family runs these types of business. We can see a number of small scale businesses around us. Tea shops, tailoring centres, cold store, grocery, furniture shops, cycle repair centre etc. operated with low investment are some examples of small scale business.



### 2. Medium scale Business

A medium scale business needs more capital and people to operate it than we require running small scale businesses. These kinds of businesses can be run by the single family or in partnership employing around 3-5 staff members. Furniture industry, workshops, iron and steel work (grill/shutter), restaurants, fancy stores, garment factory, commercial vegetable farming, poultry farming with medium level investment are medium scale businesses.



### 3. Large scale Business

As the name suggests, large scale business requires a huge capital to invest on it. Cement industry, noodle industry, cloth factory, iron and steel factory, publication and media houses, large printing press, car/motor manufacturing companies are the examples of large businesses. People with different skills, capacities and qualifications are involved in large scale businesses to produce goods, ensure effective services and manage the business as a whole. While small and medium scale businesses are run in our villages, Toles and communities, large scale businesses try to cover the entire regional, national and international customers.



#### *Activity*

1. Write names of businesses run in your villages and towns. Which scale businesses are they? Small, medium or large scale? Discuss it in class.
2. Select one business you prefer. Why do you like it? Discuss it in the class.
3. Visit one entrepreneur in your locality. Ask him why he or she has initiated that business. Prepare notes and discuss it in class.

#### **Exercise**

**Answer the following questions.**

1. What do you mean by business? What are its type?
2. Why do people run business?
3. Give five examples of small, medium and large scale businesses each.

**Lesson 2:****Basic Elements of a Business Operation**

Earning income and maintaining livelihood is the main purpose of operating a business. We should pay attention to many factors before running a business. How are we going to manage the money? Do we have necessary human resources? Are there people who use our services or goods? We must make a thorough study and plan before we launch our business. If we do not start our business with proper plans and market study, we can't be successful in it. We may suffer a loss. We should basically take into account the following elements prior to initiating our business:

**a. Capital**

Capital is known as the total cost required for starting and operating a business. Capital is needed to purchase goods, raw materials and to pay wages to laborers, etc. How much capital does our business require? Where can we manage it from? The total capital and its sources must be estimated prior to operating our business.

**b. Market**

Market is a place for selling and buying of products. What kinds of goods are demanded in the market? What sorts of services do people require? If we do not properly assess the market prior to our business, we are likely to bear a loss. In worst case, the business would be closed down. Therefore, a market assessment should be done properly before conducting the business.

**c. Skilled Human Resources**

Skilled human resources are those who are physically as well as mentally capable to work with some professional skills. It is by involving skilled persons that we can produce high quality goods and render efficient services to our customers. Therefore, we must see whether such skilled people are available before we start our business. There is no doubt that the production quantities and quality improve when skilled human resources are involved in the business.

**d. Raw Materials**

Basic substances which are essential for production oriented business are called raw materials. For example, clay and coal are raw materials for brick kilns. Wool is a raw material for carpet factories. There must be a regular supply of raw materials to run our business smoothly. If we do not identify their sources and manage them, business cannot be operated.

**e. Infrastructure**

Basic elements like space, building, electricity, transportation service, water etc. are known as infrastructure. Proper infrastructure of this sort is essential for operating a business. Our business sustains for a long term if it has a rich infrastructure.

Therefore, we must ensure that there are adequate infrastructure elements.

### ***Activity***

Visit a business house in your community. Observe what basic elements were considered before operating it. Point out all the factors considered there and discuss them with your classmates.

### **Exercise**

**Answer the following questions.**

1. What are the basic elements that we require for operating a business? Give a short description of each of the elements.
2. Why are the skilled persons required for running a business?
3. What are the infrastructures for a business? Why are they needed?

**Lesson: 3****Businesses Operating at Local Level**

Community, Tole or Settlements focused business is termed as a local level business. This kind of business is set up targeting local clients/customers. Necessary goods are produced and services are made available by considering local demands. Therefore, we must properly identify gaps of services, prospects for producing and consuming goods in the community where we want to start our business. If we produce goods without their adequate demand, they cannot be sold in the market. As a result, our business might close down. Therefore, it is necessary to be well-informed of local demands for goods and services before operating the business.

We can see different types of small and medium scale businesses being operated in our community and settlements. Cold store, furniture shops/industry, tea shops, hotels, grill industry, vehicle maintenance workshop, livestock farming, fruits and vegetables production, pottery business etc. are locally operated businesses. These types of businesses are there to ensure the supply of goods and services needed for local people in their daily life.

**Some of the factors to be considered for conducting local business**

As discussed earlier, we must properly study and analyze local markets to identify what services and goods are necessary for the people living there. Otherwise, our business will not run properly. Mainly, we should consider the following factors:

**a. Demand of the Market**

Which products and services have high demands in the local market? How can we take them to customers effectively? We must have a proper idea about it to run the business in a sustained manner.

**b. Necessary Tools**

Every business requires equipments to produce goods and run it. It also needs skillful people to handle them. Therefore, we must make a list of necessary tools and buy them from the market before we start the business.

**c. Registration of the Business**

Each and every type of business should be registered legally to conduct it at local level. Registration of such business is done in district level Office of the Cottage and Small scale Industry.

**d. Required Human Resources**

Skilled human resources are required for any business to operate at local level. It is especially important to manage skilled workers when we are going to start medium and large scale business. If such people are not available locally, they should be brought from outside.

### e. Goods Selling Spot

Where will be products from business sold out? Where can we launch our business services? Who are the customers? How many customers or service users are there? What is the price of the produced goods? Are there other people producing such goods? Are they selling their goods like us? We must consider these points before operating the business.

### *Activity*

Visit any small business house in your community/settlement. Based on the discussion, complete the table with required information.

S.No.	Title of Business	Type	Total Cost	No. of workers	Spot to sell products
1.					
2.					
3.					
4.					

### Exercise

**Answer the following questions.**

1. What kinds of business are called local level business? Describe it briefly.
2. What are the factors to be considered while operating a business? Describe each of them briefly.
3. Where should any business or industry be registered legally? What is the reason of registering the business legally? Write about it briefly.



Whether we succeed in our business depends upon a number of factors. First of all, we must select the kind of business that has a prospect to grow in a certain locality. In other words, our business should address local demands. The second factor is the way of managing our business. Without proper management, it is not possible to produce and deliver goods in time. No effective services can be given to customers if our business is poorly managed. It is equally important to build rapport with people who are the target groups, workers and various stakeholders linked to our business. If we do not know how to operate and manage our business well, we are highly unlikely to make any earning. As a result, we will not be in a position to pay the workers and settle any loans if we have it to run the business. Therefore, a man who wants to run business should develop required skills and capacity to manage and operate the chosen business. The following factors must be considered well in order to start a business:

**Selection of Business**

A through study, analysis and preparation must be made before launching a business. Do I have a proper expertise and capacity to run a particular business? Does the business have any scope in local market? Can I manage the capital, human resource etc. for it? Who should I consult to know more about the business? A number of factors should be taken into account while selecting any business. In brief, the following factors should be considered:

- A. study or mapping of businesses in the market
- B. Demand for the goods from customers and their purchasing power
- C. Availability of raw materials
- D. Availability of human resources
- E. Availability of physical facilities etc.

**Business Management**

Managing business is an important skill to run any kind of business. It involves managing human resources, raw materials, finance, and physical infrastructure etc. There must be a proper planning, monitoring and learning from mistakes in order to achieve a desired goal from a business. For example, if a person is willing to run a small-scale furniture business, the following factors have to be considered:

- A. Management of location of furniture business
- B. Management of store rooms to keep furniture items
- C. Management of raw materials (wood)
- D. Transportation of the products (furniture)

- E. Management of skilled workers
- F. Duty hour of the workers, salary, and healthy relation to them.
- G. Ways of dealing with customers

### **Business Operation Skills**

A business man should have special skills to operate the business. No one can do business without some skills related to the business he is planning to run. For example, a furniture producer should have at least the following capacities and skills:

- A. Ability to make an assessment of demands for furniture
- B. Skills to produce furniture items as per the market demand
- C. Skills to make financial dealings with customers such as asking for advanced payment for ordered goods.
- D. Deciding appropriate starting and closing time of business
- E. Keeping an account of income and expenditures
- F. Maintaining records of the materials purchased
- G. Repairing and maintenance of machineries and tools
- H. Timely registration and tax paying
- I. To produce new styles and designs of furniture items

### ***Activity***

Visit and observe a business firm nearby your residence. Interact with the businessman about the details of the business like its selection, management, and operation. Prepare a report and discuss it in the class room.

### **Exercise**

Answer the following questions.

1. What should be considered while operating a business?
2. What factors should be considered to manage a business? Write clearly.
3. What are the skills required for operating the business? Write clearly.

**Unit: 6****Trade and Market Management****Lesson: 1****Relationship between Trade and Business**

People conduct a business for generating income. If our business is related to production sectors such as agriculture and industries, we produce goods and materials from it. These products must be sold to earn income. This kind of selling and purchasing of materials or services in the form of business is called a trade. Traders do selling and purchasing of goods. Traders pay some amount of money to producers to buy their products. After they purchase goods, they sell them with more amount than they have brought. In other words, traders earn profit by selling goods. Income increases as the volume of trading increases. Business gets expanded if trading increases. There is a close relationship between business and a trade.

Another purpose of business is to produce goods and offer services to address daily needs of people. Businessmen do not serve people free of cost. It is because they must make an investment on raw materials/seeds, fertilizers, workers and other expenses while producing goods. They calculate the price of goods looking at these factors and sell them to traders and customers. Producers also consider whether their products have high demand in the market or not. Eventually, they sell their products to traders, and traders, in turn, sell them to their customers with certain profit. They fix their profit ratio as per the demand for goods in the market. Consequently, goods may be costly or cheap.

Hence, business is done to produce goods and services. Trading involves buying and selling of the same in the market to earn a profit. So, trade and business are related with each other.

***Activity***

Make a list of businesses run in your community. What are the goods produced from these businesses? Where are these goods sold? Fill up the following table with descriptions.

S. No.	Title of the Business	Goods Produced	Selling Spot
1.			
2.			
3.			

**Exercise**

**Answer the following questions.**

1. What is business?
2. What is trade?
3. How are business and trade related?
4. What will be its effect on trade if a business gets expanded?

**Lesson: 2****Searching of Trade and Collaboration Skills**

Many people do the same type of business. If so, there will be an overflow of similar products/services in the market. Customers will get a number of choices for buying goods. So, businessmen will find it difficult to sell their goods. In order to ensure proper selling of their goods, businessmen must seek new strategy and sectors. One way could be a massive advertising of the goods. Advertisements can be done through the radio, television, and newspapers to increase the volume of trade. Advertisements can increase the sales of the products and new sector of trade can be found at this moment. Thus, to find the new sectors of selling of the products is known as searching of the trade.

Group trading can be done in collaboration of many people. Large businesses can be done with minimum capital through joint efforts. Everyone should understand each other in joint attempt of business. There will be a great loss if misunderstanding exists among them. Large businesses and even the projects can be handled if they are done through collaborative efforts. Various industries, finance companies, and businesses are being operated adopting this modality. Even the double collaboration may be carried out among the businessmen. For example, producer of the feeds of the poultry can purchase poultry by selling feeds. Similarly, poultry farmers can purchase feeds by selling poultry to the producers of feeds. Investment can be made in partnership to run this type of business. The businessmen should have following skills if collaboration is done in the trade:

- a) To ensure a clear division of work
- b) To maintain transparent records of income and expenditures
- c) To fix wages of the laborers.
- d) To address the problems through group discussion for the welfare of the group members
- e) To point out the achievements and failures of business with organizing the meetings time to time.
- f) To correct the mistakes and do self-realization.
- g) To respect everybody's identification and to have positive thinking

Searching of the trade is the means of business expansion. Collaboration makes us profit oriented and ensures sustainability in business.

***Activity***

1. The traders might have collaboratively run business at your neighboring. Write the rules and regulations of collaboration that they have made after asking them about it. Discuss the same in your classroom.

2. Take a piece of advertisement from a newspaper, and write the following points from the cutting.
  - a) Name of the advertiser.
  - b) Subject of the advertisement
  - c) Features of the advertisement
  - d) Advantages from the advertisement.

### **Exercise**

**Answer the following questions.**

- A. What is the searching of the trade? How can it be done?
- B. What is collaboration?
- C. Why is collaboration done in trade?
- D. What types of skills are required for collaboration?

The use of technology and different modes of trading adopted in recent years have modernized trade. Advertising is one such means of modernizing a trade. Impressive and appealing advertising is done to publicize goods among wider customers. There is a saying in trade science that our marketing should be so persuasive that we should be able to sell toothpaste even to those who have no teeth. By means of radio, television, and computer, marketing of products are done nowadays.

In modern time, trading is not just traders going to producers to buy some goods paying the required money, and selling them to their target customers. There are different modes and ways involved in modern trade, which requires traders to acquire certain trading skills. Reservation of goods is one strategy traders should adopt. There could be a scarcity of goods in the market. Looking at the market demands, traders should book goods and offer them to their customers.

Part payment or installment based payment has become a popular trading method these days. Under this system, customers take desired goods after paying some amount and pay the rest of the amount on installment basis later. Since traders do not get full payment at the time of selling goods, they charge slightly higher prices compared to those customers who make full payment. Target group focused trade is also considered as the modern skill of trade. The goods are produced focusing some groups like students, youths, and women, and sold to the same groups. The traders offer special discount to such target customers. This is a type of trade to sell common goods such as shoes, cell phones offering some discount.

New feature of the trade is E-commerce. Trade is done through emails and the internet. Price list is attached with the advertisement of goods in the internet. Interested customers order the desired goods through emails. Payment of the goods can be done by cash, cheque, draft or credit card. Under this system, the goods are delivered at the address of customers without meeting them. Networking business is also done nowadays. In this system, customers become members, and the goods are sold only among these members. But, a number of people get cheated every year in the name of networking business.

Thus, skills of trading with new techniques are called modernization of trading skills. It is quick, handy, easy, and least expensive too. These days, businessmen utilize these techniques commonly.

### ***Activity***

Which techniques have been adopted by the traders for trading in your locality? Ask traders. Write down clearly and discuss it in the classroom.

### **Exercise**

**Answer the following questions.**

1. What is the difference between the pre-reservation and installment?
2. What is E-commerce?
3. Why is the focused group trade done?
4. Why is the networking business risky?
5. Which of the modern techniques of the trade do you like? Give reasons.

## **Lesson: 4 Search for Agricultural Based Trade and Collaborative Skill**

Agriculture based trade is the production and trading of agricultural products. Livestock, vegetable farming, dairy production, fish farming, bee-keeping, and horticulture etc. are agricultural business. Likewise, productions of tea and coffee, sugarcane, and flower are also agricultural business. It is necessary to constantly search markets for selling agricultural products. Most of the products are for daily consumption and use. If not sold timely, they may decay and get wasted.

Trade of agricultural products is done at different locations. For example, meat and eggs may not be available in the same store. Jute and apple are not produced in the same place. Marketing of these products is also done at different locations. People produce agricultural products in group as well as individually. People do agriculture based trade either in groups or individually.

Agricultural market is the location where agricultural products are sold and bought. These products could be consumed by local people and even exported to foreign countries. Selling of the products is normally done in two ways: wholesale and retail trade. Either a group of traders or cooperatives set up by farmers buy agricultural products from farmers (producers) and export them to different parts of the country for selling them. In case of retail trade, the products are sold in local markets and individual shops. Businessmen publicize their products in order to attract traders to sell their products. Consequently, wholesalers reach agricultural markets or farms to buy products. In this way, farmers and businessmen need to work jointly to make profit from the trade of agricultural products.

A single person can not ensure production and trading of all sorts of agricultural products. Therefore, co-work or partnership is necessary to expand agricultural business. However, co-work should be done only between laborious and likeminded partners. To run for any partnership business successfully, partners must be honest, self-motivated, positive minded and open to solve any problems through discussion and negotiation. These are the basic principles of cooperative skills.

Joint works or collaborative efforts are observed in many functions in our community. Ritual ceremonies like marriage, *bratabandha*, parties, get-together, and others are performed with the joint efforts of many community people. Likewise, road construction, canal construction, sanitary actions carried out in rural areas are mostly the result of co-work.

The concept of cooperative work has emerged through the concept of co-work. It took an organized shape in Nepal from 2010 BS when Cooperative Department and Cooperative Institution (2013) were set up. It is further institutionalized after establishment of the Ministry of Agriculture and Cooperative in BS 2057 and the Ministry of Cooperative in 2068 B.S. It has now become an internal part of plans and policies of the Nepalese government. Cooperative organizations are considered one of the major economic pillars of Nepal.

Now, cooperative groups/organizations are mushrooming in Nepal. They are divided into various sectors as per their objectives and priority of work. The major areas of cooperative include the field of agriculture, health, saving and credit,



dairy production and sales, small farmer, and tea and coffee. Agriculture based cooperatives are popular at grassroots level, through which farmers find it easy to produce agricultural products and sell them in markets.

Many people are associated with cooperative groups in Nepal. Cooperatives help them to form the capital needed to invest in any sort of business. Certain amount of money is collected from each member of the cooperative groups on daily, weekly or monthly basis. Over a time, a huge amount of money gets deposited in the cooperative groups. That money is lent to the cooperative members either for group or individual investment. Hence, cooperatives have created environment to invest the capital on different sectors. They have encouraged group work, group capacity, entrepreneurship skills among people. They have thus created opportunities of employment in different sectors.

### **Activity**

1. Make a list of agricultural based goods produced in your community. Display them on the table providing the information specified in it.

<b>Name of Goods</b>	<b>Market</b>	<b>Consumers</b>	<b>Condition of Production</b>
1.			
2.			
3.			

2. Discuss the functions of a cooperative organization in the classroom. For this, List out the activities of the cooperatives situated at your location.

<b>Name of the Cooperative</b>	<b>Name of the Chairperson</b>	<b>Functions of the Cooperative</b>
1.		
2.		
3.		

### **Exercise**

**Answer the following questions.**

1. What do you mean by agriculture based trade?
2. What is agricultural business? Write it with examples.
3. How can producers attract wholesalers for selling agricultural products?
4. Which sectors require joint or collaborative works in our communities?
5. What types of skills are required for collaboration in agricultural business?
6. Why are cooperative organizations important?

## Lesson: 5 Price determination Process of Goods and Services

Selling price of any products is determined by considering a number of factors. First of all, a producer must calculate his cost price. For him, the cost price involves labour cost, cost of raw materials (seeds, fertilizers etc- in case of agricultural products), loan interest and other expenses involved in producing it. Then, s/he should add the desired profit margin to the cost price. The cost price plus the desired profit becomes selling price for the producer. A trader further adds transportation cost and the cost of goods likely to be damaged etc. when he determines his selling price. Mainly the following factors are considered for fixing of the selling price:

- A. Total expenses for producing goods
- B. Expenses for services and transportation for selling goods
- C. Profit for producers and traders
- D. Security for potential damage in the trade

Determining selling price of goods depends on different layers of traders. While producers sell products to whole sellers, they try to recover their cost price and some profit by selling them. The whole sellers might then sell these goods to resellers by keeping certain profit margin. In doing so, they add transportation cost and profit margin to the price at which they have purchased the goods. The selling price of goods further increases when they come into the hands of retailers. Hence, the price of the goods differs due to their selling between different layers of traders.

Fixing rate for services is straightforward. Service providers like masons, carpenters, plumbers and electricians claim fixed amount of money as their fee rate for working for us. We can hire them either on daily wages basis or paying flat/lump sum money for completion of the total work. The price can be determined upon negotiation.

For example, let's look at price fixing techniques adopted by a farmer for selling the baby plant (*berna*) of cauliflowers:

### Cost price

a) Price of seeds (250 gram)	Rs. 125.00
b) Price of labour for land preparation (One day)	Rs. 200.00
c) Food description and irrigation	Rs. 100.00
d) Fertilizer	Rs. 150.00
e) Caring of plants and weeding (Equivalent to 5 days)	Rs. 1,000.00

---

<b>Total</b>	<b>Rs. 1,575.00</b>
--------------	---------------------

---

He produced 1,500 seedling (*berna*) of cauliflowers from this expense. He calculated the selling price after preparation of the seedlings.

---

### **Selling Price**

a. Production price of 1500 seeding	Rs. 1,575.00
b. Service charge for business (5 percent)	Rs. 78.75
c. Depreciation for possible damage (5 percent)	Rs. 78.75
d. Profit (15 percent)	Rs. 236.25

Selling price of 1500 seedlings desired by the businessman could be Rs. 1968.75 (1575+78.75+78.75+236.25)

Price per seedling Rs. 1.31

The farmer sells seedlings produced by himself at the rate of Rs. 1.31 per a seedling. He can reduce its price if production increases. But, when it has a high demand, he can increase his profit margin. The price for large volumes of sales will be less than it is for small volumes. Thus, market demand is a factor to determine selling price.

### ***Activity***

Visit some businessmen in your neighborhood. Ask them about the price fixing system, and discuss it in the classroom.

### **Exercise**

**Answer the following questions.**

1. What is difference between the cost price and selling price?
2. Why is the cost price important in price fixing system?
3. In which condition does a trader reduce the price?

## Lesson 1: Seasonal and Off-season Vegetable Farming

The process of growing vegetables is called vegetable farming. It is an important branch of horticultural science. Vegetables are grown for daily consumption and commercial purposes both. Consuming vegetables provides our body with nutrients required daily. It is a good source of vitamins and minerals required for our body to grow, develop and fight against diseases. Besides, vegetable farming helps us to generate income. Nowadays, it has been commercially practised in different places of Nepal. It has financially supported people.

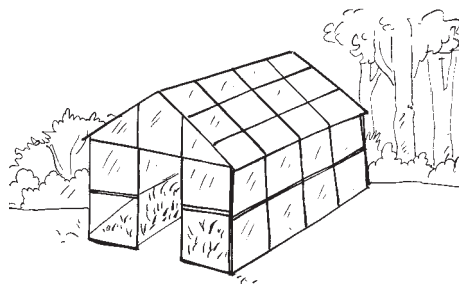
There are two types of vegetable farming: seasonal and off seasonal.

### A. Seasonal Vegetable Farming

Vegetable cultivation without controlled natural environment and setting is called a seasonal vegetable farming. Every vegetable requires special climatic conditions to emerge, grow and reap. In other words, there must be appropriate temperature and moisture for cultivating them. Cool temperature is suitable for certain vegetables while others require hot temperature. Thus, cultivating those vegetables that are likely to grow in the given seasons is a seasonal vegetable farming. Seasonal vegetables are common, so farmers cannot fetch as much profit as they do it from off-seasonal vegetables. As seasonal vegetables grow in their natural climatic conditions, they do not involve the use of excessive pesticides and insecticides. Seasonal vegetable cultivation can be done in both winter and summer seasons (cool and warm environment). Accordingly, they can be categorized into two types:



I. **Winter vegetable crops:** Vegetables mostly grown during cool season (Asoj to Magh/Falgun) are called winter vegetables. They are cauliflower, cabbage, rayo, raddish, cress, spinach, chili, tomato, potato etc.



II. **Summer vegetable crops:** Vegetables mostly grown during warm season (Chaitra to Bhadra) are called summer vegetables. Some examples are cucumber, sponge gourd, bitter gourd, ladies finger etc.

## **B. Off-season Vegetable Farming**

Vegetable grown before or after the main season with special techniques is called off seasonal vegetable farming. To grow vegetables in off-season, some environmental manipulation is done by making tunnels with some materials like bamboo sticks and plastic sheet. In this way, summer season vegetables are grown in winter season and winter season vegetables are grown in summer season by making shade houses. For example, tomato, cauliflower, cabbage, cucumber, guards etc are grown in this way. Various methods, practices of environmental control are used to grow off-season vegetables.

In Nepal, Nepalese farmers are attracted to off seasonal vegetable farming. They are getting technical support from government and private sectors. As a result, summer season vegetables are grown in winter season and sold in the market. In the same way, winter season vegetables are grown in summer and sold in local Hat Bazaar. Consumers can enjoy eating vegetables of their choice in all seasons. In developed countries, there is more use of off-season vegetables. In Nepal also, trend of growing off-season vegetables increasing with the efforts of government and private sectors. For example, cucumber and pumpkin are summer vegetables. These can be grown in winter season and profit can be earned.

### ***Activity***

1. Collect one seasonal, off-seasonal winter and off-seasonal summer vegetable each found near by your house or community and discuss in your classroom.
2. Grow two winter and summer vegetable at your kitchen garden of your school.
3. What types of off seasonal vegetables are grown in your nearby home or community? Ask your gardener and discuss in your classroom.
4. Go and visit the farm of any farmers or agriculturist's home and observe the seasonal and off seasonal vegetables. Prepare a report based on the following points:
  - a) Introduction ( with the objective of study)
  - b) Introduction of seasonal and off-seasonal vegetables.
  - c) List of cultivated seasonal and off seasonal vegetables.
  - d) Learning of study tour.
  - e) Conclusion

### **Exercise**

**Answer the following questions.**

- 1) Give a short introduction of seasonal vegetable cultivation.
- 2) Give short introduction of winter and summer vegetable farming with examples.
- 3) What is the difference between winter and summer vegetable cultivation? Differentiate with examples.
- 4) What is off seasonal vegetable farming? Introduce it with examples.
- 5) Differentiate between seasonal and off-seasonal vegetable farming.

## **Lesson 2: Organic and Chemical Fertilizer**

Like human beings, plants also require food or nutrients to grow. Fertilizers or manure serve as nutrients for plants. Plants are provided organic and chemical fertilizers for their balanced growth. The concept and use of fertilizers is briefly discussed below:

### **A) Organic Fertilizer**

Organic fertilizer is prepared after decomposing of animals and plants. When mixed in soil, such organic matters get decomposed and then become food for plants. Dung, green manure, compost, kitchen waste manure, human waste (night soil) etc are organic fertilizers. Similarly, Gobargas slurry/Biogasis also organic fertilizer. Fish meal, bone meal, oil seed cake etc are the other examples.

### **Uses of Organic Fertilizers**

Every year, different crops are grown in our field. Plants intake nutritional elements from soil. This causes the decrease of soil's fertility. So, organic matters should be used to regain its productivity and ensure necessary nutrients for plants. When we plough our field a second time, or one month before sowing seeds, such organic matters should be mixed in soil. In case of fruit cultivation, organic matters and soil must be mixed and put in the pit. For any purpose, organic matters should be well decomposed before use. The continuous use of organic matter improves the fertility of soil.

### **B) Chemical Fertilizer**

Only organic manure may not sufficiently supply plants with required nutrients. In such conditions, chemical fertilizer should be used. Chemical fertilizer is produced in factories using different chemical substances. One or more than one chemical element is mixed while preparing chemical fertilizers. Chemical fertilizers are of two types: single or mixed types. Nitrogenous, phosphorus, potash contain one type of chemical only. So, they are called single type fertilizers. For example, urea, SSP, MOP, is single element fertilizers. If chemical fertilizers contain more than one element, they are called complex or mixed fertilizers. DAP, A Sulphate are the examples of mixed fertilizers.

### **Uses of Chemical Fertilizers**

Farmers use different types of chemical fertilizers. Among them, Urea is most commonly used fertilizer. If plants are not provided Urea timely (within one or two months of planting), it will not have good impact on them. Hence, it is better to use chemical fertilizer periodically over the cropping period. As far as other chemical fertilizers are concerned, they should be used before we sow seeds in our

field. While we do so, plants get required nutrients for longer period of time.

It should also be remembered that chemical fertilizers should not be used in excess. We must use them by taking proper advice from agricultural technicians. For example, P, K, S, B, Cu, etc. should be used with proper recommendation. Otherwise, it might destroy our crops, and also decrease the productivity of land. If we use them appropriately, they help farmers to earn more profit.



Organic fertilizer	Chemical fertilizer
<ol style="list-style-type: none"> <li>1. Organic fertilizer is produced from plant and animal residue.</li> <li>2. It maintains soil fertility.</li> <li>3. 16 required nutritional elements necessary for the growth of plant are found in organic fertilizer.</li> <li>4. It does not harm plants even if the dose is high.</li> <li>5. Effect of organic manure remains for many years in the soil.</li> <li>6. Organic manure helps in retention of soil moisture.</li> <li>7. Organic manure makes soil loose.</li> <li>8. Organic manure provides fewer amounts of plant nutrients.</li> </ol>	<ol style="list-style-type: none"> <li>1. Chemical fertilizer is produced with inorganic matters processed in the factory.</li> <li>2. It cannot maintain soil fertility.</li> <li>3. Chemical fertilizer can not supply more than 1, 2 or 3 elements to the plants.</li> <li>4. If the dose is high, it is harmful to plants.</li> <li>5. The effect of chemical fertilizer does not remain in soil for long period of time.</li> <li>6. The soil remains dry with the use of chemical fertilizer.</li> <li>7. Use of chemical fertilizer makes soil hard and tight.</li> <li>8. Chemical fertilizer supplies more amounts of plant nutrients.</li> </ol>

**Activity**

1. Make a flower garden in your school compound and use compost fertilizer. Collect the samples of organic manure and discuss them.
2. Collect different types of chemical fertilizer samples from the sajha or agricultural material depot nearby your school and discuss it in your class.
3. Use organic manure or chemical fertilizers in your kitchen garden or flower garden of your house or school and discuss their effects.

## **Exercise**

### **Answer the following questions.**

1. Give an introduction of organic fertilizer and chemical fertilizer. Explain with two examples each.
2. What is chemical fertilizer? Explain it with examples.
3. Write main four differences between chemical fertilizer and organic fertilizer.
4. Why do farmers use organic fertilizer one month before the crops are sown in the field?
5. How does organic fertilizer help to improve the physical property of the soil?



### Lesson 3: Vermiculture

We can see of different kinds of earthworms cuddled in our farm, cattle shed, manure heap, and garden during the rainy season. They are of two types based on their working capacity and body shape: small earthworms (5-6cm) and large ones (8-10cm). Only small types can be reared.

Vermiculture is rearing of earthworms. It can be done in clay pots, wooden tray, vases etc. in which we keep soil, dung or kitchen waste materials, for example, fruit peels, vegetables, husk, grass from farm and weeds to rear them.

Small earthworms can be used to produce compost fertilizer (vermin compost) when reared, and their number gets increased. In favourable environment, they consume weeds and grass fast and produce high quality compost. The trend of producing compost manure from earthworms is increasing in urban areas. Vermicompost contains nitrogen 0.73-1 percent, phosphorus 0.8-0.9 percent, potash 4.3-4.9 percent and organic matter 10-13 percent.

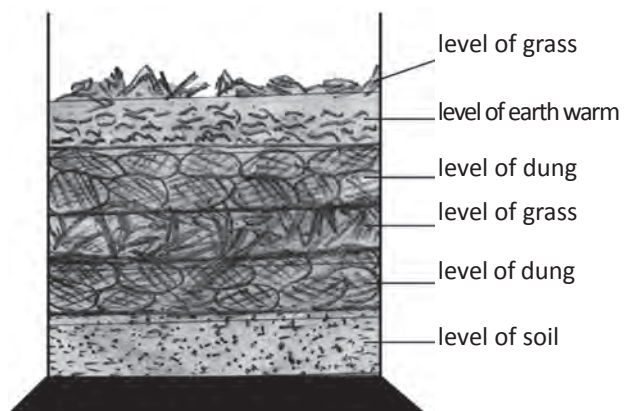
#### Importance of vermi-compost

Vermi-compost is the excreta of earthworm. So, it is better than other compost fertilizer. It has soluble nutrients and nitrogen in the form of ammonia. With the use of this compost, plants grow well. This type of compost can be used for fruit plants, kitchen gardens, vase plants etc.

#### Methods of vermiculture

The process of vermiculture is given below:

1. Fruit packaging boxes, wooden boxes, tray or vase whatever structure available at local level should be used.
2. The bottom of the pots surface should be coated with a thin layer of soil, just above which should be the layer of dung.
3. Just above the dung layer, fruits peels, green grass, vegetable sleeves and other wastes should be placed after chopping into small pieces.
4. Just above the layer of vegetable wastes and



Methods of vermiculture

grasses, one layer of dung should be set. Now, earthworms are left to spread over this (100-120 earthworms per square meter)

5. Now, those earthworms must be covered with a layer of vegetable/fruit waste and grass. Then, earthworms move downwards and consume their food.
6. 50-60 percent moisture is necessary in the earthworm's bed. So, water should be sprayed regularly everyday. Favorable temperature for earthworm is 20-25 degree centigrade. Earthworms increase their numbers in this environment by consuming the food they are provided.

**Compost produced with the above method can be applied to our field as follows:**

1. In the fruit plants, Vermi-compost can be used as per the age and size of the plant.
2. 250 kg compost should be used in one Ropani of land for other crops.
3. In case of vegetables and plants grown in vases, it is better to use 15-20 gram compost per vase.
4. Earthworms can be provided to fish, pig, duck, and poultry maxing with their food if produced in a huge amount.

### ***Activity***

1. If there is vermiculture in a nearby area, go to the farm to observe it. Ask the farmer and prepare a report on it.
2. Grow earthworms at your home or school. Use the compost on your garden, flower carry, and vase. Then discuss its usefulness in the class.

### **Exercise**

**Answer to the following questions.**

1. What is vermiculture? Explain.
2. Explain with a figure to show how earthworm farming is done.
3. Write the importance of earthworm.

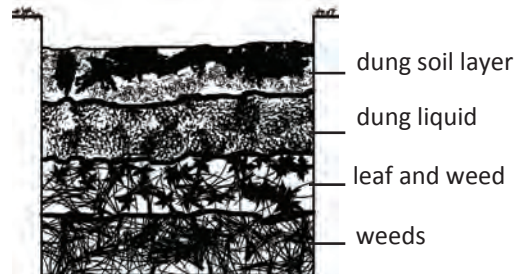
## Lesson 4: Method of Compost Preparation

The organic or natural fertilizer prepared by mixing and decomposing of different types of weeds, leaves, twigs and dung is called compost. It is an organic fertilizer. This can be prepared in house shed and farm by following a certain procedure.

### Methods of Compost Preparation

#### A) Method of compost preparation in house

Leaves, husks, roots, fruits etc received from kitchen wastes of house and kitchen garden are collected to make compost. For this, plastic drums, oil drums, black water tank, big tin cans, ghyampo, etc can be used. Pots that are easily available locally are filled with natural organic material, which gets decomposed into compost after



3-4 months and becomes ready for use. Nowadays, trend of preparing compost manure is growing in city areas. Department of Environment of Kathmandu Metropolitan city has launched a program by distributing black and blue colored holed tank for the purpose of making compost by deposition of garbage. This has not only helped keeping the community clean by garbage management, but also has helped in better crop yield.

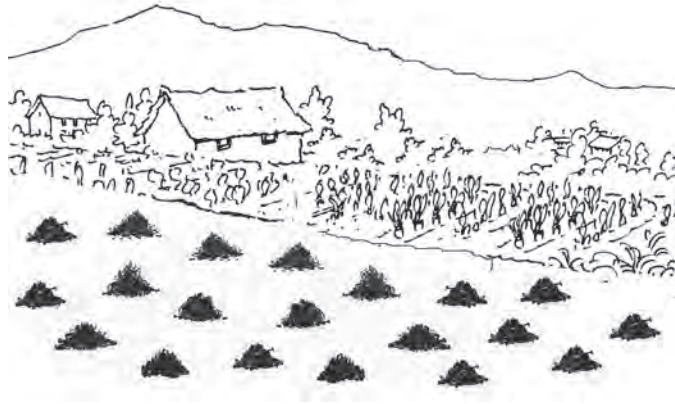
#### Methods of compost preparation in the farm

##### Method 1:- Digging the pit

A pit is dug out at a corner of the farm as required for farmers. In general, 3 meter long, 1 meter deep, and 1.5 meter wide pit is better. Compost making materials such as cattle dung and urine, etc are filled in this pot. Organic matters are filled in layers by mixing with dung-layer. It takes about 2.5 to 4 months of period, but at an interval of one month, it should be turned over. It is better to mix some lime while filling the pit.

##### Method 2:- Managing at the corner of the farm

Crop residues like roots, stalks, leaves and weeds are kept in a corner of the farm to make compost. Dung, water, salt and lime are mixed while making the heap of organic materials. The field should immediately be ploughed after using fertilizer to properly mix it in the soil. This method of compost preparation is common both in rural and urban areas.



### ***Activity***

**Perform the following activities in group.**

1. Collect weeds and wastes from your school area.
2. Dig a compost pit at one corner and fill it with the garbage you have collected to prepare compost.
3. Use the compost you have prepared in your kitchen garden.

### **Exercise**

- 1) Explain the pit method of compost preparing.
- 2) How does the environment become clean when we make compost? Explain.
- 3) How is the heap method of composting done?
- 4) Write down the differences between the pit and heap method of compost preparing.
- 5) How can we use compost?

## Lesson 5: Introduction and Use of Drip Irrigation

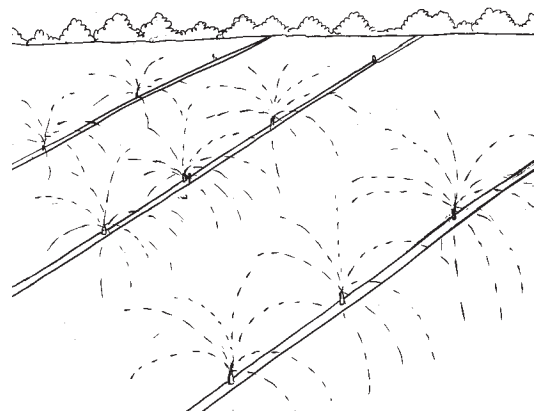
### Introduction to Drip Irrigation

The process of making available the amount of water for the normal growth and development of plants is called irrigation. There are various types of irrigation. Among them, drip irrigation is an effective and modern method of irrigation. Bamboo or polythene pipes that are easily available around our community can be used in drip irrigation. The length of bamboo or polythene pipes should be taken according to the place of irrigation. In this process, small holes are made on the surface of pipe. The water can directly reach the roots of plants through the holes. Holes are made at regular intervals of certain distance on the pipe. In this way, slow, regular and continuous way of supplying water directly to the roots of plants is known as drip irrigation. This method is being used in various agricultural farms and research farms of Nepal. Nowadays, it is being used in farmer's level too. In this process, there is good utilization of water. Every part of farm gets equally irrigated. There is good utilization of water in growth and development of plants.

### Use and importance of drip irrigation

Now, this method of irrigation has been used for seasonal as well as off- seasonal vegetable cultivation in Nepal. The farmers of Kaski, Pokhara, Hemja have gained a good advantage from tomato cultivation using this method of irrigation. Drip irrigation has been used by agricultural research center in Banke, Nepalgunj for grape cultivation. Likewise, this method has been used in various governmental agricultural centers. The important advantage of this method is the maximum utilization of water by plants for their growth and development for better production. Nowadays, ready made polythene pipes are available in the market. It can be used in kitchen gardens or commercial farms as per requirement. Drip irrigation utilizes a small amount of water to irrigate a large part of fields.

This process can easily be followed in Terai and hilly areas of Nepal. The use of drip irrigation is varies according to vegetation, place and available resources. Especially in horticulture farms, drip irrigation instruments are found to be placed near the roots of plants for irrigation.



Through this, the irrigation takes place according to the need as the water reaches the roots of fruits, flowers as well as other various plants. As a result, a better utilization of water results in better production. This ensures a good income for farmers too. Water used for drip irrigation should be clean and clear. Dirty and muddy water should not be used for drip irrigation. The source for drip irrigation should be placed at some height from the farm.

### ***Activity***

- 1) Take a long bamboo and make some small holes on it and prepare a model for drip irrigation.
- 2) Go and observe drip irrigation process in agricultural farm. Prepare a small document in the following topics including the information collected about the drip irrigation and discuss it in the class.
  - a) Introduction of drip irrigation.
  - b) Process of drip irrigation.
  - c) Learnt from the observation.
  - d) Conclusion.
- 3) Prepare a drip irrigation model using a bamboo or polythene pipe and practice irrigation in school and home gardens. (kitchen garden).

### **Exercise**

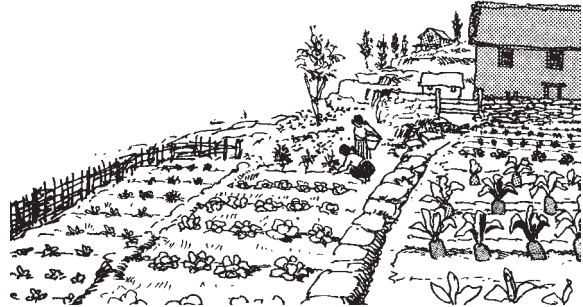
#### **Answer to the following questions.**

- 1) Define drip irrigation with an example.
- 2) How is the drip irrigation used? Explain with examples.
- 3) Write down the main benefits of drip irrigation.

## Lesson 6: Seasonal care and management of kitchen garden

### A. Methods of vegetable farming, care and its production in kitchen garden

The process of producing the vegetables necessary for family members near by our house is called kitchen gardening. Seasonal and off-seasonal vegetables can be grown depending upon geographical situation, soil structure, climate, etc. In Nepal, vegetables grown in winter season are cauliflower, cabbage, rayo (broad leaf mustard), cress, spinach, radish, turnip, onion, garlic, peas etc. For this, firstly, land is prepared by ploughing single and double way with compost. Based on the type of vegetables and season, seeds or seedlings should be planted. Mostly, seedlings are sown or planted on raised beds. This saves seedlings from getting destroyed or submerged in the water. Also, roots can grow properly.



Timely weeding and irrigation produces different types of vegetable (leaf, flower, and seed). These vegetables should be harvested and stored or sold timely, e.g. cauliflower should only be cut after its full maturity.

Necessary beds, canals, and small plots should be made for vegetable farming in the kitchen garden. Seeds or seedlings are planted in summer, vegetables seeds of ladies finger, pepper, cucumber, pumpkin, sponge gourd, bottle gourds, bean, long bean, etc. are sown directly in the field. Staking should be done for crawling types of vegetables. Nylon or jute ropes are used. In town areas where there is a limited area of kitchen garden, vegetables are grown in their verandas.

Sometimes, insects and diseases can attack vegetables. Insecticides and pesticides should be used according to the recommendation. If any vegetable is attacked by insect /disease, insecticides named Nuvan or fungicides should be sprayed according to the problem. Similarly, cow urine, ash water solution, Artemisia (titepati) and neem leaf extract can also be sprayed to control the disease and pests/insects.

### B. Methods of Vegetables Storage

Vegetables produced in kitchen gardens can be stored safely for long time and used or sold later. The process of keeping vegetables fresh and safe for a long time and use is called storage. Vegetable storage can be done as follows:

- 1) Using chemicals: Vegetables can be stored in a safe place by using non-hazardous chemicals for human body/health.
- 2) Canning: - Green pods of beans can be stored by canning in different cans.
- 3) Vegetables can be stored by putting in freezing temperature.
- 4) Vegetables can be stored by drying (eg. dry leafy vegetables, masyaura etc.)

### ***Activity***

- 1) Grow direct seeding vegetables in your house or community.
- 2) Write down the name of locally available pesticides used in controlling insects in vegetables.

### **Exercise**

#### **Answer the following questions.**

1. Write the names of three summer season and staking vegetables.
2. What are the methods of vegetable storage? Write with examples.
3. What are the benefits of seasonal farming to farmers?



## **Lesson 7: Protection from Harmful Diseases and Insects**

Many kinds of vegetables are grown in Nepal. Vegetable crops are damaged by different types of diseases and pests. Therefore, farmers should have knowledge of protecting crops from insects and diseases.

Following are the plant protection measures:

### **1. Field Sanitation**

Field sanitation can be done in following two ways:

#### **A. Destruction of insects/pests in host plants and weeds:**

Eggs of insects/pests and spores of diseases harbor in plant stubbles, leaves, roots, straw and weeds in the field. They attack and destroy crops immediately after sowing them. Therefore, they should be removed and cleaned from the field.

#### **B. Destroying of diseases and pest affected plant parts**

Diseases and pests affected plant parts are seen in the field. They should be destroyed by uprooting, cutting and burning them. For example, virus affected potato plants should be uprooted and burnt.

### **2. Ploughing the field**

Land should be ploughed to expose the bottom soil up in the summer season. This process kills the fungus and insects living in and inside the soil. This can minimize the attack from insects and pests for the next season crop.

### **3. Crop rotation**

Insects that feed on single crops and less mobile insects can be controlled by crop rotation. Insect tolerant vegetables should be grown. Similarly, disease spores can live up to two years in the soil. To control those diseases, crop rotation is a suitable method.

### **4. Use of clean/healthy (matured) seeds and seedlings**

Vegetable cultivation should be done only with disease and insect free seeds. This is the most common medium of disease and pest eradication method in the field. Specially, diseases caused by virus spread through seeds and seedlings.

### **5. Alter the sowing planting time**

Some diseases and insects attack plants during certain seasons or months. If ladyfinger is planted during Chaitra and Baisakh, it is attacked more than it is planted during the rainy season. Similarly, potatoes planted in mid Magh get attacked by blight diseases than the crop planted during first week of Aswin or mid Poush.

## **6. Use of disease resistant varieties**

To control some diseases, use of resistant varieties is better options. Diseases resistant varieties of different crops are recommended by agriculture research and their cultivation has been done. Such varieties of cabbage, cauliflower and tomatoes have successfully been produced.

## **7. Seed treatment**

Crops can be protected from the attack of insects with Malathion dust. (aldrin, dieldrin, lindane, chlorodane banned).

## **8. Use of Chemicals on Plants**

Insects can be controlled by the use of different insecticides. Insecticides enter into the body of insect when it comes in contact. Similarly, diseases can be controlled by spraying fungicides in the form of dust or solution. Killing the insects is most effective measure of viral disease control in vegetables and crops. Insects transmit viruses. Mosaic disease of cucumbers and leaf rolling disease of potatoes are transmitted by aphid and hopper/white fly.

### ***Activity***

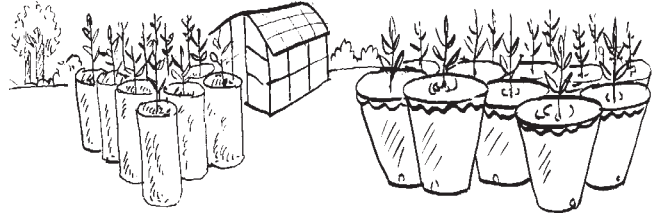
1. Collect the insect and disease affected samples of vegetables and discuss it in your class.
2. Prepare an album of vegetables insects. Collect eggs, larvae, pupa, and adult of the insect which affect vegetables and plants .
3. Collect insects under the weeds and soil and show them in your class.
4. Collect the controlling measures of insect and diseases of vegetables commonly found in your community.

### **Exercise**

#### **Answer the following questions.**

1. Write how insects and diseases harm vegetable crops.
2. Write any three disease and insect controlling measures of vegetable crops.
3. Write any four names of insecticides used in seed treatment.
4. 'Plant protection using disease and pest resistant varieties is better.' Explain this statement with examples.

Pomology is branch of horticulture, which deals with fruit cultivation, production, protection, storage and their marketing. Fruit saplings are produced by seeds or by a vegetative method. These are very tender in the beginning.



So, they should be protected from bright sunrays, rain and hail, wind, frost and dew. A farm having small saplings of fruit crops and made for proper care and management is called a fruit nursery.

### **Importance of Fruit Nursery**

Different types of fruit saplings can be grown in a small area. Selling price of sapling grown in nursery is high. Such plants can ensure a good return for farmers. Fruit nursery benefits farmers in the following ways:

1. Fruit plants can be grown, protected and produced in a fruit nursery in favorable environment.
2. Good income can be earned by selling fruit saplings.
3. Visitors can be attracted.
4. Fruit nursery adds beauty to environment. Large fruit nurseries attract tourists as well. Earning can be enhanced by selling tickets to visitors.

### **Methods of Fruit Nursery Preparation**

Nowadays, fruit nurseries can be seen in villages and city areas everywhere. There are commercial nurseries, from which farmers generate income. For setting up a nursery, fertile land that faces south is suitable. Also, light pulverized and loam soil is better for a fruit nursery. It is necessary to have a water source near nursery land. There should be a provision of roof to protect seedlings from bright sunlight, wind, rain and storm. Seeds should be sown immediately after the fruit is ripening in case of mangos, jackfruits, oranges and litchis. Seeds of walnut, peanut and sweet almond must be sown only after soaking them in water for one or two days. Grafted fruit saplings should be kept for six to twelve months in the nursery. Healthy parental quality and pure saplings can only be found from a well managed nursery. Farmers can sell seasonal and off-seasonal fruit saplings in the market.

### ***Activity***

1. Plant the fruit saplings in your nearby community nursery.
2. Visit a nursery nearby your community. What type of fruit saplings are there? Study and discuss them in class.

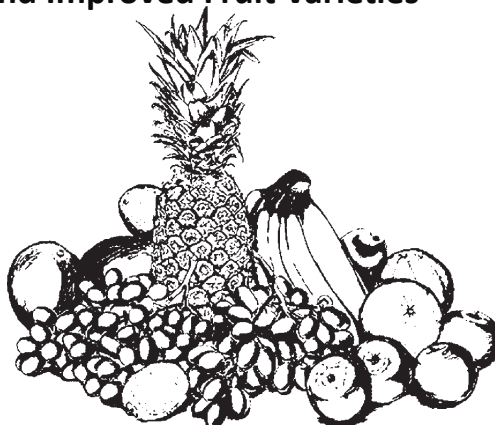
### **Exercise**

#### **Answer the following questions.**

1. What is a fruit nursery? Describe it with examples.
2. What points should be considered while preparing a nursery? Write any four points and explain them.
3. Describe the method of preparing a fruit nursery.
4. What is the importance of fruit nursery? Explain.
5. What may be the benefits of establishing a fruit nursery?

## Lesson 2: Identification of Local and Improved Fruit Varieties

We can see different types of fruits grown in our villages. Cultivating fruits, eating them, squeezing the juice from them has been practised for a long. Locally grown common fruits include mangos, jackfruits, papayas, oranges, bananas, litchi etc. In recent times, high yielding improved varieties of fruits have been developed along with local varieties.



### Identification of Local Fruit Varieties

Different types of fruits grow in different climatic conditions. Fruit germinated and grow in local places are called local fruits. Mangoes, bananas, apples, pineapples, guavas, amlas, lime, lemon, pears, etc are local fruits. Local edimayal (wild pear) and sukhila syau (wild apple) is found in Karnali zone. Mayal and Pharping are famous local varieties of pears. Local varieties of mangos are *Kaliaanp*, *Bhadaure aanp*, *Supare aanp*. Likewise, local banana varieties are *Malbhog*, *Phusre*, *Mungre*, *Charinangre*, and *Dhusre*. Fruit plants of local varieties are tall in height. They bear fruits late; have long life, and are tolerant to diseases and insects. Local varieties have sweet taste.

### Identification of Improved Varieties

Improved and developed varieties of fruits are being produced applying new technologies on local varieties. Those varieties have better yields compared to local varieties. For example, some names of fruits and their improved varieties are given below.

S.N	Fruit name	Name of improved varieties
1	Apple	Red delicious, golden delicious, McIntosh, Jonathan, Rome beauty, Cox orange pippin, Red June, Anna etc.
2	Pear	Hawana, Chojuro, Bartlet, Kosui, Hosui.
3	Mango	Bombay green, Bombay yellow, Maldah, Krishna bhog, Jarda, Dashhari, Langada, Neelam, Aamrapali, Mallika, Chansa, Subarnarekha, Gulabkhas, Sipiya, Kalkottia etc.
4	Banana	Robasta, Pavan, Basrai, Dwarf, Harichhal, Rasthali, William Hybrid, Chinia champa, Gross etc.

S.N	Fruit name	Name of improved varieties
5	Pineapple	Jaint Kew, queen, mouritious etc.
6	Guava	Illahabad safeda, Locknow-49, Bedana, Chittidar, redflesh, etc.
7	Aonla (Amala)	Banarasi aonla, Frassi, Kachaiya, Manchan, Krishna etc.
8	Litchi	Mujjapfarpur, seedless, Rosescented, Sahi, China late, Bedana, Calcuttia, earlilarge, Red etc.
9	Peach	Redheaven, floridasun, perigreen, Alberta, French early, spring time etc.
10	Persimmon	Fyu, Jiro, Hachia, Jenjimar, Haratanenasi etc.

### **Activity**

1. Plant local fruits available in your village.
2. Demonstrate the matured/ripen local improved fruit varieties available in your village in your class.

### **Exercise**

#### **Answer the following questions.**

- 1) Differentiate local and improved fruit varieties with examples.
- 2) Write any four names of local fruits found in Nepal.
- 3) Write any five names of improved varieties of fruits found in Nepal.
- 4) Write the method of identifying local and improved fruit varieties with examples.

### Lesson 3: Time and Method of Fruit Harvesting

We mainly grow fruits either for consuming them at home or selling them in the market. Every farmer thus will expect to get a good production as per their fruit types. For this, farmers must take well care while fruits are growing in plants. They should also have knowledge of appropriate time and method of fruit picking or harvesting. Only well matured fruits should be harvested. Some fruits are harvested and eaten only after they have ripened in the tree. Some fruits are stored, eaten or sold in market 2-4 days after harvesting. Following factors determine the time of harvesting fruits.

a) **Softness:** - Fruits like peach, plum, and avocado are soft and mushy while it ripens. It indicates that fruit is ready to harvest. Most of the unripe fruits are hard.

b) **Colour:** - Fruit colour also indicates whether the fruits have ripened or not. Fruit colour changes to brown, yellow or light red from green. This indicates the time for harvesting fruit. Grape is harvested after colour maturity. Orange is harvested as the green colour starts becoming reddish-brown. Box byrtle (kafal, Myrica, esculenta) is harvested only after fruit becomes red in colour.

c) **Tasting and eating of sample fruit:** - White grapes, mango, plum, apple, fruits can be harvested only after eating and tasting them. To know whether or not the fruit is matured, we bite it, and form an idea based on its taste, softness and sweetness.

d) **Varietals character:** - In some fruit variety, characters are seen after full maturity such as pineapple and jackfruit give off pleasant smell after they have ripened. Similarly, good smell comes from ripened McIntosh variety of apples. Fruits should be harvested considering their types. We must pick them by catching slightly on their stem. A ladder can be used to collect ripe fruits from big and tall trees. Fruit harvesters should take baskets or bags with him/her. In some cases, we can also use stick and stones to get fruits from tall trees. However, this scratches fruits, and may decrease their quality. Fruits should not get scratched. We should avoid leaving any spots or patches on fruit skin during the entire process of harvesting. Otherwise, it will be difficult for us to sell fruits in the market. This would lead to decrease of fruit cost and hampers the income of farmers.

#### *Activity*

1. Collect the fruits harvested after they have ripened. Discuss with your friends about their time and method of harvest.
2. Prepare a report on time and method of harvesting of different fruits. Ask farmers or agriculturists about it.

#### **Exercise**

##### **Answer the following questions.**

1. How do we know the time of fruit harvest?
2. Make a list of ten fruits which are harvested based on their colour.
3. Point out the process of fruit harvesting and explain in brief.

## Lesson 4: Method of Fruit Preservation

Fruits are harvested when they are ripe. Fruits are mostly consumed at home. But, all of them cannot be consumed at a time. If fruits' quantity exceeds the domestic consumption, they can be sold in *haat bazaar*. Matured fruits can be stored and sold during off-seasons. When we do so, we can fetch a good profit from them. In big industries, Jam, jelly and juice are produced from fruits. Likewise, these can be stored in cold stores too. In our locality, fruits can also be stored inside the house.

### Methods of Preserving Fruits

- a) **Canning and cooling:** Temperature should be maintained during canning. Temperature is a medium of cooling and freezing. For this purpose, fruits should be graded and selected accordingly. While preparing, fruits skin, core, stems are removed, washed and cleaned. Blanching can fill, brine solution filling and corking is done while preserving fruits. Then these are preserved in suitable temperature, either increasing or decreasing it. After completing all jobs, labeling and storage are done.
- b) **Drying:** Matured fruits are cut into pieces and dried. Apples are cut into thin pieces and dried in Marpha (Mustang). They are then eaten or sold. The same method is applied for pears too.
- c) **Pickle making:** Fruit fibers are protected from bacteria, fungi and enzymes. People also make pickle from fruits by keeping them in appropriate pots.

### Activity

1. Which fruits are preserved with local technology in your community? Find it out by asking farmers, agriculturists or your gardener.
2. Preserve ripe fruits found in your locality by using local technology and show it to your teacher

### Exercise

Answer the following questions.

1. What is the main objective of preparing fruits? Mention it.
2. What is the local method of preparing fruits? Mention it.



## **Lesson 5: Tools and Methods and Tools of picking fruits**

Fruits should be picked carefully. Generally, fruits are picked after they are ripe. Fruit skin should be protected while picking them. Scratched fruits quickly get rotten. As a result, farmers do not get desired income. Instead, they will have to bear a loss.

### **Common instruments of picking fruits are as follows:**

1. **Bag:** A kind of back pack bag is made for picking fruits from the tree. Bags may be of jute, cloth, windless straw (baby) or plastic.
2. **Hook:** Hooks made of iron rod or bamboo sticks are used to bend branches of fruit trees to pick up fruits.
3. **Ladder:** Iron, aluminum, bamboo or wooden ladders can be used to climb up fruit trees.
4. **Doka or Thumse (bamboo baskets):** Bamboo baskets are necessary for picking fruits. Baskets are suspended in the middle pair of tall fruit trees, and picked fruits are thrown into it.
5. **Net:** Fruits can be protected by net from falling on the ground. Fruits are picked and dropped into the net.
6. **Use of sickle, scatter and khurpi:** - Fruiting stem/ stalk (bhetno) of some fruits are thick and strong. They cannot be picked up with hands. Secateur, sickles or Khurpis should be used to pick fruits like jackfruits, pineapple etc.

### ***Activity***

1. What types of equipments are in use to pick fruits in your locality? Discuss it in your class.
2. Make a hook to pick fruits and show the fruits picking process.

### **Exercise**

#### **Answer the following questions.**

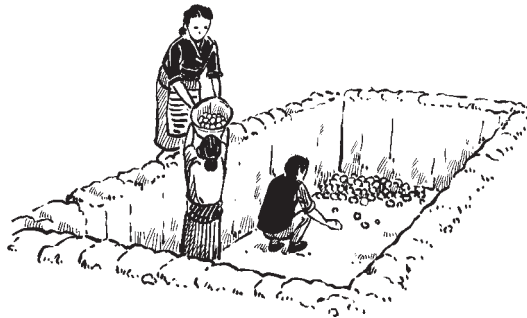
1. Explain fruit picking equipments briefly.
2. What are the harmful effects of fruit picking if no precaution is taken. Explain.

## Lesson 6 : Local Technology of Fruit Storage

How are fruits produced in your locality stored? Have you ever seen it? Such technologies are discussed in this lesson.

### Storage in Sack or Bamboo basket with Sand

Farmers use local materials and practices for storing fruits. One way is keeping them in a box or a sack. For this, sand is kept on the pit in a wooden box or sack. Fruits are stored for some months in it after harvesting and before taking them to the market. When fruits start to ripe, farmers store them for some weeks in sand of



bamboo baskets or gummy sac. Similarly, well matured bananas ripen well when they are put into a paddy store. Another method is to keep them in a pit. A pit of appropriate size is dug to store well matured oranges. Sand is put on the bottom of the pit. Oranges are carried from the garden, put into the pit and buried with sand. Oranges kept in this way are safe and fresh for 2-4 months. Farmers in Tanahun, Shyanjha, Parbat, Gorkha, Lamjung are following this method of storage. Central Food Research Laboratory, Babarmahal, Kathmandu is also conducting experiments for finding out suitable ways of storing fruits underground. Local materials like stone, soil and woods are used for underground storage. A Research carried out on underground storage in Mustang, Baitadi and Solukhumbu districts of Nepal have confirmed that apples stored in Aswin was found safe till Chaitra month. Thus, fruits can be stored at low cost with local resources and materials.

### Activity

1. How are local fruits stored for later consumption in your locality? Discuss it in your class. How fruits are stored using local resources?
2. Dig a pit in your school compound and store any two types of fruits in sand according to local technology for later use. Discuss it in group.

### Exercise

#### Answer the following questions.

1. How can fruits be stored with local technology? Explain.
2. Write the importance of underground storage.
3. Write about the trial conducted by Central Food Research Laboratory, Kathmandu.

## **Lesson 7: Method of Packaging and Transportation**

Fruits are grown for home consumption and earning income by selling them. No return of investment can be obtained till they are sold. Fruits should be properly selected, graded, packaged and arranged to carry them to the market. If we have not done it carefully, fruits get damaged, decayed and lost. Our entire labour of producing fruits goes in vain.

### **Method of Fruit Packaging**

After fruits become fully grown, they are harvested and graded according to their types and sizes. They are kept into different suitable packs, cartoons and sacks to carry them to the market. Packaging methods are different according to nature of fruits. Fruits having soft and hard skins should be packed differently. Fruits like apples, pears, peaches and mangoes should be wrapped with soft paper and kept in wooden boxes, cartoons and hard paper pack in line. Likewise, mangoes are packed in baskets, *Doko*, *Thumse*, wooden or paper boxes. Thus, the act of keeping fruits in different materials is called packaging. Locally found leaves, skins, moss, thatch grass, straw, *babiyo* (a kind of grass plant) etc can be used for packing up fruits.

### **Method of Fruit Packaging**

Transportation is necessary to carry the packaged fruits from the place of production to the *Haat Bazaar* or market. In places of Terai and hills where there is a road access, fruits can be transported by trucks, buses, tractors, three-wheelers, rickshaw etc. Especially, big vehicles are required for a large amount of fruits. Fruits like jackfruit and pineapples are kept in boxes. Cartoons, baskets, sacks, bags are transported after they are properly placed in vehicles. In high hill regions, fruits are kept in *Doka* and *Thumse*. They are either carried by people or animals. While transporting fruits, care must be taken that no scratches and damage take place on fruits. Fruits having very soft skin must be transported after putting them in baskets or cartoons.

### **Activity**

1. How are fruits packed up after harvesting in your community? Visit a farmer or garden owners near your community and prepare a report based on it. Discuss it in your class.
2. What are the means of transportation in your locality? Carry fruits in groups to the market using those transportation means.

### **Exercise**

#### **Answer the following questions.**

1. Why are fruits packed up after harvesting? Write them in points and explain it in brief.
2. What are the main means of fruit transportation in our country? Write them in points.
3. It is difficult to transport fruits in high hills, why? Give reasons.

## **Lesson 8: Identification of Diseases and Insects on Fruits and their Traditional control**

### **A. Identification of Disease and Insects on Fruits**

Fruits are attacked by different diseases and pests. Grass hopper, flies, mealy bag, steno weevil etc. attack mangoes. Similarly, anthracnose powdery mildew, mango malformation, black tip etc are the diseases that attack mangoes. Likewise, insects like weevil and thrips attack bananas. Banana leaves are attacked by anthracnose and bunchy top diseases. We can identify diseases and insects that attack fruits from symptoms. Generally leaves get wilted, become dry; holes are seen on them, or they fall off. Fruit braches become dry and fruits start falling on the ground. Eventually, fruit plants die. Farmers will have to bear a huge loss.

### **B. Traditional Method of Controlling Fruit Diseases and Insects**

If fruit garden gets attacked by any diseases and insects, one should contact at nearest agriculture service center. Care should be taken on field sanitation. We should also properly irrigate the field according to seasons. If we find any plants affected with diseases, the entire plant or affected parts must be disposed by cutting or burning them. In general, cow urine, soap solution, tobacco solution neem extract, artimesia, adhatoda etc can be used to control fruit insects.

To control flies in fruits, a pheromone methyluginol should be used. Male flies are attracted by pheromone and killed with the effect of malathion. Five drops of methyl euginal and five drops of Malathion should be dropped per trap. This should be used every month. To control the mango hopper, one milliliter metasystox should be mixed in one liter of water and sprayed on the tree before flowering. To control the anthracnose of mangoes, blitox 50 should be sprayed for 3-4 times. For apples scab, dithane M-45 or should be sprayed mixing 3 gram per litre in water. To control the wooly aphid of apple a parasite Aphelinus Mali should be used.

### **Activity**

Collect the samples of fruits attacked by diseases and insects in your community and control them with the help of natural measures.

### **Exercise**

**Answer the following questions.**

1. List the names of insects that attack mangoes and explain them in brief with major measures of their control.
2. What are the measures to control the fruits affected by insects?
3. What are the major losses caused by diseases and insects of fruits?

**Lesson 1: Production, Processing and Storage of Dry Vegetables**

Green leaves and different types of vegetables can be dried and stored for off-season consumption. During winter, mustard (tori), rayo, radish, spinach are found abundantly whereas it is difficult to find them during off-seasons. So, dry vegetables can be used.

Production, processing and storage of dry vegetables can be done as follows:

1. **Selection of vegetables:** Vegetables appropriate to harvesting are selected. Vegetables selected should be fresh and clean. Soil, dirt, insects etc should be removed. Vegetables recently sprayed with pesticides should not be selected and it should not be over matured and tender too.
2. **Washing/cleaning vegetables:** Vegetables are washed with shower of clean water in a big bowl or net.
3. **Initial processing:** Cleaned vegetables are cut into small pieces or made ring shaped and processed initially.
4. **Steaming or blanching:** In this method, cut pieces of vegetables are laid on clean cotton (muslin) cloth and dipped on boiling hot water. It is boiled for two to eight minutes according to the type of vegetables. Little amount of baking soda is mixed, the natural color of leafy vegetables become dark.
5. **Drying:** Water should be immediately drained from vegetables after blanching. These vegetables should be spread on a clean tray, naglo, mandro etc. and kept under the sun or solar or electrical dryer. Vegetables should be turn upside down time to time to enhance drying. It is kept only after proper drying.
6. **Cooling:** Vegetables after drying should be kept in a cool and dry place for about one hour. It is better to pack then after.
7. **Packing:** Dried vegetables after cooling is packed in 250 gauge thick plastic sacks and be sealed carefully not to allow the air to enter. Then, vegetables packet is labeled with their name, variety, date of packing, quantity etc.
8. **Storage:** While storing the dried vegetables, humidity of the room, temperature, sunlight etc should be considered. Store room must be dry and cool. Thus produced dry vegetables can be sold in the market. With the above method, carrot, cauliflower, cabbage, green peas, hot pepper, potato, tomato, beans, bitter gourd, radish, turnip, spinach, rayo, colocasia stem and leaf, onion, brinjal, garlic etc can be dried for producing dry vegetables.

### *Activity*

1. What type of dry vegetables are produced in your house and community? Collect one sample of each vegetable and discuss their method of preparation.
2. Make a group of appropriate size in your class and demonstrate the method of vegetable drying of any four vegetables found in your locality in your classroom.

### **Exercise**

#### **Answer the following questions.**

1. Introduce dry vegetables with examples.
2. Write the production and storage technology of dry vegetables with examples.
3. How are dry vegetables produced from green vegetables, prepare a list of it.
4. Write down the differences of green and dry vegetables on the basis of taste, colour, etc. if you have eaten any dry vegetables.

## Lesson 2: Production, Processing and Storage of Dry Fruits

A system of fruit drying and eating has remained as a common tradition in our country for a long time. Inedible parts of fruits like skin, seeds, stalk, etc are removed. Then, fruits are cut into small slices and dried on *mangle or mandro* (flat baskets). Production of dry fruits, processing and storage methods are presented stepwise below:



- a) **Preparation and selection of fruits:** First of all, the fruits should be collected and identified the condition of the selected fruits. Then fruit should be washed for 2-3 times after harvesting.
- b) **Cutting into slice:** According to the nature of fruit, it is cut into slices in desirable shapes after removing the skin and seeds. If a slicer is used, slices are of uniform in shape and slicing process is less time consuming.
- c) Blanching or **Dipping into solution of Potassium Metabite Sulphite or brine (KMS):** After making slices, these are dipped 2-3 times into brine or 0.5-1 percent KMS solution. Otherwise, cut fruits come into air contact and changes into brown or black colored sliced; and seem unattractive. According to nature of fruits and the thickness of slices, it can be dipped for 20 minutes to 1 hour. If the slices are to be blanched slices are kept in muslin cloth and dipped in to boiling water for 2-5 minutes.
- d) **Drying:** Slices dipped into brine or KMS should be taken out and dried. Slices should be kept by spreading on a tray, Nanglo, mandro etc. Slices can be dried with thinly spreading or with the help of solar or dryer. Slices should be dried on well ventilated and sunshine area. If not, it may be damaged by poor ventilation. Dried slices must be broken while breaking.
- e) **Cooling:** Just after drying, packing should not be done immediately. After drying, water vapour is produced from hot slices and can be damaged with the fungus attack. Therefore, slices should be cooled in a cool room for 30 minutes before packing.
- f) **Packing and labeling:** Slices should be put properly on 150 gauge polythene packaging sacs. It should be sealed airtight. Slices if packed on the sacs of double packing or aluminum laminated sacs; and if packed by vacuum or nitrogen packing are done; it can be preserved for a longer period. Printing on packing sacs can also be done while labeling. If not, printed paper can also be stuck.

- g) Obtaining ratio:** Generally, fruits decrease up to 1/4<sup>th</sup> to 1/9<sup>th</sup> the part of fresh fruits weight after drying. Quantity of dry slices obtained from 1 kg of fruit is as follows:-

S.N	Name of fruit	Quantity(gm)
1.	Apricot	150-200
2.	Apple	100-160
3.	Pear	140-190
4.	Grape	210-270
5.	Mango	140-190

Generally, slices are made up of apricot, apple, pear, pulp, grapes, mango etc.

### ***Activity***

1. What dry fruits are produced in your house? List and demonstrate the model in your class.
2. Go and observe the dry fruit producer farmer and demonstrate with model process in your class.
3. Form different groups of students and bring one fruit per group, cut into slices, demonstrate the process of storage.
4. Form groups in class and prepare dry vegetables of rayo and mustard (tori) etc, leafy vegetables and discuss it in classroom.

### **Exercise**

1. When was the trend of dry vegetables production started?
2. What is blanching? How is it done?
3. Why should dry fruits and vegetables be stored in a cool and dry place?
4. Describe the drying method of fruit slices.



### **Lesson 3: Introduction and Study of Recipe**

We eat a variety of food items. Thus, the process of preparing food with different food items is called recipe. Process and method of preparing food items are given in recipe. Based on it, we can cook our food. In this lesson, such types of recipe models are given.

#### **1. Recipe for Rice Pudding**

Materials required:

- (a) Rice ( long grained or Basmati) = 200 gm,
- (b) Milk = 2 liters
- (c) Ghee = 2 spoonful
- (d) Sugar = one pau (can be increased or decreased according to the taste).
- (e) Kismis, coconut, cardamom etc can be increased or decreased according to the taste.

#### **Method of preparation**

Wash rice properly. Fry the rice well on heated ghee. Put out the fried rice in next pot. Now boil milk properly. Add fried rice in boiling milk and mix it by stirring. When the milk and rice mixture becomes thicker while cooking, add two spoons of kismis, coconut, cardamom etc. into the pot. After mixing these materials, stir it. Now, thick rice pudding is ready. Rice pudding is kept into the plates to eat when it is ready. Thus, rice pudding is prepared.

#### **2. Recipe of Tea**

Materials required to make tea for four persons.

- (a) Water : three cups
- (b) Tea leaves : three spoonful
- (c) Sugar : five spoonful in different cups
- (d) Milk in cups
- (e) Cardamom according to taste

#### **Method of Preparation**

Mix water, cardamom and milk in the kettle. Boil it properly. Mix the tea leaves and let them continue boiling in the kettle. Pour prepared tea into cups filtering through a net. Serve the tea into cups and put sugar in them. People drink tea by adding sugar according to their taste. In this way, tea is prepared.

### **Activity**

1. Prepare rice pudding for ten friends in the picnic based on the above mentioned recipe.
2. Prepare and serve tea in your school annual anniversary programme following the above specified tea recipe.

#### **A. Recipe of Cucumber Pickle**

Materials required:

Cucumber	= 1 kg
Salt	= 200 gm
Chilly powder	= 15 gm
Cardamom	= 10 gm
Small cardamom	= 10 gm
Cloves	= 6 pieces
Hing	= 2 gm
Turmeric powder	= 10 gm
Sarson grain	= 20 gm
Venegar	= 750 ml
Jeera (cumin)	= 10 gm

#### **Method of preparation**

Take a well matured cucumber. Wash the cucumber properly with clean water. Peel out the external skin of cucumber. Cut the cucumber along with longitudinal side making long pieces. Remove seeds and internal pulp of the cucumber. Cut the cucumber into small pieces and mix salt in them. Fill the glass vessel or bottle with this and put them for 12 hours. Remove the water from the cucumber and mix the powder of condiments and vinegar with it. Then, take another bottle, glass or jar. Fill it and keep the bottle cap tighten. Keep it for about 7 days in the sun and it can be used or sold after labelling.

#### **(A) Recipe of Pear Pickle :**

Different recipe can be prepared from pear though it is a fruit. Jam, Jelly, dried fruits and pickles are some items that can be made from pear. The recipe for pear pickle is given herewith:

### **Material required**

Pear	=1 kg
Sugar	= 200 gm
Cloves	= 6 pieces
Black pepper, cumin, cardamom	= 10 gm each and
Vinegar	= 200 ml

### **Method of Preparation**

Take a fully matured pear that is going to be ripe. Wash it with clean water. Peel it properly. Cut it into four parts. Soak cut pieces in 2 percent salt solution immediately. Cook it for 8-10 minutes mixing sugar, vinegar and other ingredients. While cooking, pear pieces should be covered with the solution of vinegar and other ingredients. Then, it should be kept in dry bottles or jars and stored in cool and dry places. This pickle is stored, labeled, used and sold in the market.

### ***Activity***

1. Prepare a recipe of rice pudding for ten friends in picnic.
2. Prepare a recipe for the pickle of Pear for all of your friend in the picnic.

### **Exercise**

#### **Answer the following questions.**

1. Write an introduction of recipe with examples.
2. Prepare a recipe of tea for eight persons.
3. Prepare a recipe of rice pudding for four persons.

## Lesson 4: Production Processing and Safe Storage of Pickle, Chuck, Tofu, Chhurpi and Juice

### A. Production, Processing and Safe Storage of Pickle

Different kinds of pickles can be prepared from fruits and vegetables found in villages or agriculture farms. Locally found fruits and vegetables are mixed and fermented after keeping them with salt, vinegar and oil. Food materials prepared with this method is called pickle. Pickle prepared by mixing different types of fruits and vegetables is called mixed pickle.



#### Method of Preparation

Select different kinds of fruits and vegetables. Wash, clean and cut them into small pieces as required. Spices, oil, ginger, garlic etc can be mixed as desired. This mixture is kept in one pot after mixing different types of spices. Thus, by putting into glass jar, pickle can be stored safely.

#### Types of pickles

- Pickle with only salt such as cucumber pickle, nimki of lemon.
- Pickle kept by dipping into vinegar or lemon juice (sour).
- Pickle of Akabare or green pepper, sesamum, or lemon pickle.
- Pickle preserved on cooking oil: radish, carrot, or mango pickle.
- Pickle prepared by drying the moisture on fire: lemon pickle, apple, tomato chutney etc.

After preparing Pickles should be sealed and labeled with the information like date of production, date of consumption, ingredients and their quantity etc. Pickles can be used in our own house or sold in the market or stored for future use.

### B. Production, Processing and Safe Storage of Chuck

Sour juice can be produced by squeezing citrus fruits like, lemon, lime, rough lemon (jyamir) etc. This juice is boiled to reduce the water contents in it. After boiling it for a considerable time, thick liquid is prepared. This liquid is called *Chuk*. *Chuk* is mixed with pickle to make it sour.

#### Method of Preparation

Juice of lemon, rough lemon, lime, etc is boiled. Boiling it for a long time reduces the water contents in it. Finally, juice changes into thick liquid, which is called *Chuk*. Properly boiled *Chuk* can be stored in a closed container for one to two years. *Chuk* is mixed while making fresh pickle. Pickle can be made from different vegetables by mixing *Chuk*. For example, we can make fresh pickle by putting a little amount of *Chuk* on cooked potatoes, bitter guard and ladyfingers etc. We can store *Chuk* in a packet, can bottle etc. We can sell it in the market with labeling. If it is produced

for a commercial purpose, it should be labeled with a date of production, last date of consumption, ingredients mixed and their quantity. Chuk can be used in the house, sold or stored as per need.

### **C. Production, Processing and Safe Storage of Tofu**

*Tofu* is a food item made from soybean. It is nutritious and healthy to eat. The word *Tofu* comes from Japanese language. The curd of soybean is called *tofu* or bean curd. We eat *Tofu* mixing it with different food items.

#### **Method of Preparation**

Soybean is soaked for 18-30 hours. Make it fine sludge by dehusking and grinding. Add ten times more water on this sludge and boil. Soybean milk is prepared after sieving with muslin cloth. Add calcium sulphate two percent or ten percent sour milk and stir it. Put it on *Tofu* making machine and cover it with cloth. Press the machine with heavy weight. Thus prepared food item is called *Tofu*. Make pieces after the *tofu* is prepared. Change water for 2-3 times and store it in cool and dry places. *Tofu* made from soybean can be eaten mixing it with different vegetables, pickles or legume seeds or paneer.

Tofu can be stored, used and also sold in the market, packed in bottle, packet, can etc with the lases of date of manufacture, last date for consumption, ingredients and their quantity.

### **D. Production, Processing and Safe Storage of Chhurpi**

Chhurpi is milk made food item produced in a high hill region of Nepal. Churpi is made with Chauri milk. A dried and very hard milk product is called Churpi. This is cut into small pieces and eaten.

#### **Method of preparation**

First of all, curd is made by fermentation of Chauri milk. After extracting ghee from curd, the remainder is called whey. This whey is heated and it is split. Split solid is collected in muslin cloth. Water is drained from it by pressing with heavy weight or stone. When it becomes hard, it is cut into long pieces and Churpies are made by drying them.

Milk products used by Sherpas of Himali region are sercom (ser), soy syo etc. This *ser* is pressed, dried and cut into pieces and, Churpi of sercom is prepared. At present, government and private cheese factories are in Rashuwa, Sindhupalchok, Dolakha, Ramechhap, Solukhumbu, Taplejung, and Illam districts. Those farmers who are not able to sell their milk in cheese factory produce butter, ghee and Chhurpies. Chhurpi production is common in Olanghungola region of Taplejung, Pashupatinagar of Illam, Ranke, and Rakse and in the border area of Pachthar. *Chhurpi* is prepared from buffalo milk in Deurali of Kavre district. Local entrepreneurs have been running 8-9 Chhurpi factories in Kchetrakali and Tamaghar rural municipality of Sindhuli district.

Thus produced Chhurpi can be kept in a packet, can, bottle, etc. and sold in the

market with labeling. If it is produced for commercial purposes, it should be labeled with a date of manufacture, last date of consumption, ingredients mixed and their quantity. We can use Chhurpi for home consumption and commercial purposes.

### **E. Production, Processing, and Safe Storage of Juice**

Liquid obtained by squeezing fruits is called juice. Such fruit juice is consumed as a drink. We extract juice from different types of fleshy and juicy fruits.

#### **Method of preparation**

Fruit pulp is obtained by removing its skin and seeds. Juice is extracted from that pulp using a hand or electrical juicer and strained in muslin cloth or nylon net. This juice is left to allow rough fibers and other solid contents to get sediment and filtered. Then, the liquid is heated for about one minute at 82 degree centigrade. Sterilized bottles are filled with this juice. Then, they are sealed with corks.

Thus produced juice can be kept in a packet, can, bottle, etc. and sold in the market, labeling them properly. If it is produced for a commercial purpose, it should be labeled with date of manufacture, last date of consumption, ingredients mixed and their quantity. We can either consume fruit juice at home or sell it in the market.

Juice can be produced from mangoes, pineapples, apples, sweet oranges, oranges, limes, grape, pomegranate etc. Squash (sarbat) can be prepared from juicy fruits by removing their skin and seeds; and adding necessary amount of sugar, sour, and water on it.

#### **Activity**

1. Ask your family members, *Tofu* producers and agriculturists about the process of *Tofu* making and demonstrate it in your classroom.
2. Observe the process of making Chhurpi and share it in the class.
3. How has the juice been produced in your house or community? Ask your family members, shop keepers etc. Discuss it in class
4. How are pickle and Chuk prepared in your house? Ask your family members about it. Make a note of the process.
5. Form groups in your class. Discuss with each other the ways of making pickle.

#### **Exercise**

##### **Answer the following questions.**

1. What is called pickle? How many types of pickle have you seen and eaten? Explain with examples.
2. Note down the process of preparing Chuk in points. Describe its uses.
3. Write the process of preparing Tofu.
4. Explain the process of chhurpi preparation.
5. How is juice produced? What are the major fruits used for producing juice?

## **Lesson 5: Production, Processing and Safe Storage of Turmeric, Ginger, Masyaura and Titaura**

### **A. Production, Processing and Safe Storage of Turmeric Powder**

Turmeric is a root crop used spices. Turmeric is a kind of ayurvedic medicine. This plant is used against cold, cough, eye sore, wound and scratches. Turmeric powder is a medicine to treat gastritis and blood purification. Generally, it is harvested by two years of planting.

#### **Method of preparation**

Turmeric is properly washed with water. It is dried in the sun after washing. Dry root and skin is peeled and washed. It is cut into pieces and dried in the sun. Turmeric powder is prepared by crushing the lumps in *Dhiki or Khal* after drying. Nowadays, machines are available in places where electricity is available. These ground dried slices of turmeric into fine dust/powder. Nowadays, many people have adopted turmeric farming as their means of livelihood. Turmeric powder is packed and stored in bottles, cans or plastic bags.

### **B. Production, processing and safe storage of Dry ginger/Sutho**

The powder made up of ginger is called Sutho. It is used as spices while cooking vegetables and as medicine. In Nepal, sutho production has been done for domestic use and commercial sales both.

#### **Method of preparation**

Bring well matured ginger from the field. Ginger is washed with clean water. Washed ginger is cut into small pieces and dried under the sun. Those pieces can also be packed in air tight containers or plastic bottles for daily use. In other method, dried ginger pieces are ground on spice grinding machine and stored. That is called *Sutho*. In Nepal, ginger production is more than other spices and crops. Sutho is not used as spice, but as domestic medicine.

Thus produced *Sutho* can be kept in a packet, can bottle etc and sold in the market with labeling. If it is produced for a commercial purpose, it should be labeled with a date of manufacture, last date of consumption, ingredients mixed and their quantity. We can use it for daily use or sell it in the market.

### **C. Production, Processing and Safe Storage of Masyaura**

Masyaura is a vegetable related food item. Mostly, *Masyaura* is prepared from the pulse of black gram. Vegetables prepared after mixing water on black gram is called *Masyaura*. It is a dry food product eaten everywhere in Nepal.

### Method of preparation

Grains or pulses of black gram are soaked in clean water. The external coat of wet black gram is ground into thick paste with grinder or *silauto*. Small pieces of leaf and stem of colocasia, radish, cabbage, rayo, vegetables are made. They are mixed properly with the black gram paste (masyauto). *Masyaura* is ready when the mixture is changed into small balls and dried in the sun. When the balls become rigid and hard, they are packed in sacks or small polythine bags. *Masyaura* can be eaten after frying it on hot oil till it gets dark brown colour. We can mix *Masyaura* with other vegetables.

Thus produced *masyaura* can be kept in a packet, can, bottle etc. and sold in the market with labeling. If it is produced for a commercial purpose, it should be labeled with date of manufacture, last date of consumption, ingredients mixed and their quantity.

### D. Production, Processing and Safe Storage of Mombin (Lapsi), Mada (stiff fruit juice) or Titaura (dry sauce)

Lapsi is a kind of sour fruit. It is commonly used in pickle making. This fruit is found in midhill region of Nepal. We can prepare different varieties of food from Lapsi. Making *Mada* or *Titaura* is famous in Nepal.

### Method of preparation

First of all, collect well matured fruits of Lapsi. Then, wash them with clean water. Fill the steel pots with water till the fruits are dipped, and get split. After boiling, take them out and remove the fruit skin. Separate the seeds and pulp from the skinless fruits by wearing clean gloves in hands. Prepare the **Mada** of Lapsi from that fruit paste mixing it with sugar, salt, pepper/chilly, black salt, timur etc. Thus, this food variety is called *lapsi mada*.

There is another way of making *Titaura* combining different ingredients with Lapsi. Pulp and stone/seed should be separated. To prepare one kilogram of spicy *titaura* from the pulp, we should use these ingredients: sugar 800 gm; salt 30 gm; chilly powder 30 gm; black gram 10 gm; timur to taste; asafetida (hing) 3 gm; cumin 5 gm; black pepper 10 gm; and KMS 1 gm. After mixing all these ingredients, spread the paste on a tray by making 1-2 cm to 2-3 cm thick layer. And then, dry the paste in the sun covering it with thin and clean cloth for 3-4 days. Turn the layer upside down to dry it for 1-2 days more in the sun. Fold and keep it properly after it gets completely dried. Now, the *lapsi mada* is ready. Spices mentioned above are mixed in the pulp of Lapsi, small balls are prepared out of it and dried in the sun. In this way, spicy **Titaura** is prepared.

Through this process, plain mada, sweet mada (*titaura*), spicy mada or *titaura*, hot



(piro) mada or titaura can be prepared.

Thus produced titaura can be kept in a packet, cans, bottles etc and can be sold in the market with labeling. For commercial purposes, it should be labeled with a date of production, last date of consumption, ingredients mixed and their quantity. This can be used in the house, sold or stored as per need.

### ***Activity***

1. How is *Masyaura* prepared in your house or local society? Collect samples, ask with your family member or Masyaura shopkeeper about the method of preparation and discuss in class.
2. How is *Titaura* prepared in your home or family or community? Collect samples and discuss it in classroom.
3. Collect the samples of turmeric powder. Ask the process of preparing it with family members, turmeric powder producers or agriculture technicians and demonstrate it in the class.
4. Collect the samples of ginger to prepare Sutho. Ask the process of sutho preparation with family members, sutho producers or agriculture technicians and demonstrate in the class.

### **Exercise**

**Answer the following questions.**

1. What is *Sutho*? How is it produced? Mention its process.
2. Mention the method of preparing Masyaura and Titaura in points.
3. What is the importance of Lapsi in our society? Mention in points the process of producing food items from Lapsi.
4. What do you understand by the safe storage of produced materials? Explain.

People grow different flowers for the purpose of religious, cultural, and natural beauty in their house, kindergarten, orchard and field. Floriculture is one of the branches of agriculture. Nowadays, it is found that flowers are grown mainly in hill and terai regions for economic benefits. Produced flowers are used in festivals, marriage and other ceremonies including death rituals. Flowers can be grown in villages, towns, Terai and Himali region.

### **1. Vase and polypot flower cultivation**

Mostly in town area, flowers are planted in vases (gamalas) and poly-pots in courtyards, kitchen gardens and barandas in our house. Gamalas are found in different sizes. They should be selected according to varieties of flowers, seasons and flowering duration.

While growing flowers, firstly gravels are put into the bottom of Gamalas and polypots. A layer of compost and soil from the decomposed leaves of forest should be set above the gravels. Then, fertilizer, soil, sand is mixed and filled up to 2-3 inch. Upper part of the pot should be left empty. Flowers seedlings are planted on these pots as per the seasons. Water should be sprayed on flower plants daily or at the interval of certain days.

### **2. Collection of seeds and seedlings to plant them on Gamala and polypots**

We must consider different factors while collecting seeds and seedlings. Flowers selected for this purpose should be matured ones. They must be dried properly to take seeds out. Before packing the seeds, they should be dried for 2-4 days more. Each packet should be labeled with descriptions such as the name of flower, date of production, and its variety. It must be a healthy flower with good genetic character: especially bright leaved, unbroken shoots and disease free.

### **3. Preparing seedlings**

Seedbeds are prepared according to the need of seedlings. Seedbed size should be of 2-3 square feet or more. Land for this purpose should be dug for 3-4 times and soil should be made fine by removing wooden pieces, weeds and stones. Well decomposed fym or compost should be mixed properly. Lines need to be drawn on the land and seeds are covered with straw or thatch grass after irrigation if necessary. Normally, seeds start to germinate after a week. Then, the covered materials should be removed. Seedlings grow and become ready to be transplanted in 20-25 days as per flower types.

#### **4. Managing and caring of the Flower (hoeing and pruning)**

Flowers grown in pots should be hoed as required. Weeds are germinated 10-15 days of flower plantation. Weeds should be uprooted and soil should be loosened with our hands or spades. As flower plants keep growing, they should be pruned. Dry leaves, insect and disease affected leaves, stems and branches should be taken away. In order to prevent flower plants from insects, appropriate insecticides can be used by consulting agricultural offices nearby our locality. Regular trimming and pruning is also required to prevent their unnecessary growth. Perennial plants should be trimmed during winter seasons. They look attractive when trimmed to make them of desirable shape and size.

#### **5. Method of flower harvesting and storage**

Flowers grown in pots develop flowering buds after full growth. Then, they sprout gradually. The time of picking flowers depends on whether it is for home use or selling them in the market. Flowers should be picked after their full maturity according to their genetic characteristics. Flowers should be picked carefully without damaging their plants and stems. Generally, it is better to pick them during morning time. Picked flowers should be kept on a dry place. Flowers picked during evening should be kept on the open space at night. If we have a refrigerator, we can keep them inside it. Plucked flowers can be used according to our need or sold. Winter flowers such as calendula, petunia, phonic have high demands in the market.

#### **6. Decoration with flower, garland, and bouquet**

We mostly use flowers to decorate gates, windows of rooms, houses, hotels, schools on various auspicious occasions. Different types and sizes of garlands and bouquets are made weaving flowers with needles and thread. Similarly, flowers plucked along with their stems can be used for making bouquets. Pavilions for marriage, *Bratabandha* and other ceremonies are decorated with garlands. Flower garlands and bouquets are also used for worshipping temples, Gumbas, Motherasha, churches etc. They are used during festivals and death rituals.

#### ***Activity***

1. What types of flowers are grown in your house or local community on *Gamala* and polypots? Discuss it in classroom.
2. Discuss the process of planting flowers in *Gamala* (vase) and polypots in the classroom.
3. Which flower seed and seedlings are selected and collected in your house and local community? Ask with different people and discuss it in classroom.
4. Prepare a seedbed to sow flower seeds in a free space of your school area. Work in group for it.

5. Hoe and trim plants of your *Gamala*.
6. What methods of harvesting and storage of flowers are followed in your house and local community? Ask your guardian, flower producer, gardener, and agricultural technicians. Each student is required to demonstrate one method in your school.
7. What types of flowers are used to decorate or making garlands, bouquets in your local community? How is it done?
8. Prepare bouquets and garlands of flower and decorate your school during its anniversary.

### **Exercise**

#### **Answer the following questions.**

1. How is flower grown in Gamala or polypots? Write the process
2. How can flower seeds be collected?
3. Write the method of seedling production from flower seeds.
4. Write the method of picking and storage of flowers.
5. Describe the use of flowers in short.
6. In which place and occasion is flower decoration done? Mention it briefly.

## Lesson 2: Medicinal Herb Farming

Medicines and scent/ perfumes are made from parts of different plants and weeds. In other words, parts such as roots, leaves and stems are used for medicinal purposes to treat different kinds of diseases. Mugwort (Titepati), spike nard/ jatamasi, holy basil (Tulsi), ginger, chirayito etc. are medicinal herbs.

### 1. Types of Medicinal Herbs

In our country, about 7 000 types of plants are found. Out of them ten percent or 700 plants come under medicinal herbs. About 238 types of herbs are chemically analyzed till now. Medicinal herbs are mainly of two types: medicinal and aromatic oils.

#### Medicinal herbs

- a. **Root/rhizome types:-** salaporchid (Panchaunle), spikenard, sweat flag, calamus root (Bojho), forest garlic, valerian (sugandhawal), deltoid yam (vyakur), rock foil (Pakhanbed)
- b. **Leafy types:-** Nepalese cinnamon, kumkum, Himalayan yew (Lothsalla), bhorla, mugwort, Malabar nut (Asuro)
- c. **Seed and fruit types:-** pipal, uttrasum bead tree (rudrakshya) hug plum, chest nut, soap nut tree, Nepal sassafras, Soap pod, Cherubic myriobilion, Ebmlic, myrobalan or gooseberry.
- d. **Plant types:-** Cordyceps, lichen, Indian madder, chiretta, water pennywort, ephedra (Somlata), common club moss, jibanti or orchid
- e. **Bark types:-** box-byrtle, walnut, Nepalese cinemon, barberry, Himalayan silver birch, devils tree, totalo, bastardteak, arjun (white murdha), neem (margosa tree)
- f. **Flower and fur types:-** Rhododendron, iron wood, malatar nut flower, silk cotton, tree fur, giant milk wood flower
- g. **Colour types:-** Long pepper, Indian madder, gooseberry, mehendi, bell flower.
- h. **Gum and resin species/group:** - Shilagit (Rock exudate), gokul dhup, raktachandan, saldhub.

#### Aromatic oily herbs:

Under the aromatic oily herbs are Nepal sassafras, menthe, citronella, Basal, Marigold and so on.

### 2. Time of Medicinal Herbs Collection

Collection time of all medicinal herbs is not the same. Care should be taken while collecting naturally grown or cultivated medicinal herbs. Which part of the herb is used? Are they matured? Generally, in which season do they get matured? Which

time is good for harvesting them? We must have a good idea about these factors while collecting medicinal herbs. Some information regarding this presented in the table below:

S.N	Parts of herbs to be collected	Name of medicinal herbs	Month of collection
1	Root and stem	Spikenard, Himalayan rubark, rock foil, valerian, sweet flag, deltoid yam, atis root, picrorhiza, serpentine.	Aswin to beginning of chaitra.
2	Bark	Barberry, Neem, Himalayan silver birch, Nepalese cinnamon etc.	Before new flush in plants or within Falgun-Chaitra.
3	Leaf	Belladonna, Nepalese cinnamon, thorn apple, digitalis, mugwort.	Collected before flowering.
4	Flower	Chamomile, simal	Dry air and before complete sprouting of flower.
5	Seed	Thorn apple, yellow berried night shade, serpentine, goose-berry etc.	After ripening of fruit.

### 3. Identification and collection, storage and conservation of local medicinal herbs

#### a. Identification of local medicinal herbs

Different types of medicinal herbs are found in our country. To identify them, their shape, size should be studied. Herbs can be tall, dwarf, big, small, thick, and thin in terms of their shape. If we look at their tenderness, they could be smooth, rough, hard, and soft. Based on their types, we can categorize them into deciduous, evergreen herbs. They also differ from one another as per their look, colour, liquid contents, taste and smell.

Each colour (green, black, and blue, yellow, red) has its own importance. Many of them have juicy, dry, bitter, hot, astringent/tarro, and sour taste. Similarly, some of them give off good smell while others the bad smell. It is necessary for us to have detailed idea and information on leaves, bark, root, stem, flowers and fruit to identify them.

Nepal has a unique landscape and climatic condition that supports the growth of different species of local medicinal herbs. We can identify such herbs in terms of which region of the country they grow and in what climatic conditions. Himalayan silver birch, cheetah, thuja, anthopagon, leaf, spikenard, picrorhiza, cordyceps,

salap, common clob moss, delpenium, rock foil, etc. are the medicinal herbs found in the Himalayan region. Medicinal herbs found in mid hill region are: Himalayan rubard, Nepalese cinnamon, barberry, fire flame bush, mugwort, gulancha, toothache tree, liquorice. Medicinal herbs found in *Chure bhabar and Terai region* include serpentine, neem, chebula myrobalam, belleric myrobalan, gooseberry soap pod, asparagus, sweet flag, khayer, thorn apple, parijat, Indian laburnum etc.

#### **b. Collection of local medicinal herbs**

After identifying medicinal herbs, we must know where these herbs are found and which parts are used as medicine. It is important that the right parts of medicinal herbs should be collected at the right time. In some cases, the whole plants can be used for medicinal purposes. So, the entire plants must be collected in case of spikenard, rock foil, sweet flag etc. From barberry, Neem, Nepalese cinnamon etc, only the barks should be collected. Leaves of cinnamon and thorn apples are useful while fruits must be collected from chamomile and simal. Likewise, the seeds of serpentine, yellow berried nightshade and thorn apple must be collected.

#### **c. Storage and preservation of medical herbs**

Special care should be taken while storing and preserving of medicinal herbs. For this, following points should be considered:

1. Medicinal herbs should be stored only after drying them in the sun or shades.
2. Medicinal herbs should be protected from insect and fungus.
3. Containers in which the medicinal herbs are kept should be dry, free from fungus and clean.
4. They should be stored only in dry, well ventilated and moist free room or store.
5. Medicinal herbs should be inspected regularly after storage.
6. Medicinal herbs to be stored for longer period should be dried under the sun time to time.
7. Seed type medicinal herbs should be kept on earthen jars. Ash should be kept on the mouth of jar and mouth should be closed with clothes to protect from entering air inside the jar.
8. Medicinal herbs stored sacks are labeled clearly with the information name, weight, date etc.
9. Water and external substances are to be removed from aeromatic oil or extract if it is to be stored.

Clean aromatic oil or extract should be kept in steel or galvanized pots. If such pots are not available, aluminum or dark red glass pot tightening the cork and should be stored in a cool dry and sun free place. If it is stored in dirty and iron pots, the quality of oil or extract may be lost.

#### 4. Method of processing and use of local medicinal herbs

After processing of locally available medicinal herbs, they can be used for treating different diseases and illness. The processes followed after medicinal herbs collection, like threshing, grinding, winnowing, grading, cleaning, drying, storing, piece making, liquid extraction, oil extraction, cooking, vaporization etc, are all called processing. As the nature of medicinal herbs, processed materials are used against different types of diseases.

Methods of processing and use of some medicinal herbs are given below:

S.N	Name of medicinal herbs	Method of processing	Parts of medicinal herbs used	Functions and methods of use
1	Mugwort	Grinding or smashing, drying.	Bud, leaf, root, stem, plant.	For worm, insecticide, fever, loss of appetite. Use as insecticide. Beat and boil in water and drink liquid.
2	Sweet falg	Beat, grind, and make powder.	root	Common cold, sore throat, gum bleeding, scabies, to remove cattle louse.
3	Chiretta	Soak in water and extract juice.	whole plant	Fever, worm infestation, as required quantity.
4	Needle	Make paste by grinding	root	Sprain, bandage for leg fracture.
5	Lindera	Grind and make liquid or powder/ dust.	fruit	to cure abdominal distension.
6	Chebula myrobalan	Cook and drink liquid or put in mouth.	skin and pulp of fruit	common cold or loss of appetite.
7	Raspberry	beat and make liquid	root	liquid is made and taken for pneumonia.
8	Indian madder	beat and produce colour	bark	Thread of carpet is coloured.
9	Barberry	Beat and sieve on cloth to produce juice.	bark	put on eye pain
10	Malabar nut	Make liquid and drink after cooking.	leaf and bark	for malaria fever



11	Sundhupi	Extract oil.	leaf and bark	scent is made and used.
12	Garlic	Beaten and eaten by making juice/liquid.	bulb/cloves	altitude sickness and spices.
13	Holy basil	Grind and drink by boiling leaf in water or chewing leaf.	leaf and stem all	fever or common cold.

### **Activity**

1. Find out the medicinal and aromatic oily herbs in your community. Collect one sample of each of them and demonstrate it in your class.
2. Make a table of medicinal herbs found in your community. Discuss the table in your class.
3. Collect ten medicinal herbs and their parts used in your community and discuss it in class.
4. How are medicinal herbs produced and stored? Collect the sample and discuss it in the class.
5. Collect two medicinal herbs in each of your class. Discuss their processing, preservation methods and area of use.
6. Make a table of medicinal herbs found in your locality and discuss.
7. Make a list of medicinal herbs that are disappearing in the villages and how they can be conserved. Discuss and present your suggestions.
8. Prepare a report on any two medicinal herbs. Name that are used in common cold and fever asking with the guardians and baidhyas of your neighbor.

### **Exercise**

#### **Answer the following questions.**

1. Write the kinds of medicinal herbs with examples.
2. Write the name of five aromatic oily herbs.
3. Make a list of medicinal herbs of which roots and stems are used as medicine.
4. "Nepal is a rich country in medicinal herbs". Justify this statement with examples.
5. How can medicinal herbs be stored? Explain the process.
6. What are the points to be considered while collecting medicinal herbs? Note them down.
7. What is the method of storage for aromatic oily medicinal herbs?

**Sheep, Goat and Chyangra (Mountain Goat) Rearing**

People rear goats and sheep in most parts of Nepal. They rear such animals for meat, wool, skin and dung which can be used as manure for better agricultural products. We can make good income from these animals if they are well cared, provided with appropriate fodder and kept in sheds or pens. Some relevant information about these animals is discussed in paragraphs below:

Sheep and goats require nutritious fodder. They grow properly when they are given a balanced fodder. If so, farmers can fetch good income by selling these animals. Their fodder or diet should include nutrients such as carbohydrates, protein, fat, minerals, vitamin, iron and water. As per their age and physical conditions, they should be given different amount and types of fodder.

**Balanced fodder (Ahar)**

It is not good to give only one variety of fodder to our sheep, goats and chyangra. Their fodder must include nutrients like carbohydrates, protein, fat, vitamin and minerals. The fodder (**Ahar**) that contains all required nutrients is called a balanced diet or fodder. In other words, the fodder that meets one day or 24 hours' nutrients' needs of livestock is called a balanced fodder.

**Fodder and pasture management**

As started above, we must prepare a balanced fodder for goats, sheep and Chyangra from locally available food stuffs such as maze barley, wheat choker, soybean residue (pina), mustard and nuts residue and paddy husk. Likewise, pasture land must be properly managed. Natural food (grass) is very beneficial for them. They enjoy grazing. Before starting a commercial farm, seasonal grass, multilayer grass, shrubs, tree based fodder, small tree twigs can be given to them. Likewise, they should be taken from one pasture and to another to ensure grass supply throughout the year.

In Nepal, pasture is a major source of grass. Meadows, opens fields, forests areas, clearing, edges; and humps of fields used for cultivation are used to graze domestic animals. We also provide these animals straws, hay, grass and corn leaves obtained from the fields. During day time, goats and sheep are taken to pasture for grazing them. They prefer to eat different kinds of grass such as Napier, Amriso, Satilo, Kalover, Raigas etc. Trees and bushes such as Ipil, Koiralo, Gogane, Taaki, Kimbu, Khanghu, and Gideri serve as fodder for them. We should also shift them from one pasture (land) to another to ensure required grass for them. Well managed pastures enable farmers to grow more sheep and goats and fetch more income from them.

### **Fodders for pregnant, calved (Mother), castrated goats and kids**

**Pregnant goats:** They should be given nutritious grass and fodder containing 14-16% protein in the amount of 200-250 gram daily.

**Calved (mother) goat:** Green grass, fresh water including a balanced fodder of 200-400 gram should be given to mother goats.

**Castrated male:** Castrated male goats should be provided green grass with 150 gram balanced fodder daily.

**Breeder goats:** A breeder goat (male buck) or 'Thuma' must be given 300-500 gram balanced diet or fodder daily from 45 days before using it for a breeding process.

**Mother's milk for newly born kids:** Kids must consume their mother's milk within one hour of their birth. If it is not sufficient for them or in case their mother dies, they should be fed a mixture of one egg, 200 ml moderately hot water, 300 ml milk mixed with liquid paraphed 3-4 times a day.

### **Preparing a balanced fodder/ration from local food stuffs**

A balanced fodder is essential for rearing goats, sheep and Chyangra. It ensures their quick physical growth and farmers can fetch a desired income. We can prepare balanced fodders using locally available food stuffs. Maize, barley, mustard residue (pina), fish powder, wheat husks, molasses mineral and salt can commonly been used for this purpose. The table given below gives a sample/example of preparing balanced fodder:

<b>Raw food stuffs</b>	<b>14% protein</b>	<b>16% protein</b>	<b>18% protein</b>
Maize/corn	37 part	35 part	32 part
Wheat bran	15 part	13 part	14 part
Mustard residue (pina)	9 part	15 part	20 part
Mineral mixture	1 part	1 part	1 part
Salt	1 part	1 part	1 part
Barley	37 part	35 part	32 part

As per the need and age of goats and sheep, we can prepare a balanced fodder following the sample above.

### **Breeding and its management**

It is necessary to ensure proper breeding management for rearing goats, sheep and Changra. Healthy and good quality kids can be obtained from them if we have male and female goats of high quality. Farmers can get more meat and wool from sheep and Chyangra when they provide balanced fodder and clean environment

to kids that are born from healthy male and female goats or sheep. We should also consider that seasons and time factors affect a breeding process. When nights are long, goats' (melatonin) hormone gets activated, which causes its egg to break and fall. In such cases, mother goat or mother sheep must be given appropriate amount of fodder and water.

Generally, there should be one male goat or Thuma (breeder) to breed around 30 goats or sheep. The male goat reared for breeding should be given 300 gram balanced fodder daily. The male goat that has reached the age between 6 months to 1 year can be used for breeding purposes. 10-14 months after their birth, female goats (she-goats) must be bred. In order to reduce death rates of kids, breeding should be managed in such a way that mothers should not bear kids during two winter months and one summer month.

### **Points to be considered while managing breeding**

- (a) For breeding, genetically unrelated male goat and female goat should be involved
- (b) If genetically related male and female goats are involved in breeding, their kids cannot grow well. They remain weak and sick.

After a goat bears her kids, she can be ready for next breeding after 50-65 days. It can produce kids twice a year.

### **Diagnosis of Diseases, Symptoms and Prevention**

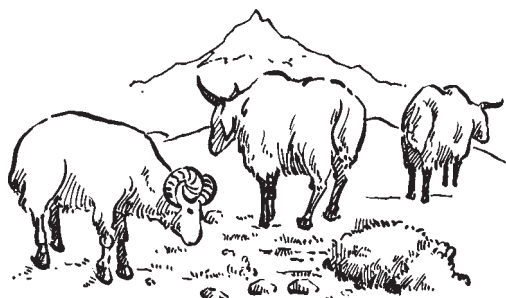
Major diseases, their symptoms and preventive measures are presented below:

#### **(a) PPR (Peptides Peptisis Ruminant-PPR)**

PPR is called an epidemic disease of sheep and goats. It is caused by bacteria. There is a high risk for sheep and goats to suffer from this disease when they are transferred from one place to another.

#### **Symptoms**

- Fever of 104-106 degree Fahrenheit
- Look inactive and sickish
- Dry mouth
- Red eyes
- Running nose
- Wounds seen in gums and inside mouth
- wounds inside nose
- Black diarrhea



- Dehydration
- Could not bear babies

### **Prevention**

There is no permanent treatment for this disease. In order to prevent it, PPR vaccine should be given every two years.

### **(b) Diarrhea**

#### **Symptoms**

- Fluid droppings
- Decrease in weight
- Get weaker
- Cannot digest fodder

#### **Prevention**

- Give medicine like Neblone and Pergocare
- Give salfa medicine tablet
- In case, this disease is a result of parasites, get droppings tested and treat accordingly.
- Maintain sanitation, provide vaccines against diseases timely and give medicine against parasites.

### **(c) Bloat/Acidosis (Abdominal distention or tympany)**

When sheep and goats consume excess of corns or grass or poisonous grains, their stomach gets filled with gas. Major symptoms are as follows:

- Swelling of stomach like a ball
- Releasing of saliva from the mouth
- Difficulty in breathing
- Feels pain in stomach and bleats due to it
- Constipation (can not urinate either)
- At last, die as they cannot breathe

#### **Prevention**

- Provide *Avil* vaccine
- Get the gas released by applying Troker *Cyanula* or Injection
- Apply antibiotics
- Apply Afnil, Blotocil, Tympol powder
- Inject vitamin B complex

### **(d) Pneumonia**

Fungi, bacteria and worms cause this disease. Animals suffer from this disease mostly in cold seasons. Common symptoms are as follows:

- Fast breathing initially and difficulty in respiration later
- Cough, fever and running nose
- Loss of appetite
- Obstruction in breathing

**Prevention**

- Provide **Avil** vaccine
- Give medicine against tape worm and parasites every four months.
- Keep sick goats and sheep in dry and warm place
- Feed cyafloone (caflon) powder
- Provide antibiotics injection for 3 to 5 days

**(e) Mastitis (Thunelo)**

**Symptoms**

- Swelling of udder and teats (thun)
- Bleeding and pus coming from teats
- Teats get dry and blocked

**Prevention**

- Provide antibiotics vaccine
- Apply cream/paste on udder/teats and inside them
- Keep pens/sheds clean
- Wash teats and udder frequently

**(f) Khoret (Foot and Mouth disease)**

**Khoret** is caused by virus. It is a communicable disease. Common symptoms are as follows.

**Chore**

- Fever of 104-105 degree F
- Discharge of saliva
- Reddish spot (red sore) seen in the middle part of hoofs and stumble while Walking
- Swelling of tongue
- Produces water bubble in the tongue, so can't eat grass

**Prevention**

- Wash wounds in the mouth with alum (fitkiri) or potash water
- Wash their feet with phenol solution

- Vaccinate the animal yearly
- When livestock suffer from any diseases, provide first aid treatment and contact nearby veterinary offices.

### **Management of products from sheep and goats**

We mainly obtain meat from goats, sheep and Chyangra. We sell male goats after they get sterilized and become matured. There is high demand of Chynagra and Goats' meat in local market places, district headquarters and city areas. In addition to meat, goats' milk can be used for making cheese. For example, farmers of chitlange VDC in Makwanpur have started this enterprise. Likewise, we obtain ghee and wool from sheep. Carpets, sweaters are made from wool. So, the industries set up for these purposes buy wool from farmers paying them reasonable price for it. In recent years, farmers are affiliated with many cooperative organizations to grow, manage and promote products from sheep and goats.

### ***Activity***

1. What are common products from sheep, goats and Chyangra in your community? Ask your parents and farmers about it and discuss in the class.
2. Prepare a report based on your observation of sheep and goat farming in your community.
3. Collect the ways of producing balanced fodder at local level. Prepare a sample yourself.
4. Visit a local veterinary office to observe breeding management of sheep or goats. Prepare a report on it.
5. Discuss remedial measures adopted by local people to treat common diseases of sheep and goats.
6. Visit a local veterinary office and learn how vets identify diseases of goats and sheep.

### **Exercise**

#### **Answer the following questions.**

1. What do you mean by balanced fodder of sheep and goats? Describe its importance.
2. Name major diseases that sheep and goats suffer from.

**Lesson 2:****Cow and Buffalo Keeping**

Farmers rear cow and buffalo. These are reared for milk, curd, ghee, butter and calves production. For that, good quality of feed, pasture and proper care should be taken. Some important information about these is given below:

**1. Fodder and pasture management**

Grass, straw, leaves, and ration fed to animals daily is called feed/fodder. The role of feed for animals is important for their good health, growth and development, milk production etc. For this, regular supply of winter, summer, perennial grass and tree fodder is necessary. Proper management should be done for this. In the same way, formulation of balanced food should be done by mixing different types of grains. At day time, cattle needs pasture. Different types of seeds or seedlings are sown or planted for pasture in public area, forest pasture land and individual lands. Commercial cattle farming have also been started. Commercial cow farming has been done by running larger livestock farms including Chitwan and Rupandehi districts. These require high amount of grass, straw etc as compared to other animals. Some cow and buffalo are left in the pasture land and fed as their requirement.

**Balanced diet**

Cows and buffaloes should not be given same type of grass and diet everyday. They should be given proper amount of carbohydrate, protein, fat vitamin and minerals for their proper growth and development. This kind of fodder is called a balanced diet or Ahar. In other words, the fodder that meets one day or 24 hours' nutrients' needs of cattle is called a balanced fodder.

While preparing fodder locally, we should mix up ingredients in the given quantity as shown in the table below:

<b>S N.</b>	<b>Elements to be mixed</b>	<b>Quantity</b>
1	Food Grains (Maize, wheat, millet etc.)	25 to 35 parts
2	By products from food grains (husk, flour, choker, bran)	10 to 25 parts
3	Mustard, nut, cotton residue (Pina)	25 to 35 parts
4	Husks of pulses, grams, peas etc	5 to 20 parts

In the fodder mentioned above, we must mix up mineral mixture and 1-2% salt and stir it properly. We can give it to cows and buffaloes as per their need. For instance,



if they have recently produced calves, we must prepare their fodder of 100 kg. including 30 parts choker, 30 parts beaten oat, nut residue (pina) 30 parts, beaten gram 20 parts. We can also buy fodder from the market. We should give the fodder with grass and hay. This increases milk production from them.

## 2. Breeding and management

Breeding is an important part of cattle rearing and its development. Breeding means producing young ones from matured couple. Healthy and productive cows and buffaloes breed healthy and qualified young. Cattle used for breeding must be fertile, healthy, well-builder but breeding shouldn't be done with kins.

### Classification of Breeding

Breeding management can be classified into two categories.

#### A. In breeding

- i) Close breeding- intra kin breeding
- ii) Line breeding- inter kin breeding

#### B. Out-breeding

Breeding, not with kins, but from very different groups, is called out-breeding. We should be careful of their proper age, season, sexual activation period for reproducing them.

### Appropriate time for cattle breeding

S.No	Condition	Cow	Buffalo
1	Getting Adult (month)	6-16	24-40
2	First breeding (month)	18-22	36-42
3	In between a season (day)	18-21	20-24
4	Pregnant period in season (hour)	12-18	30-36
5	High fertility time	14 hours after cows calls for breeding	18-24 hours after they call for breeding

## 3. Diagnosis of Diseases, Symptoms and Preventions

Cows and buffaloes often suffer from different kinds of diseases. Some common symptoms include watery eyes, sickish appearance, keep ears downward; erected hairs; dry face; yellowish urine; difficulty in breathing; swelling of stomach and blood in dung; fast pulse rate.

### Prevention

Cattle suffer from different diseases. Each disease has its own symptoms. We should consult a nearby veterinary office when cattle are not in normal conditions. It is to understand that prevention is better than cure. So, we must keep cow-sheds clean; provide farm animal's fresh, healthy food and water. In case, they suffer from any diseases, we can notice certain signs in them. We should immediately consult technical people (vets) for this.

**i) Mastitis:** Mastitis is the infection of udder caused by different diseases.

**Symptoms:**

In mastitis affected animals, there is swelling of udder, hot and feels difficult while milking. Pieces like clots are seen in milk. Blood piece or pus also can be seen. Animals may be suffered with fever.

**Prevention:**

Udder should be cleaned properly before and after milking the animal. Mastitis affected animal should be milked at last and sanitation should be maintained. Antibiotic medicine/drugs should be applied from the teat for sick animals. Milk should not be consumed till two days of teat treatment.

**ii) Brucellosis/Abortion**

**Symptoms**

Brucellosis occurs during 6-9 months of pregnancy period. The protective skin of Embryo (Sal) or naval cord might get stuck. Cattle get sterilized after they suffer from these diseases.

**Prevention**

Keep the sick animal away from the herd. This disease is fatal and can be transferred to men also.

**(iii) Black taurper (Charchare Rog)**

**Symptoms**

- Stumble while walking
- High fever
- Swelling thigh
- Death follows within 3 days after the disease attacks.

**Prevention and treatment**

Vaccinate against it before summer season begins

Provide penicillin injection in every six hours

#### **(iv) Diphtheria (Bhyagute Rog)**

##### **Symptoms**

- Instant fever of 106-107 degree Ferenhight
- Swelling throat and pain in it
- Swelling of tongue and the part around the neck
- Difficulty in breathing, heavy sound heard during breathing

##### **Prevention**

- Vaccinate before summer season
- Separate the sick animal from the herd
- Do not keep grass and fodder near to sick cattle.
- Use Teramaisin or Tetracycline antibiotics groups
- Provide HS Vaccine penetrating beneath 3.5 mm skin.

#### **(v) Khoret**

##### **Symptoms**

- Discharge release saliva, swelling feet.
- Reddish spot seen in the middle part of hoofs and stumble while walking
- Swelling tongue and scars in mouth
- Bred cattle will suffer from brucellosis

##### **Prevention**

- Wash wounds in the mouth with alum (fitkiri)
- Wash their feet with Tarpin Oil
- Provide vaccine before summer season begins

#### **4. Managing of cattle products**

We rear cattle like cows and buffaloes for milk and meat. Milk of such cattle can be sent to dairy, cheese factories and many other milk product producing factories. Some dairies of our country are in Lanchaur, Ramechhap, Dolkha, Solukumbu and Rasuwa. They collect milk and refine it; and produce different milk product for our

daily life. Cheese, butter, ghee, chhurpi are some of major milk products of our country. These products are to be stored safely and well until they are sold in the market.

### ***Activity***

1. How are cows and buffaloes kept in your locality or at your home? Ask to your parent farmers and specialist; and discuss in your classroom.
2. Find out two major diseases of cattle that they suffer during summer and also discuss its preventive measures.
3. Prepare a list of cattle which are treated in veterinary nearby you and discuss the types of diseases that they suffer from.
4. How many veterinary reproducing centers are there in your community, collect a data of cattle which are reproduced in this year?
5. Write down some milk products prepared in your local community.

### **Exercise**

1. What do you mean by balanced diet for cattle? Clarify the importance of balance diet.
2. Write down the main diseases of cow and buffalo?
3. Write about the reproduction of cattle.
4. Write down any two major diseases of cattle and also mention the symptoms and preventive measures.

## **Lesson 3: Poultry Farming**

Farmers keep hens and ducks at their homes. They keep them for meat and eggs. Hens and ducks can also be kept in commercial farms in large quantity. This requires farmers to properly manage their feed and care for their health. Some relevant information regarding this are discussed below.

### **1. Feed management**

Hens and ducks need different types of food in different conditions. It is needed for their growth, development, and for keeping them healthy. The feed to ducks and hens should be managed in 4 stages mentioned below:

#### **i. Dana at the initial stage**

In the beginning, starter diet should be given to chicken and ducklings from 1<sup>st</sup> to 8 week. This diet (*Dana*) is also called no.1 *Dana*. It contains 20-22 % of proteins.

#### **ii. Growing condition.**

Number-2 *Dana* is given in growing condition of chicken and ducks. This type of *Dana* contains 17-18% of protein.

#### **iii. Dana for egg laying condition**

This type of *Dana* is given from 20 to 80 weeks. This *Dana* is also called layer *Dana* as it is given during egg laying stage. In the context of Nepal it is known as no.3 *Dana*.

#### **iv. Broiler Dana**

Initially, we give starter *Dana* from 0 to 5 weeks and we give 2 number *Dana* from 6 to 10 week.

Chicken and duckling grow better in open environment as they get natural nutrients from environment.

### **Balanced Diet or Food**

Chicken and ducks require proper amount of nutritive elements like protein, carbohydrate, fat, vitamin minerals and water. We can prepare nutritive diet from corn, mustard seed, soybean, wheat, ground nut, khudo, till, rice, gram, millet etc. which are locally available. Different parts of these grains such as husks, residue and peels are used for nutritive elements. Of them, some are sources of carbohydrates while others contain protein. In addition to grains, the diet should include dry fish, fish powder, bone powder, salt etc. Food that contains all the required nutrient elements is called a balanced diet.

## Preparing nutritive diet from locally available products

Chicken and duckling need sufficient amount of protein to grow, so they should be given proper amount of protein enriched food. An ingredient table is given below for preparing nutritive diet.

S.NO.	Food	Quantity
1	Maize broken	30%
2	Rice bran	15%
3	Groundnut's cake	15%
4	Wheat bran	10%
5	Gram broken	10%
6	Barley Broken	7%
7	Fish powder	6%
8	Khudo (Molasses)	5%
9	Bone powder	1%
10	Chun/Limestone	1%
11	Salt	0.5%

## 2. Breeding and its management

We keep different species of hens and ducks for meat and eggs. Hybrid poultries are kept for producing more meat and eggs. Many commercial, scientific researches have contributed to producing improved breeds of poultry. Such researchers are going on in Nepal as well. In Nepal, poultries are imported from India. Chicks that farmers buy from hatchers of different countries are all hybrid one.

In poultry farms, breeding takes place between roosters and hens. Eggs are hatched artificially or naturally. Poultry farms use machines (Incubators) to hatch and produce hundreds of chicks at a time.

## 3. Diagnosis, symptoms and preventions of diseases

Many kinds of diseases can attack hens and ducks. We can identify diseases based on their symptoms. Ways of identifying diseases, their preventive measures, and types of diseases are discussed below:

### (A) Identifying diseases and preventing measures

**Identifying diseases:** Hens and ducks mostly suffer from virus caused diseases like Ranikhet, Marecs, small pox (Chicken pox) etc. They also get attacked by bacteria infected diseases such as pulmorum, poultry cholera, long term breathing related

diseases, and typhoid. Protazols cause them Cocksidimosis diseases.

**Symptoms:** Stay drooling and inactive; do not eat food; yellowish ear lobes; turn grey; watery eyes; difficulty in breathing; green, fluid droppings; fever etc. These symptoms would help us to identify which diseases they are suffering from. Accordingly, we should consult nearby veterinary offices.

### **General preventive measures**

- I. Keep their coops clean and dry
- II. Keep them in separate places as per their age group
- III. Don't keep too many chicks in a place
- IV. Keep fowls separately in case you doubt that they are sick
- V. Keep plates used for feeding hens and ducks clean
- VI. Don't hatch infected eggs. Disinfect incubators using fumigation
- VII. Bury droppings of sick hens and ducks in a proper place
- VIII. Provide appropriate vaccines to prevent them from diseases
- IX. Provide them balanced diet (Dana)

### **(B) Major diseases and their prevention**

Some common diseases that hens and ducks suffer from are as follows:

#### **(i) Ranikhet**

##### **Symptoms**

- Sound like blowing of the nose comes when hens cough
- Droppings seen like water mixed with white, red and green colour water
- Eyes look red and burnt
- Keep the beak open to breathe more
- Twists the neck
- Decrease in eggs production

##### **Prevention and treatment**

- Give proper care to sanitation
- Keeps hens and ducks separately when any symptoms of sickness are seen
- Provide Ranikhet 'Ek Strain' Vaccine as per agro-technicians

## **(ii) Fowl pox**

### **Symptoms**

- Comb, ear lobes and appearance contain small boils or pimples
- Black scars are formed when these boils get dried
- Eyes become watery, eye lids get swollen covering the entire eyes as swelling increases

### **Preventions**

Hens and ducks must be vaccinated against small pox when they are of 6-7 week old. Although there is no cure for this disease, actiphalacin syrup must be applied to spots where there are scars. We can also give a mixture of vitamin and antibiotic medicine to sick fowls in order to save them from other diseases.

## **(iii) Poultry cholera**

### **Symptoms**

- Stops eating Dana (diet)
- Comb and lobes get swollen
- Green and pale coloured droppings
- Can't walk properly-stumbles, twists and turns while walking

### **Preventions**

- Keep hens in separate coops as per their age group
- Provide vaccines timely
- When attacked by diseases, give medicine that contains Sulphamezathene (16%) syrup or Ambozine (10-13 %) syrup, Hostacyclin (1%) syrup for one week period.

## **(iv) Pullorum**

### **Symptoms**

- It is a disease that chicks suffer from. They eat low quantity of food/grains, become weak and die.
- More likely to get attacked when they are two weeks old.
- All chicks huddle in a place.
- Droppings look whitish



- Droppings get stuck to the anus hole, and chicks feel pain when pulled.
- In case of matured hens, they have no food desire and their combs look pale
- Fluid droppings

### **Prevention**

We must give medicine such as Suphonide, Nitro fusion to sick ducks and hens. We can also decrease death rate by given antibiotic medicine mixing it with food.

### **4. Managing products**

Hens and ducks lay eggs. We also obtain meat from them. We must collect eggs daily and store them in a cold room. As per the market demand, we can sell eggs and meat. When growing stage of broiler hens stops, we must manage markets to sell them. Generally they are to be sold within 6 to 8 weeks as per market demand.

### ***Activity***

1. What things are used as food (Dana) for hens and ducks in your locality? Discuss it with your parents, farmers and agriculture technicians.
2. What kinds of diseases do hens and ducks in your community suffer from? Make a list of diseases.
3. How do people treat sick hens and ducks in your community? Discuss it in the class.
4. Discuss the methods of preparing sample **Dana** from locally available food stuffs. Prepare a sample fodder. Make a report on it.
5. Observe diseases in ducks and hens and their preventive measures visiting veterinary offices in your community or home place. Make a report on it.

### **Answer the following questions.**

1. While making a balanced food from locally available food stuffs for ducks and hens, which items should we include? In what quantity should they be mixed?
2. Describe briefly the food (Dana) given to hens and ducks at different stages of their life.
3. Name any two major diseases that hens and ducks suffer from. Mention their preventive measures as well.
4. Write down breeding process of hens and ducks and its management.

**Lesson 4:****Swine Keeping**

In the past, farmers used to keep a local variety of pigs in Nepal. Nowadays, those pigs are crossed with improved breeds and are raised commercially. Different breeds of improved pigs are brought from other countries and commercial swine farming business is run after research. Swine can not tolerate hot climate. If swine farm is in the Terai, inner terai, or other warm places, water ponds should be constructed in the compound of pig sty. When pigs feel hot, they go to swim in the pond.

**Diet and pasture management**

Pigs feed on potatoes, radish, yam, *Githa*, turnip leaf, sweet potatoes, beet leaves, carrot, *dubo*, sugarcane leaf, cchukundar leaves, drovers, berseem etc. They also eat Jalkumbiand grass found nearby river and lake. We can feed pigs above mentioned grass keeping them in sty or leaving them free. Besides this, it is necessary to provide nutritious food to pigs for their proper growth and increasing their ability to reproduce. For better food, paddy, maize, wheat, millet, buckwheat, rice bran, grain powder, oil seed cake etc. can be mixed.

**a) Balanced diet:** Piglets and adult pigs should be fed with the diet according to their age. If they are provided grass with a balanced ration, they can grow fast.

**b) Preparing a balanced diet from local materials:** Food/diet containing 13-20 percent protein should be fed. It can be prepared using local food stuffs such as rice bran, fish meal, gram pieces, molasses, salt etc.

**c) Diet/ration and pasture:** Pigs require grass along with grains daily. As per their age and weight, pigs should be given feed in proportion mentioned in the table below:

S.N	Type of pigs	Daily require grains ( kg)
1.	Small piglets	1-2(20-40kg body weight)
2.	Growing piglets	3-4 (50kg body weight)
3.	Breeding male and female	2-3(100kg body weight)
4.	Sow with boar	4-5(100kg body weight)
5.	Boar	3-4(100kg body weight)
6.	Dry sow	5(100kg body weight)

## Breeding and management

Swine raising is especially done for meat. To produce piglets, minimum of one boar and five sows are necessary. We must select healthy, fit and hygienic swine for reproduction. They should be fertile but should not be diseased or weak. Growth rate of both male and female pigs should be good.

Breeding details of female (sow):

S.N	Pig	Duration
1.	Age to adult/ puberty	8-12 months
2.	First mating with male	8-15 months
3.	Estrus cycle interval	15-24 months
4.	Heat period	36-48 hours
5.	Time of ovulation	next day of heat
6.	Gestation period	148 days

### A. Identification of diseases, symptoms and preventive measures

**Symptoms of sick pig:** - Dejected look, loss of appetite, increased body temperature, wounds in hoof and mouth and salivation are the symptoms of sick pig. Obviously, we can observe symptoms specific to diseases. Based on these symptoms, we should identify which diseases they are suffering from. They should then be carried to livestock health center for treatment.

### B. Major diseases and their preventive measures

- 1) Anthrax:** This disease in swine causes swelling of neck and surroundings. Finally, they die due to respiratory problems. Its major symptom is bleeding from nose and anus of dead animals. In case of this disease, Strep to-penicillin injection is given at an interval of 12 hours. Anthrax spore vaccine should be given in the place where yearly disease outbreaks occur. Dead animals should be buried immediately. (Other swine diseases are mentioned in textbook of class 6).
- 2) Swine fever:** In this disease, animals do not like to eat and look dejected. Constipation, mucus and blood mixed stool may be observed. Fever reaches up to 104-106 degree F. Other symptoms include watery diarrhea, inability to move legs and blue spots on the body. To prevent this disease, piglets should be brought from disease free farms; swine fever vaccine be given regularly and care should be taken in regular sanitation.
- 3) Scabies/mange:** Itching is the symptom of scabies/mange. This attacks on ear,

neck, and back of pigs. Mange is skin disease, so actomin 5 ml per liter of water is mixed and applied in the cleaned body of pig. On the basis of body weight, Ivermectin medicine is injected simultaneously at the rate of one milliliter per 40 kg body weight. To protect the wound on skin from insects' attack, himax paste should be applied.

- 4) **Foot and mouth diseases (Khoret):** This causes sore on the mouth and tongue. Salivation occurs. The sick pig limps while walking due to the wound in between its hoof. For this, the leg must be washed with one percent alum solution or phenol mixed water. Himex paste should be applied. Foot and mouth disease vaccine should be given every four months at a rate of 2-3 ml simultaneously.
- 5) **Parasites:** The swines are also troubled with inner and outer parasites such as tapeworm, round worm, louse etc. The swine after two month should be fed with Bimraphin 1ml per 5 kg weight in each month interval.

#### **Preventive measures**

- A. At the entrance of swine shed sterilization, liquid or lime should be kept.
- B. Dead animals should be buried in safe places.
- C. Enclosures should be dry, clean and there should be plenty of drinking water.
- D. Litter and water from the enclosure should be drained easily.
- E. Advice on vaccination routine, disease control and treatment details/ record etc. should be taken from the livestock technicians time to time
- F. Iron injection for newly born piglets should be given within 3 days.

#### **Management of produced materials**

Piglets can be sold from breeding farms or personal farms. Fully grown piglets raised for meat can be sold in the market.

#### **Activity**

1. What type of food is fed to pigs raised in your village? Ask with your guardian, swine raisers or livestock service technicians. Prepare a report and discuss it in classroom.
2. Collect the samples necessary to formulate the swine diet/food from locally available materials. Demonstrate it in class and discuss.
3. What types of disease attack pigs raised in your community? What types of preventive measures are followed to prevent this disease? Ask with your

guardian, pig entrepreneurs and livestock service technicians. Prepare a report and discuss it in class.

4. Prepare a balanced diet from the local food stuffs with the methods mentioned above. Demonstrate it in class and discuss.
5. Go to livestock hospital; or livestock health center or swine farms near your house or community. Observe the swine diseases, their prevention and treatment method. Then prepare a short report.

### **Exercise**

**Answer the following questions.**

1. What materials should be mixed in what quantity while preparing a balanced food for swine in local level?
2. Explain in short, the types of food given in different stages of swine and management for swine rising.
3. Write the name of two major diseases of pig and their preventive measures.
4. Mention the breeding process and their management methods of pig.
5. What measures should be followed to prevent from disease attack in pig? Write.

Breeds of different types of fish are cultivated in water expanses. The task of rearing different types of fish for securing livelihood and entrepreneurship is called Fishery. Fish are naturally grown in ponds, paddy fields, rivers, lakes etc. Nowadays, the trend of raising fish with improved methods is increasing. Nepalese farmers produce fish and fingerlings in Nepal, and even import them from other countries to run their enterprises. Some important facts about fish cultivation are presented below:

**A. Balanced diet**

Carp breed fishes are mainly raised in Nepal. Fish should be given artificial feed along with natural feed. The management of balanced diet to fish can be done by preparing locally or bringing it from ration production industry or both. A balanced food should include nutritious elements such as protein, carbohydrate, fat, vitamin and minerals. Such elements can also be found from the crops grown in our fields. While preparing a balanced ration, information about the fish nutrition should be taken and prepared in a chart. 30-35 percent protein for fingerlings and 25-30 percent protein containing food for adult fish is required for the fish of carp breed. 20-25 percent protein is required for growing stage fingerlings.

**Diet and pasture management**

In Nepalese fish rearing enterprises, native and imported both breeds are found. Qualitative and quantitative production of fish can be done on commercial fish farming in a short period of time. For this, provision of food containing nutritious elements is necessary. Breeds of fish that wish to eat artificial food are common carp, grass carp etc. Silver carp, bighead carp, *Mahur* etc are the fish that like natural food. Similarly, fish that like both the natural and artificial food are Rohu, Naini, common carps etc. Foreign fishes reared in Nepal are silver carp, bighead carp, grass carp and common carp.

Thus, diet management is necessary according to breeds of fish. To increase the natural food as well as artificial food in ponds, compost 2000-2500 kg per hector per year, nitrogen fertilizer 220 kg, phosphorus fertilizer 545 per hector per year should be used. The ratio of artificial and natural food should be maintained at 45:55.

**A. Preparing a balanced food from local materials**

Artificial food can be prepared with local materials such as barley, maize, paddy, millet, wheat, groundnut, mustard, linseed cake. Soybean cake, sunflower cake, silkworm pupa also serves as fishmeal for different age group of fish. These food

items supply fish with different nutritious elements such as protein, carbohydrate, fats, vitamin and minerals. A balanced food for fish can be prepared by making grains and their byproducts containing nutritious elements.

For example, following ingredients are necessary to form 100 kg fish food that contains 15 percent protein.

S.N	Name of materials	Quantity
1.	Wheat flour	38 percent
2.	Rice bran	38 percent
3.	Soybean flour	12 percent
4.	Fish powder or 'sidra'	12 percent

### **Breeding and management**

Breeding of fish can be done in two ways: natural and artificial. Production of fish and fingerlings with the artificial method is quick and better for distribution. Male and female of mother stock are kept in small ponds feeding a balanced diet. When the breeding season comes at eggs are squeezed from the abdomen of female fish on a clean bowl. Then seed is squeezed from the male fish and mixed with the help of clean feather and kept in water. Then water should be replaced continuously. Egg swell slowly. Small fingerlings are developed from those eggs. Those fingerlings are called fry and should be kept in a nursery pond, giving them a balanced food. They then grow slowly.

### **Some major diseases and their preventive measures**

**a) White spot disease:** Skin colour greening, back and body becomes thin, small wounds in different places and white spots on whole body are the symptoms of white spot diseases.

**Prevention:** Fish should be dipped in 3-5 percent brine solution for 3-4 minutes for this disease. In addition to this, this disease can be prevented by treating fish with 1:400,000 part sater: formalin solution for 15-25 minutes.

**b) Trichodina:** Symptoms: Trichodina disease attacks the fingerling. Gills are affected more than body and white spots are seen. Fish feels restlessness and dies.

**Prevention:-** Trichodina disease can be prevented by dipping the sick fish in 2-3 percent brine solution for 5-10 minutes.

**c) Fish louse (Argulus)**

**Symptoms:** - Argulus suck blood from the fish body. So, wounds and sores are seen on the body. Fish are badly affected by it.

**Prevention:** - The whole body of the fish should be dipped in 2-3 percent brine solution for 5-10 minutes or used 0.25 ppm Dipterex to prevent the disease.

**d) Larnia/ hook insect**

**Symptoms:** It makes wound on the body surface of fish by inserting its hook. If it reaches to hang on the head of fingerling, fish moves round and dies. Symptoms of lernia are: slow moving fish, sores on body and head. Fish creep along the side of pond and die in the same place later on.

**Prevention:** - Fish is dipped in 1-2 percent brine solution for 2-3 minutes or trilcopan 0.25 ppm is used for prevention.

**Management of produced materials**

There are two objectives of fish farming. The first objective is to produce fingerlings artificially and the second objective is to produce fish for home consumption and selling them in the market. Farmers produce and sell fingerlings commercially. For this, ponds should be constructed according to need and fish should be farmed. It is better to sell fresh fish produced for consumption. Fish can be preserved by following methods after catching fish from ponds.

- A. Drying over the fire
- B. Drying on drum or chamber
- C. Drying on solar dryer
- D. Preserving fish by using brine solution.
- E. Freezing fish
- F. Packing on jars

**Activity**

1. Prepare a short report on fish farming after consulting fish farmers, your guardians or agriculture specialists in your community and discuss it in class.
2. What type of fish diseases are common in the of ponds of your villages? What treatment measures are followed? Find it out and prepare a report on it. Then, discuss it in class.



3. Prepare a fish food by locally available agricultural materials, and show it in your classroom.
4. Discuss the ways of treating diseased fish in your classroom.

### **Exercise**

#### **Answer the following questions.**

1. What do you understand by the natural and artificial food of fish?
2. Write down the main diseases of fish and their preventive measures,
3. " Fish farming is an important profession in Nepal". Explain it clearly.

**Introduction**

Nepal is rich in its natural resources. Nature has gifted Nepal with many kinds of plants and animals. Among these animals, insects are in large numbers. Some insects are beneficial while others are harmful. The bee is a beneficial insect for humans in many ways. It is a source of honey. For producing honey, bees collect nectar from flowers of different plants. This helps in pollination process of plants. Besides this, high value products pollens, wax and royal jelly also are produced by bees. Beekeeping is a science and art. This teaches to keep bees in a proper manner for bee keeping, pollinating plants/crops and conserving environment and helping farmers to generate income as a whole.

**Balanced diet and bee pasture**

Materials that bees eat are bee food. Honey and pollen are main foods for bees. To eat and digest these materials, bees require water. Queen bee and bee brood of the bee eat royal jelly. Bees collect nectar from flower of plants and produce honey. Likewise, flower dusts are collected to make pollen. Bees store these food materials in the comb for the scarce period. Food collected and stored by bees themselves is called natural food for bees. Sugar syrup of one part sugar and one part clean water (sugar and water in equal quantity) is mixed and fed to bees if natural food is not available. The right time to provide sugar syrup is evening time of the day. Different types of feeders should be used to prevent bees from dipping and dying.



Bee pasture is the place where plants, flowers and nectar and pollen are available to bees. All plants of earth surface may not bear flowers, but most of them bear flowers. Among them, some produce more nectar and pollen while others produce less quantity. Some flowering plants also bear flowers in different times according to the distance of sea levels. Bee is a small living creature which can not travel very far to collect food. To generate more income from bees, there should be useful plants for bees within one km from beehives. Useful plants for bees found in Nepal are Schima Walichi, chestnut, Sal, Tooni, barberry, dhatelo, kuiesi, butter tree, wild pear, puwale, rudilo, box byrtle, rhododendron, cotton tree, wild buckwheat, white

clover, red clover, bottle brush, guava, ber, peach, plum, pear, citrus fruits, banana, buck wheat, mustard, rayo, radish, cauliflower, cabbage, sunflower, niger, coconut, arecanet, cufia, papaya, gladiolus, tomato, brinjal, pepper, guords, cucumber, pumpkin, Watermelon, bean, sesame, acheme, borage, eucalyptus etc.

### Activity

**What are useful plants for bees found in your village? Discuss it in class and prepare a list.**

### Bee breeding and management

The bee is a kind of small insect. It has different stages from both till death. Bee breeding process is as follows:

S.N	Caste	Life stage of bees/days				Total life period	
		egg	larva	pupa	total days to adult	active duration	less active duration
1	Queen	3	5	8	16	1 year	2-3 year
2	worker	3	6	12	21	6 weeks	3-3 months
3	Drone	3	7	14	24		2 months maximum

Honey bee is a social insect like humans. Bees live in a group to reproduce for existence and livelihood. It is called a bee colony. In general a queen, some drones and many worker bees are in a colony. The development of these bees takes place from eggs laid by a single queen. But it is dependent on the food type fed by worker bees and the caste of bees. The colony of bees is more disciplinarian. All the bees are busy in their work as divided according to the caste and age group.

### General identification of bee diseases and their prevention

Deviation from the general conditions in bee body and any difficulties in their lifespan is called bee diseases.

Mainly bee diseases can be divided into two parts. They are as follows:

#### a) Brood diseases

**1. European foul brood:** The colour of affected larva with these disease changes yellowish brownish from white. Sour smell comes from dead larva. This disease is caused by a kind of bacteria and in weak colony. This disease attacks during beginning of spring season to less than 48 hours aged larva in dispersed pattern.

**Prevention:** Bees should be handled carefully to make their strong colony. All the

hive and their parts should be treated with brine solution, cleaned and then used. For treating this disease, we should take out the frame; shake off by heating on other hand lightly; replace old queen with new and healthy one; and give oxytetracyclin orally.

**b) Thai sac Brood:** This disease attacks larva stage with Thai Sac Brood virus. This is communicable disease. Disease affected larvae die before they pupated. To prevent it, It is necessary to make bee colony strong, use clean equipments, avoid food deficiency and inspect the colony, cut remove and destroy the disease affected part of bee comb, protect bee colony from cold; and make colony queen less for 5-7 days, or close the queen in queen cage.

**Control:** - Being a disease affected by virus, it can't be treated. The only one solution of this disease is replacing the queen with the next healthy one.

a. **Adult bee diseases**

**Nosema:** - This disease is caused by unicellular parasite. This enters from the esophagus, reaches the intestine and their offspring multiply. These damages the stomach that results in swelling of stomach, causes diarrhea inside the hive makes the hive dirty. This disease occurs in winter season. Frames with artificial combs can be replaced at sunny and warm time by opening the hive or the whole hive can be replaced.

**Activity**

1. What types of disease affect the bees in your village? What are the measures followed to solve them? Discuss it in your classroom.

**Exercise**

**Answer the following questions.**

1. What is the balanced diet of honey bees? Explain.
2. Mention the breeding of honey bee in table.
3. Write the name of bee disease and explain the measures of prevention.

**Practical task**

Prepare a report on the following subject discussing with your guardian, teachers or friends.

- Food and pasture of bees
- Disease and problems of bees.

## Unit: 12      **Craftmanship**

### Lesson: 1      **Preparation of Different Things from Paper**

1. **Paper Bag:** We can utilize paper in different areas. Paper bag is one of them. They are used for packaging and/or carrying items. They can be used as best alternative to polythene bags. They can be prepared from the magazines, newspapers and other rough papers. They are utilized in both education and business sectors. So, this chapter covers the method of preparing a paper bag.

#### **Materials required for preparing a paper bag**

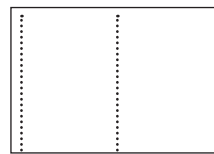
Old Magazines or Newspapers, Scissors, Knife, Rice Starch, Gum or Mobicol, Thick Paper, etc.

#### **Methods for preparing a paper bag**

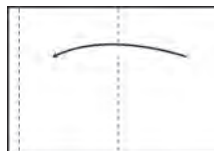
a) First of all, arrange old magazine, newspaper or thick paper with the dimension of about 12 inches length and 10 inches width.



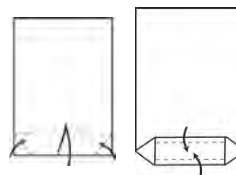
b) Make a mark of half inch on one corner side of a paper as shown in the figure. Then, again mark at exact middle of the paper from that previous half inch mark.



c) Now fold the paper from the centre as in the figure. While folding the paper, keep in mind that the fold should only be from the previous half inch mark.



d) Leave the half inch of paper as shown in the picture and fold it slowly downwards from dot-dot portion and stick it with the help of gum or mobicol.



e) Now the paper will be like that of the picture. Gently fold the paper below up to one and half inch. Then, it looks similar to the shown bag.

f) Stick a small but thick paper in the lower portion of the paper to make a paper bag. You can make variety of paper bag from this same method. One can earn money by selling these products in market.



**Papper Bag**

2. **Greeting Card:** A greeting card is a small attractive letter. The custom of sending greeting cards started from China. At this time, Chinese used to write greetings in silk clothes. In nearly Egypt, greetings were written on papyrus scrolls and conveyed.



Model of a card

Greeting cards were used in exchanging message of good will to celebrate New Year, Special Occasions etc. But these days'

greeting cards were also used in New Year, Dashain, Tihar, Lhosar, Birthday, etc.

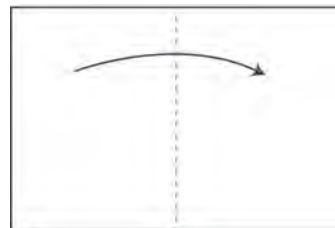
Greeting cards are prepared mostly from paper. Greeting cards nowadays are developed as a business. Besides, handmade greeting cards are also possible to prepare. The process of preparing a handmade greeting card is mentioned herewith:

#### Required materials:

Scissors, Ruler, Paper cutter, Pencil, Color, Brush, Gum or Mobicol, White or Coloured Cartridge Paper, etc.

#### Methods of preparing cards:

- a) Cut a 6x8 inches thick white cartridge paper. Fold it making two halves.



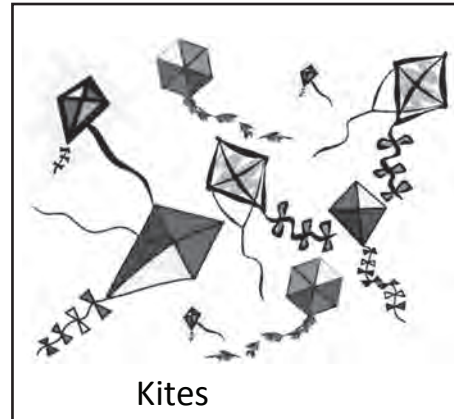
Card



- b) Make an attractive object or picture in the front part of the fold. While making the image on the greeting cards, we can use stencils or other printing methods.
- c) Post card, greetings card, invitation card etc of different size and shapes can be prepared and shared in different occasions and festivals.
- d) Besides this, leaves, flower petals and other materials can also be used for the preparation of different size and shape of cards.
- e) Colors can also be used in the cards.

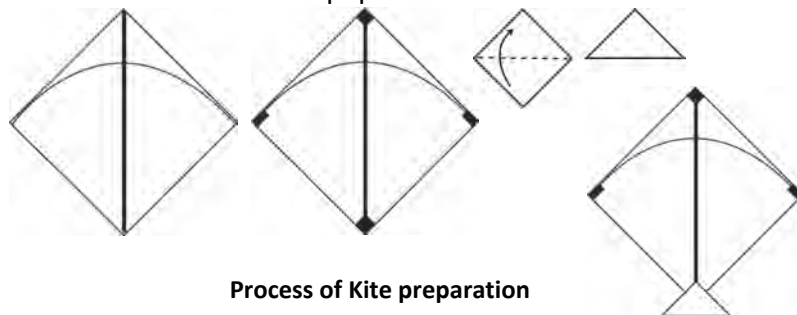
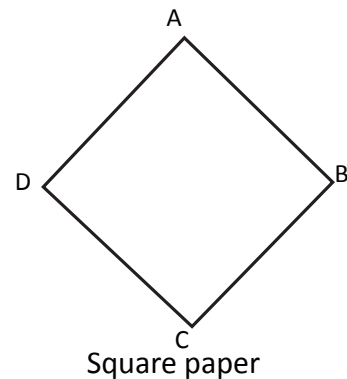
3. **Paper's Kite:** Paper's kite can be prepared from the thin color or Nepalese paper. The paper's kite prepared and tied with the kite string can be flown in the light breeze. Following materials are needed to prepare a kite.

**Required material:** Thin and colored paper, Scissor, Knife, Rice Starch or Gum, Bamboo Skewer of appropriate size and shape, Kite string, Thread, etc.



**Methods of Kite Preparation:**

- a) Firstly, cut the thin and colored paper or Nepalese paper with the dimension of 12 cm \*12 cm.
- b) Fold it in half making the two triangular shapes in the paper.
- c) Prepare the bamboo skewers with the size equal to the A to C and for B to D as shown in the picture.
- d) Lay the skewer as shown in the picture and stick it in the kite.
- e) Arrange another square shaped paper with dimension of 4 x 4 inches.
- f) Stick the bamboo skewer diagonally with the help of rice starch or gum in the colored paper as shown in the picture.
- g) Fold the small square shaped paper from its mid making triangular shape and stick at the one end of the paper.
- h) Leave the stick paper for some time to dry. Pierce two small loops in upper and lower part of the bamboo skewer in its left and right side as shown in picture. Tie a small loop on each end of the bamboo skewer by thread. Make sure that you balance the kite while tying with the thread for smooth flight in the breeze. Have fun of this paper kite.

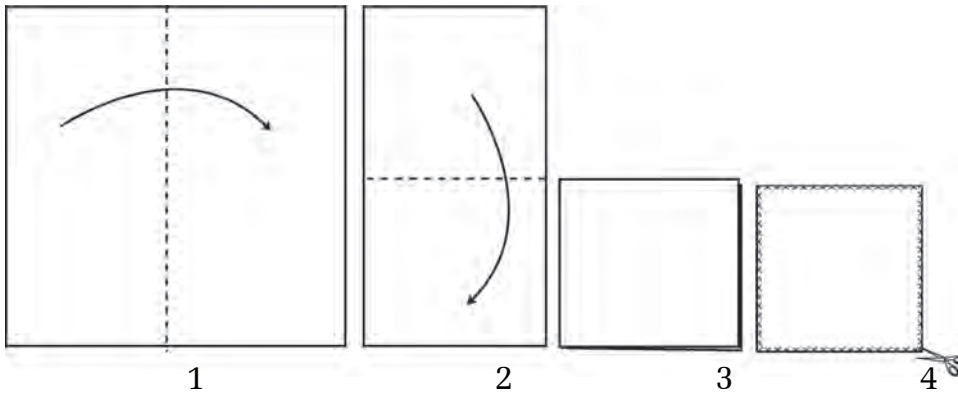


4. **Paper Napkin:** Several useful materials can be prepared from different type of papers. Among them, napkin is the one which is prepared from soft type papers. Napkin is used mostly in household purpose or wiping hands before and after the meal. For this different soft type and colored papers are needed. Napkins are prepared by cutting these papers using scissors or paper cutters.

**Required materials:** Soft type different colored papers, scissors, paper cutter, Markers (Temporary and Permanent), etc.

**Methods of Napkin Preparation:**

- Cut the soft paper making the square with dimension of 15 x 15 cm using scissors.
- Fold the paper as shown in the picture-1 making in two halves. Again fold the paper in half again to form a smaller square as shown in picture-2, and then



it appears like the picture 3. Mark the whole edges of the smaller square by different shapes using pencil as shown in the picture 4. Cut the desired different shapes with the scissors.

- Unfold the previously cut papers. An attractive napkin will be prepared which can be used in different works.
- Decorate the newly prepared napkins differently. Few models were shown below.

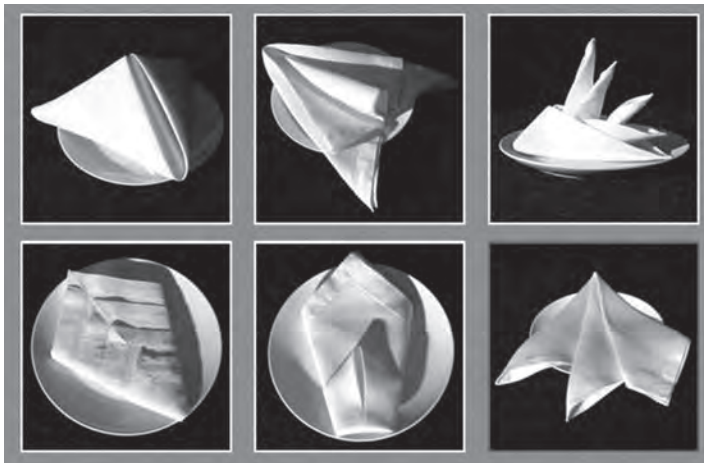


Fig. 5

**Activity**

- Have you seen a paper bag? If so, what type of





**Paper napkins decorated in different shape**



- paper bag and which type of paper is used? Discuss it with your friends.
2. Prepare a paper bag as discussed and sell it in market to collect some money.
  3. What type of cards have you received from your friends? Discuss it with your friends.
  4. Prepare and send New Year greetings card to your friends. Sell different cards you have prepared in market to collect some money.
  5. With your friends prepare a paper's kite using the appropriate paper.
  6. Prepare a paper napkin and discuss with your friends in class.
  7. Demonstrate the napkins prepared by you in class or other objects and discuss it in the class.

### **Exercise**

#### **Answer the following questions.**

1. What are the purposes of paper bag? Explain with examples.
2. "Paper bag makes the environment clean". Explain it.
3. What do you mean by Card? Explain its importance.
4. What are the materials essential for preparing paper's kite? List them out.
5. What is a napkin? Elaborate its importance and use.
6. Mention the process of preparing a decorative napkin from simple papers.

## Lesson: 2 Origami and Kirigami

### 1. Origami:

Origami refers to the art of folding the papers in certain shape and size to develop certain objects. This art was developed in Japan. The word 'origami' is derived from Japanese language in which 'Ori' means "folding" and 'kami' means "paper"; It is a Japanese art of paper folding. From this art, we can transform a flat sheet of paper into a finished object through folding techniques. In this chapter, method for the preparation of some objects through origami is described. Paper aero plane and paper dust bin preparation method is described hereby :

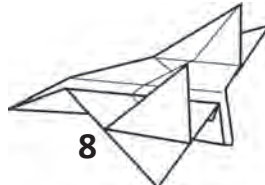
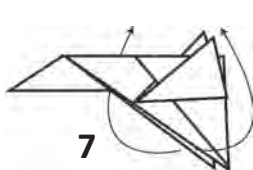
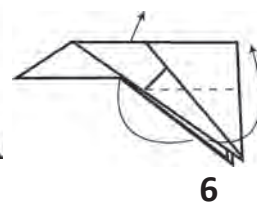
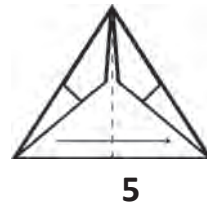
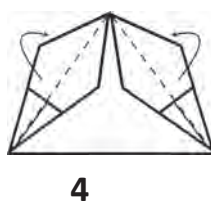
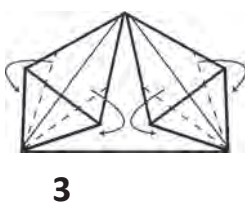
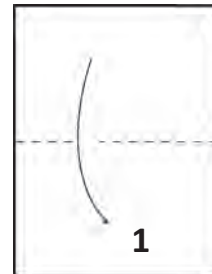
#### Required materials:

Old magazines or newspapers, useless paper, scissors, etc.

#### Methods of Paper Aeroplane Preparation:

The steps of preparing a paper aero plane are given follows:

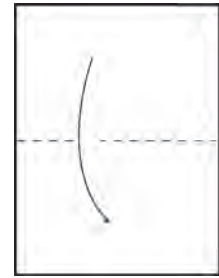
- Take a rectangular paper. Fold the paper from the dotted lines as shown in the picture 1.
- Fold the two edges of the paper towards the inner side and unfold to bring the original position as shown in picture 2.
- Prepare the paper aero plane as per the instructions given in the picture from 3 to 8. We can prepare paper aero plane from these instructions. You can also prepare the paper aero plane and play with your friends.



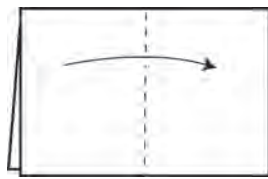
## Methods of Paper Dustbin Preparation

The method of preparing a dustbin from paper is illustrated as below:

- Take a rectangular paper. Fold the paper from the middle part of the paper making two equal halves as shown in picture 1.
- Again fold the paper in next two halves. Fold the paper as shown in the picture.



1



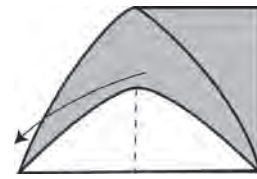
2



3

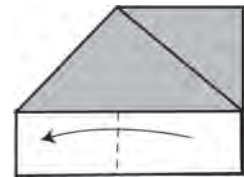


4

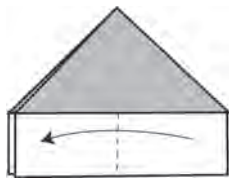


5

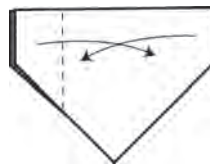
- Fold the paper for the shape as the direction shown in the picture. Fold the back side of the paper with the same process.



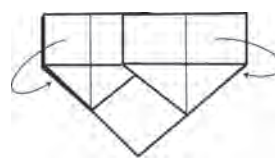
6



7



8

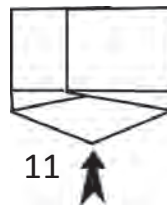


9

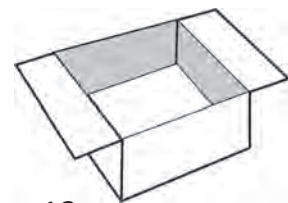


10

- After folding the paper, a paper dustbin will be prepared. By this process, you can prepare different types and shapes of dustbin.



11



12

**Prepared Paper  
Dustbin**

## 2. Kirigami:

Kirigami is an art of object preparation from paper like Origami. It is also developed from Japan. The word Kirigami is derived from Japanese language in which 'Kiru' means "to cut" and 'gami' means "paper"; thus the art of paper cutting to make some objects. From this art we can prepare different sculptures and decorative objects. Method for the preparation of some objects is described in this chapter herewith:

### Spectacular Buntings (Toran):

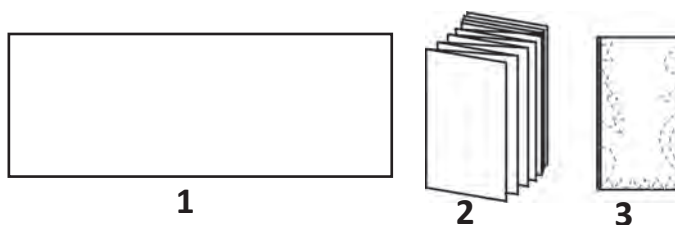
Bunting is a type of kirigami made of colored fabric or paper which is used for decorations.

#### Required materials:

Colored paper, Pencil, Scissors, Knife, Rice starch or Gum, Thread, etc.

#### Methods of Preparation:

- a) Take a thin and colored paper with the length of about 12 inches and width 5 inches. Fold this paper up down and up as shown in the picture.



- b) After folding this paper, draw an image of your interest at the edges of the folded paper as shown in the picture. Cut the outside part of the folded paper with the help of scissors or knife to prepare a spectacular bunting. Such prepared buntings can be used in various places for decoration.

### Paper Mask:

Mask is the object prepared from the paper which is put over the face. Slightly thicker paper or cardboard paper is used to prepare the paper's mask. It can be used for entertainment in different festivals, celebrations, occasions etc.

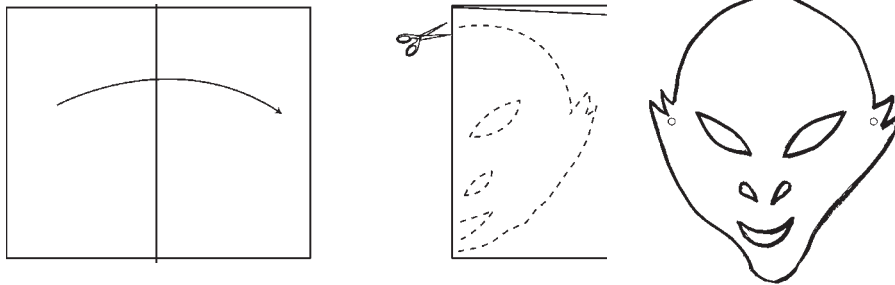
#### Required materials:

Thick paper or Cardboard paper, Pencil, Scissor, Knife, Thread, etc.

#### Methods for preparation:

- a) Take a cardboard paper with size about 7 x 9 inches.

- b) Fold the paper from the middle point making two equal halves.
- c) Mark at each side of the paper with the attractive image of your interest using pencils.
- d) After marking the outline for the image, cut both the layers along with using scissors or knife.



An attractive paper mask will be prepared after the cut. Pierce a small loop in both the sides of the paper mask and tie with the thread. It can then be put in the face for bringing entertainment. One paper mask is shown in the picture as an example. You will also be able to prepare different types of paper mask using the same technique.

### ***Activity***

1. Prepare and demonstrate any two objects from the paper using Origami art in your classroom.
2. Prepare and demonstrate an attractive buttedar toran of your interest in your classroom.
3. Prepare any attractive paper mask and wear it on your friend's birthday for celebration.

### **Exercise**

**Answer the following questions:**

1. Introduce Kirigami shortly with some examples.
2. What is the difference between Origami and Kirigami?
3. What is the importance of Origami and Kirigami? Write with examples.
4. Introduce the paper mask and mention its importance.

**Lesson: 3****Preparation of Materials from Bamboo, Straw, Wheat straw and Grass (Babiyo)**

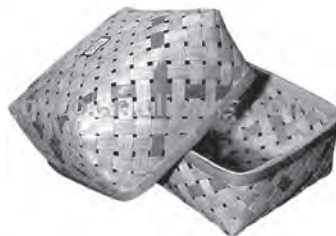
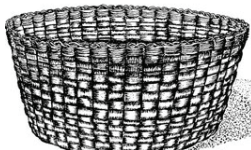
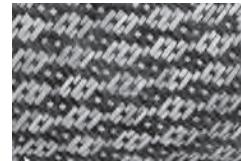
Several useful materials can be prepared from naturally available materials. Those include bamboo, rice straw, wheat straw, etc. Several decorative and household purposes materials will be prepared from these materials. Different raw materials and instruments are needed for their preparation.

**Required materials:**

Bamboo, Rice straw, Wheat straw, *Khukuri*, Knife, Axe, Saw, Measuring tape, Pencil, Piercing instrument etc.

**Materials from bamboo sticks:**

Cut the locally available bamboo in suitable lengths. Peel apart each bamboo strip (*Chuya*) to create multiple miniature strips of bamboo. From the bamboo's flat side, make such bamboo strips with the help of knife. From these bamboo strips bamboo box, bamboo mats, hats, Nanglo, Dalo, etc can be prepared. Hope you must have seen different things prepared from the bamboo strips. These things are prepared by weaving the bamboo strips in an usual manner.

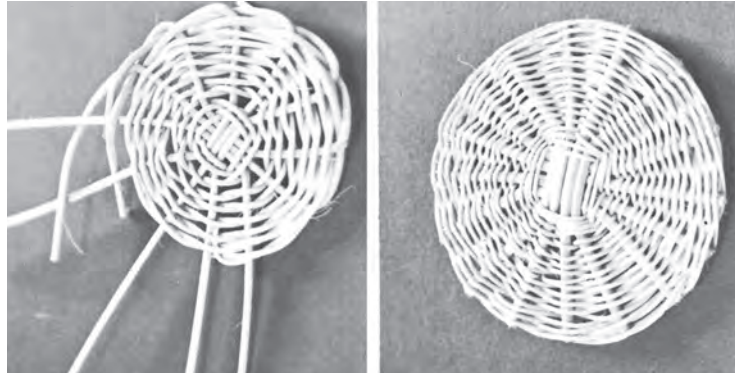
**Materials from Rice straw, Wheat straw, Maize husk etc:**

Rice straw, Wheat straw, Maize husk and *Babiyo* grass can be found abundant in the villages. Mat, rope, Dalo, bag, etc can be prepared from these materials. Certain processes are needed to prepare them.

**Process of Preparation:**

- a) First of all, place the straw, husk or *Babiyo* grass to develop the base as shown in the picture.
- b) Start by weaving the string straight up and down and continue wrapping and coiling works.

- c) A circled small mat will be prepared upon the weaving process. Finish off the mat by wrapping string all the way around the mat as shown in the picture. Such mats can be prepared of different shapes and types.



### **Activity**

1. Is there any person in your community who had an idea to work upon bamboo works? If so, visit there and learn about the bamboo string preparation and simple weaving process. Document the steps in your copy.
2. What are the essential materials in bamboo works? Discuss with friends.
3. What are the materials prepared from bamboo, straw, husk of *Babiyo* grass in your community? List the items needed for the preparation of these materials and discuss in your classroom.
4. Prepare and demonstrate each material from bamboo, straw, husk or *Babiyo* grass in your classroom.
5. Prepare and demonstrate a small mat using straw or husk.

### **Exercise**

1. Mention the importance of bamboo, straw, husk or *Babiyo* grass in local livelihood.
2. How are new materials prepared from waste materials? How does it help in conservation of environment?

## **Lesson: 4**      **Preparation of Materials from Waste Objects**

We can find unused and waste objects that arise from the household, commercial and other areas around our house, community and school. These objects have a negative impact on our health and environment. The waste objects including magazines, papers, plastic, sacks, paper box, glasses etc when reused or recycled help in economic welfare along with the cleaner environment. It assists in our sound health. So, the preparation of different types of attractive materials from the waste objects is described as follows:

### **Required Materials:**

Old and thick type cardboard paper or paper box (packaging materials of Computer and or other electronics), Old colored papers, Glue or Rice Starch or Mobicol, Paper cutter, Scissors, Pencil, Scale, etc.

### **Method of Frame Preparation:**

- a) Take one photo of your interest. If the size of your photo is 10x15 cm, arrange the cardboard of 16x21 cm size.
- b) The mark all the sides of the cardboard paper with the size of 4 cm and then cut it in all sides.



- c) After cutting the cardboard paper there will be an empty space inside. Attach the photograph in the empty space on the back side to prepare a photo frame. To fix the photograph frame, place a small arch with the paper.
- d) Attach the colored and illuminant paper's cuttings outside and around the frame so as to make more attractive.





### Greetings Card:

Cards send with best wishes on auspicious occasions, festivals, birthdays, celebrations are called greeting cards. The procedure of making such card in mentioned herewith.

#### Required materials:

Old colorful magazines, grass, rice straw, wheat straw, dry leaves, glue or starch, paper cutter, scissors, pencil, scale etc.

#### Methods of card preparation:

- a) Take 24X 17.5 cm cardboard. Fold it from the middle in such a way that both sides become equal. This cardboard comes to the size of 12X 17.5 cm while folding.
- b) Draw your favorite image or shape in the front of the cardboard. You can also stick different decorative materials into it.



Now messages and best wishes can be written inside this prepared greetings card. Mosaic method can be used in the greeting cards for making it more attractive and appealing.

### Preparation of attractive materials and toys from old papers and magazines

#### Required materials:

Old papers, magazines, scissors, utensils, *mungro*, fenugreek, grinding stone, hand grinder

#### Process:

- a) First of all, take some fenugreek. Make it into fine powder with the help of grinding stone. Soak the powder of fenugreek for two nights in water.
- b) Cut old magazines or paper into small pieces and soak it in water for one day.
- c) Squeeze and remove all the remaining water from the pre-soaked paper by hand and make it into paste by grinding. Now mix the fenugreek paste into it. The ratio of 4:1 should be maintained while mixing paper paste and fenugreek paste respectively.



Fenugreek acts as binding material and sticks to the paper very well. Now this prepared mould can be used as mud to make a variety of attractive materials like birds, animals, toys, statues etc. Colors can be added to these materials for making it bright.

### ***Activity***

1. Prepare an attractive photo frame for your family photo or for your favorite photo from the waste materials.
2. Prepare a New Year greeting card and give it to your friend or to the person you like.
3. Collect all the materials prepared by your group in different occasions and make arrangement for selling them in market.
4. With the help of above mentioned method prepare a toy from the paper. Also color the toy.
5. Properly observe all the materials you have prepared from the given method and discuss it with your friend.

### **Exercise**

**Give answers to the following questions.**

1. What materials can be prepared from waste objects? Mention it.
2. Why is it important to prepare variety of materials from wastes? Describe it.

## Lesson: 5 Simple Carving on Wood and Stone

We might have been various beautiful carves in House, *Pati Pauwa*, Temples, Stone Tap (*Dhunge Dhara*), doors ,windows, poles, wooden pillars made from wood. The phenomenon of making various beautiful images by cutting into woods or stones is called Carving. Nepal is renowned in the world through these ancient arts. In Kathmandu *Aakhi Jhyaall* and *Mayur Jhyaall* are famous. These arts are made by skilled carve workers. There is a need of carving knowledge and skill for these works. There is a high demand of these arts worldwide but due to lack of skilled carve workers we are not able to supply as per the demand.

Craving works is limited in few cities of Nepal. These indigenous arts are in the stage of extinction. Knowledge and skills about carve works are necessary to scale up throughout the country. Special knowledge, skill and instruments are needed to perform these works. This work is income generating and thus can be taken and developed as a business.

### Process of Carving:

Following are the steps for the carving works in woods and stones.

#### 1. Selection of Object

First of all, select the object on which carving is done. In some stones carving is difficult due to slip. So, it is necessary to select the good stone or wood. The stone must take the shock through the use of chisels. Stone carving is difficult in hard stone. Besides *Sissoo*, Pine (*Sallo*), *Devdaar*, etc, Saal will be appropriate for carving.

#### 2. Selection of Instrument

Carving makes special type of shapes or images in the objects. These carves may be of different shapes and types. These may be circular, semi-circular or triangular. Different types of chisels or cutting instruments are needed for making those shape. These chisel sets are available in the market. These types of instruments can also be obtained from the persons working with the metal works. Carving instruments for wood and stones. Tough types of instruments are needed for stone carving.





### 3. Carving Process

First of all, favorite prints should be copied either in wood or in the stone. Prints may be slightly upper or lower from the surface of the object. There is a general tradition of making prints in the upper surface In our context. The slightly raised upper surface is cut and removed by using suitable size of the chisels. Beautiful carve will thus be prepared.

Simple and complex carves can be prepared by the similar process. Carving prepares complex, thin and hard type of shapes in stones or woods. Some dots can be observed deep on the lower surface of the object during carving process. There is a need of suitable instruments to carve and form an ideal shape from the dots. The interwoven shapes prepared in the object can be raised above slightly to give an attractive shape. Complex shapes can also be drawn easily by this process in both the wood and stones.

#### *Activity*

1. What materials are prepared in your local community using simple carving in woods and stones? Discuss in your classroom with each samples.
2. Present a report on simple wood and stone carving after visiting in your local community.

#### **Exercise**

**Give answer to the following questions:**

1. Give introduction of simple carving on wood and stones with examples.
2. Separate/Mark the image or raised part and the deep dots in wood and color with different color in two different parts.
3. Differentiate between carving process in wood and stones.

**Lesson: 6****Coloring Works on Prepared Objects**

Coloring of the objects is done to make them more attractive and increase their longevity. Coloring is the work in which the objects are colored as per the desired color. Different color is used with the type of objects. Following materials are needed for coloring works.

**Required Materials**

Poster color, acrylic, enamel, varnish, brushes, color mixing bucket, water, tarpin oil, old clothes, boot polish, etc.

**Method of Coloring**

First of all, clean the surface of the objects which is going to be colored. Coloring can be done as per the nature of the object. Example: Enamel or acrylic or simple varnish can be used in the objects prepared from bamboo. Similarly varnish can be used for the materials from bamboo and 'Beth' to make more attractive.

**Activity**

1. Color any object prepared by you and demonstrate it in your classroom.
2. Make arrangement for selling the objects you have prepared in the nearby market.

**Exercise**

**Give answers to the following questions.**

1. Why is coloring done in the objects?
2. Mention what type of colors can be used in objects prepared from wood?
3. Mention any four essential materials for coloring?
4. What types of colors are suitable in the objects you have prepared? Discuss it with your friends.

## Unit: 13 Clay Works

### Lesson: 1 Preparation of Different Geometrical Shapes from Clay

Suitable type of clay is needed for preparing different materials from clay. Using appropriate clay will make the work easy. For this, the clay should not contain sand, grasses, weed roots, etc. Clay should be silky and lustrous. Soft type of clay is most suitable for clay works. Different geometrical shapes can be prepared from clay. There are numerous geometrical shapes, but the major and basic shapes are mentioned here as follows:



Circular



Oval



Rectangular



Conical



Cylindrical



Pyramid



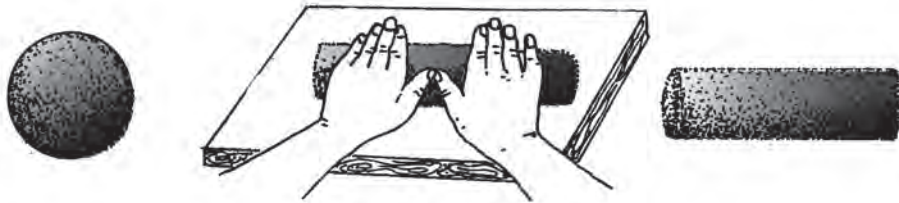
Prism

#### Methods of preparing geometrical shapes

Take a prepared clay ball. Place the clay ball in the leveled surface or in the wooden plank. Slightly press the clay ball placed in the plank using palm to prepare different geometrical shapes like circular, flat, lengthy, wider, etc. By this method, the above mentioned geometrical shapes can be prepared.



Pressing the clay ball using palm to make flat



Pressing the clay ball to prepare the cylindrical shape

### ***Activity***

Prepare different geometrical shapes as mentioned below and discuss in your classroom.

Circular, Oval, Rectangular, Conical, Pyramid, Prism, Cylindrical

### **Exercise**

**Give answers to the following questions.**

1. What type of clay is suitable for clay works?
2. List different geometrical shapes that can be prepared from clay.
3. Why is silky clay important for clay works?

**Lesson: 2****Preparation of Fruits, Vegetables, Animal and Household Materials from Clay**

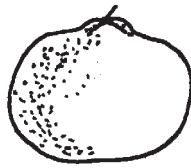
Different materials can be prepared from clay. Given below is the procedure for the preparation of such materials.

**Fruits and Vegetables**

When we know how to prepare different geometrical shapes from the clay, we can construct different materials. Given below are the types of fruits and vegetables from clay in the pictures.



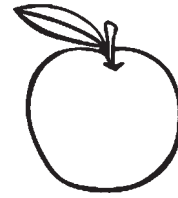
Circular:



Orange,



Pumpkin,



Apple



Conical:



Radish,



Strawberry,



Capsicum,



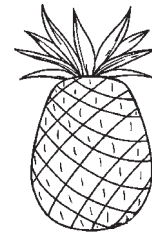
Oval:



Bottle gourd,



Potato,

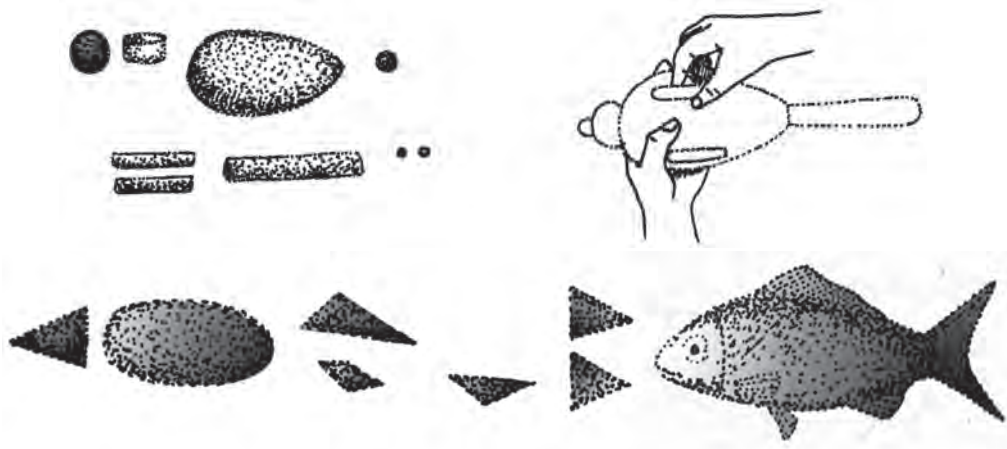


Pineapple

**Animals**

By using the same techniques, we can prepare different shapes of animals and birds. New and attractive materials can be prepared by joining or arranging different geometrical shapes. Here is the example of some materials prepared.





*Preparation of new materials by arranging different shapes of clay*

### **Household materials**

Different household materials can be prepared by using techniques as discussed above. Some examples include utensils, bucket, cup, Vessel (*Surai*), *Makkal*, Piggy bank, etc.

### **Activity**

Prepare each of the fruits, vegetables, animal and household materials from clay. Demonstrate it in your classroom and discuss it.

### **Exercise**

#### **Give answers to the following questions**

1. Write four names of the materials that can be prepared in circular, conical and oval shapes?
2. Which geometrical shapes can be used while preparing birds and animals from clay works?

## Unit: 14 Sewing and Knitting

### Lesson: 1 Decorative sewing Stitch

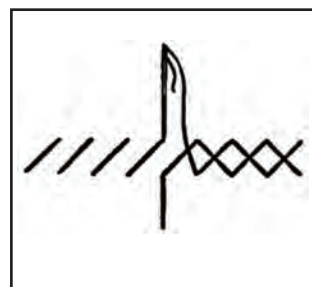
Different types of cutting and sewing are done to make our clothes attractive and beautiful. The art of attaching different attractive objects into the clothes is known as stitches. While sewing clothes and uniform, different types of stitches can be used. Various decorative sewing stitches are used in different clothes like shirt, sari, pants, skirts etc. Some major decorative stitches are mentioned herewith.

#### 1. Cross Stitch

Cross stitch is very old way of attaching attractive stitches. It is used all over the world. It is used to add stitches in table cover, pillow cover, etc. It can also be used as an art. Colorful threads are used to make triangular shaped stitches in clothes. Given below are the samples of cross stitch:

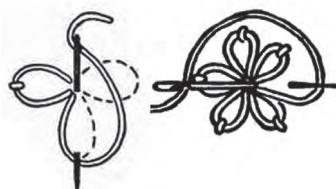
##### Method of Preparation

- Put the thread into the needle. Sew cross over the clothes with the tip of the needle as shown in the figure.
- Sew from the backward side towards the inward side making the cross lines with the thread as firstly sewed. English X shape is formed in the stitch. Cross stitches is prepared by this process.



#### 2. Lazy Daisy Stitch

This decorative stitch is of flower shape. It is used in clothes, borders of handkerchief, border in other clothes. Stitching is done with short gaps in this type. Its sample is shown in the picture. This decorative stitch uses different colorful threads along with the frame or with special design to make the clothes more attractive. This stitch is highly useful in decorating clothes.



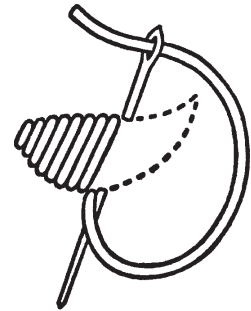
##### Method of Preparation

- Sew with the needle fitted with thread to make a flower shape in the clothes. The thread must be circled as shown in the picture and sewed using needle to make the stitch. Lazy daisy stitches is prepared by this process.

- b) Lazy daisy stitches with the shape of flower can be attached in the clothes with this process.

### 3. Satin Stitch

This stitch is also called as Damask stitch. It is used in wide clothes to make beautiful images like of fruit, fish, animal etc. Both short type and long type wide stitches can be prepared through this process. It is an artistic work. Its sample is shown in the picture.

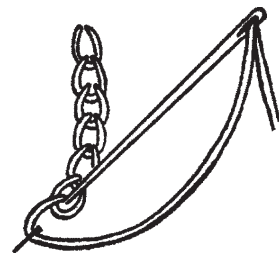


#### Method of Preparation

- a) Cross and straight stitches are prepared one after another with the regular repetition in the clothes.
- b) Satin stitches can be attached in the clothes with this process.

### 4. Chain Stitch

The decorative stitches using the series of stitches forming chain shape is called chain stitch. Generally, the stitches are made by overlapping one another giving attractive images. The sample of this stitch is shown in the picture. It is used in decorating and stitch attaching works.



#### Method of Preparation

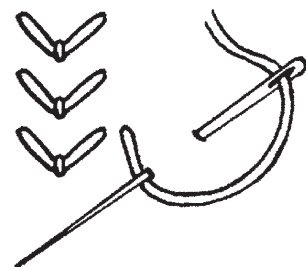
- a) Sew making a series of stitches to form a chain shape as shown in the picture.
- b) Sew with the chain shape as shown in the picture.
- c) Make a stitch with the shape upon your interest.

### 5. Fly Stitch

This stitch is also known as Y and open loop stitch. Various designs can be prepared with this fly stitches. It can also be used in both decoration and artistic works. The sample of fly stitch is shown in the picture.

#### Method of Preparation

- a) Sew the upper-left side of the cloth with the needle fitted with thread. This joint is slightly lowered and pressed with the thumb. Again sew in a little gap with the same level at the right side. The measurement of the right and left side should be similar.



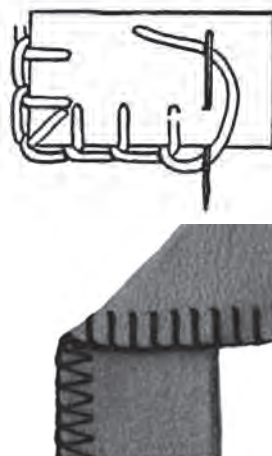
- b) Then sew again in the lower in the middle part of the previous sewing. During sewing, the thread should be pulled little downward to form a new shape. Similar process is also shown in the picture. In this way fly stitches can be prepared.

## 6. Blanket Stitch

Blanket stitch is the decorative stitch mostly used in the borders of blanket, towels and other thicker clothes. This stitch saves clothes from being turn out from the edge. This stitch is used to make clothes more attractive. This stitch is used in woolen clothes, sweaters and etc.

### Method of Preparation

- a) Make the stitch using needle in upper and lower direction of clothes as shown in picture.
- b) Make a loop in the upper side using needle. Then, turn the needle down as shown in the picture to prepare a blanket stitch.



### Activity

1. Observe the type of stitches used in different clothes of your house and discuss in classroom with your friends.
2. Prepare each sample of decorative stitches and demonstrate it in your classroom.

### Exercise

#### Give answers to the following questions.

1. Write the name of any five decorative stitches.
2. What type of stitch is called Cross stitch? Explain it with a figure.
3. Differentiate between lazy daisy stitch and satin stitch.
4. Give a short introduction of fly stitch with figure.
5. How can blanket stitch save our clothes or handkerchiefs tearing from the edge?

## Lesson: 2      **Method of Making Handkerchief**

Handkerchiefs are of different types and shapes. They are used in cleaning our body and parts. We use them to wipe out the sweat from face and other parts while doing some works. These can also be used in wiping nose drops while suffering from common cold.

### **Materials needed for making a Handkerchief**

- |                     |                    |                     |                  |
|---------------------|--------------------|---------------------|------------------|
| 1. Scissors         | 2. Colored Thread  | 3. Clothes          | 4. Needle        |
| 5. Carbon paper     | 6. Pin             | 7. Pencils          | 8. Tracing paper |
| 9. Decorative laces | 10. Printing frame | 11. Tailoring Chalk |                  |

Generally handkerchiefs are formed with following three dimensions.

- |              |               |               |
|--------------|---------------|---------------|
| (1) 12x12 cm | (2) 18 x18 cm | (3) 18 x30 cm |
|--------------|---------------|---------------|

### **Procedure**

- a) First of all, cut the clothes with any of the above mentioned and appropriate dimensions.
- b) The four edges can be folded and sewn either with hand or by machine. While folding the edge, only the portion left for fold should be utilized using rolling stitch, banquet stitch, etc.
- c) In case of handkerchief, print is made only at one edge but with interest prints can be made in four sides.
- d) Clean and iron the handkerchief for proper finishing.

### **Activity**

1. What types of handkerchiefs are used in your community and by your friends? Visit and prepare a list to discuss in your classroom.
2. Prepare each handkerchief with prints using different stitch and demonstrate it in your classroom.

### **Exercise**

#### **Answer to the following questions.**

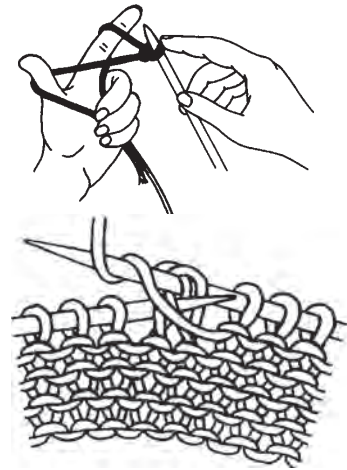
1. Give a short introduction to handkerchief.
2. Write any five essential materials needed for making a handkerchief.
3. Write the methods of preparing a handkerchief.
4. What are the three dimensions of handkerchief that are most common in use?

## Lesson: 3 Hand Knitting

### 1. Introduction of Hand Knitting

Hand knitting work refers to the method of preparing clothes, sweater, socks, gloves, caps, etc from the thread or wool using wooden or metallic needles or cruses. In this method, the line or loop of thread are prepared from the thread of wool with different shapes and measurements using needles. Different clothes and uniform can be prepared from this method.

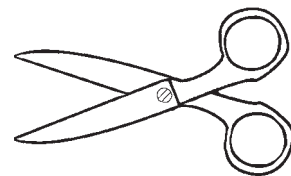
There are two types of knitting methods: Making home (*Ghar Halne*) and Simple method of knitting.



### 2. Instruments used in Knitting Works

The instruments necessary for knitting works are mentioned as follows:

- a) **Knitting needles:** Knitting needles are of three types namely one pointed, two pointed and circular type. They are in different sizes.
- b) **Scissors:** It is a type of instrument used in cutting clothes or paper.
- c) **Colored threads:** It is one of the necessary materials in knitting works used for knitting, sewing or in the preparation of different images. They are available in different color.
- d) **Stitch holder:** It is a type of instrument used as a safety material for finger in knitting works.
- e) **Needles:** It is an instrument used in knitting or stitching made by inserting thread in its hole.
- f) **Cruses:** It is a round shaped knitting instrument made from metal.
- g) **Protractor:** It is a type of instrument used to measure different angles in sewing and knitting works.



### 3. Making home and Simple Knitting

#### a) Making home (*Ghar halne*) method:

Firstly, make a loop in the forefinger. Then make a knot by twisting it round on the needle using the thread. In this way, one home will be prepared. This should not be more tight or loose. It should be tied in balance. Similar process will be followed to make the *ghars* upon our need.



#### b) Simple knitting method:

After preparing the *ghar* upon our necessity, another needle is used to prepare another loop. Move forward from the first *ghar* to the next by making a loop. Knitting works need to be followed continuously in a similar manner.

#### *Activity*

1. Prepare a list of the clothes prepared through hand knitting in your home and your community and discuss it in classroom.
2. Demonstrate *Ghare halne* and Simple knitting in the class.

#### **Exercise**

#### **Answer the following questions.**

1. Give introduction of hand knitting with examples.
2. Prepare a list of the instruments needed in hand knitting works.
3. Mention the *Ghar* making and simple knitting process?

## Lesson: 4 Fabric Painting

Fabric paint can be used in the interior decoration of room and clothes. Beautiful fabric paint can be kept framed. Fabric paint is the art of making prints in clothes with special type of color. The word 'Fabric' is derived from Latin English which means woven clothes. Thus, this painting is fully done in clothes. It can also be done on the clothes we wear. This art can be used as both home work and as an enterprise. Prints can be made on handkerchief, bed sheet, pillow cover, T.V cover, Sofa cover etc. This painting can be done in front and back of ladies *Salwar Kurta*, plain *Sarees*, kids wear and so on.

### Required materials

Different types of fabric color, liquor that should be mixed in color or Acrylic medium, brushes of various sizes, pencil, eraser, white cloth, white paper, carbon paper, tracing paper, ring (for stretching cloth), color mixing utensils, water, old clothes etc.

### Techniques of making different prints and images from fabric painting

- First of all, clothes on which painting is done should be selected. Prints should be made with consideration of clothes shape and size.
- After selecting cloth, matching prints image should be drawn in the clean transparent paper. Prints shouldn't be too big or small. While making prints, things like where and how it is being used should be kept in mind.
- After making the prints in the paper, it should be copied to cloth with the help of carbon paper by keeping cloth below the drawn paper. Special attention should be given while copying as the image will be drawn from the paper above. While drawing, both the paper and clothes should be fitted tight for fixing it properly.
- After copying the prints, required coloring should be done with respect to the type of prints. Cloth should be tightly fitted with the help of ring before fabric painting.
- While painting, fabric paint should be mixed with the medium to make color thin. Coloring should be done slowly with the help of painting brush. Painting can be done in clothes of various shapes and





size following this process.

- f) After the completion of fabric painting, cloth should be dried thoroughly and ironed. This helps in proper sticking of fabric paint in cloth. Iron should be pressed in the opposite side of paint.
- g) Handkerchiefs, bed sheets, covers can be painted using the similar procedure. This is not only limited to home but also can be expanded for business purposes.
- h) All the equipment used in this fabric painting should be cleaned and kept safely so that they can be used for longer period in future.
- i) Fabric painted clothes should be handled gently to avoid friction.

### ***Activity***

1. List the materials needed for fabric painting. Draw with the help of carbon paper one of your favorite images in the paper.
2. Take 5X5 inch white cloth. Do a fabric painting after drawing one or more prints according to the need and demonstrate it in your classroom.

### **Exercise**

#### **Answer to the following questions.**

1. What do you understand by fabric painting?
2. What is the difference between fabric painting and simple painting?
3. What things should be kept in mind while doing fabric painting? Mention them.
4. What are the things in which fabric painting can be done?

## Unit: 15 Local Technology

### Lesson: 1 Interrelationship between Local and Modern Technology

The attachment between any two or more technologies is called inter relationship of technologies. There is a direct connection between traditional and modern technologies.

People of Egypt carved large, unmovable stones into a wonderful pyramid. At that time, people might have used their local technology to carry those huge stones. They may have moved the stones from one place to other with the help of simple lever and wedge. These simple technologies had made the work simple and easy. These technologies are still being used in various fields and have their own importance in modern technologies.

By using these simple technologies, many works can be done in short time with less effort. This is the main quality of technology. Nowadays those ancient technologies are modernized applying the same principle. Gear is the modern technology. Screw is a traditional technology. While doing iron works, traditional men used physical energy to blow fire. At present it is replaced by electric blower. It aids in air out and making fire burn hot. These appliances make work fast and easy. Electric blower has a switch; and functions by turning it on. In old time people used human power for this purpose.

In today's modern time, electrical turbines are used in power house to generate electricity. Water mills were used in old days for the same purpose. Large materials are carried up and down, lifts are developed using the simple concept of lever.

Various technologies are developed after modernization of traditional technologies in pulling, lifting, grinding, crushing. Bull carts, mule carts were means of transportation in earlier days. Now buses, lorry, trucks, trains replaced



those cart. Wheels are used in both the technologies. Energy produced by bulls is replaced by engines and petrol. So there are many similarities between modern and traditional technology.

In summary, the main source of modern technology is the principle of traditional technology. Modern technologies are being developed based on the traditional technology.



### ***Activity***

1. What types of technology are being used in your community? Make a list and discuss it in your classroom.
2. What type of equipment is used by the iron worker of your locality? Visit the area and discuss it with your friends.

### **Exercise**

**Answer the following questions.**

1. Why is technology used?
2. Modern technology is developed from the traditional technologies. Explain this statement giving relevant examples.
3. How does lever technology make work easier and convenient?

## **Lesson: 2**    **Safety Measures of Daily Used Equipment**

Many appliances are used in our daily life. Precautions should be taken to use these appliances safely. Improper handling of electric appliances sometimes may lead to accidents. So, safety measures should be followed while operating these appliances. Appliances that we use daily differ with enterprises. Appliances such as kitchen wares, room heater, and water boiler have different functions and work accordingly. These technology and appliances are of many types and have various areas of use.

Appliances used by a carpenter and of dairy technology are not similar. But precautions should be followed by all while operating them. If not, there is a high risk of losing our life.

There is a need of knowing safety rules before using any type of electrical appliances. These rules should be followed strictly during work. It is better to coordinate with helper friends rather than working alone while engaged with electric appliances.

Home appliances of daily use can be used safely with the following precaution measures:

### **1. Electric Appliances**

Given below are the special precautions that should be followed while using home appliances such as iron, refrigerator, radio, television, and computers:

- a) Check with the tester whether the plugs are burnt or not.
- b) Check whether the wires with different charges are connected and burnt. If a wire has turned black, immediately consult a technician and repair it.
- c) Replace the plug that has been damaged by over-heating.
- d) Only switch on the plug after connecting it with appliance.
- e) Save the electric appliances, plugs, switch from water and cold.
- f) Switch off the power of electric appliances after use.

### **2. Gas Appliances**

Gas stove, Gas heater, Gas Geyser are some of the gas appliances. Safety precautions should be followed before operating these appliances for our personal good.

**Following safety precautions can be obeyed while using gas appliances:**

- a) Gas leakage in the initial stage can be found out from the smell. If so, any object that catches fire immediately or fire spark or light should be kept away from that area. Outlets such as doors, windows and ventilators should be opened for the outflow of the gas from the room.

- b) Gas regulator should be turned off in case of gas leakage.
- c) Keep gas cylinder and stove in open area and check it with the help of technicians.
- d) Open the windows while using gas heater because burning fire reduces oxygen and increases carbon monoxide in closed room. This situation is very dangerous to our health. Opening the windows let the oxygen pass inside the room and is risk free.

### **3. Other Appliances**

Safety precautions should be followed while using other appliances.

- a) Safety valve should be considered while using pressure cooker. Vent (gas outlet aperture) should be opened.
- b) Wear cotton clothes and shoes while working with electric appliances. Save eyes, ears and head according to the need of work. Apply cotton in ear while working in noise polluted areas. Nowadays modern devices easily found in market can be used to protect our ear.
- c) Protect hands and legs from revolving electric appliances such as fan, gas exhaust hand.
- d) The position of turn on/off switch should be near.
- e) Wire leakage should be checked regularly.
- f) Wear masks on welding works.
- g) Put on welding glass while welding. Do not see welding with naked eyes.
- h) Wear helmet and mask before doing any risky works. Do not neglect it.

### ***Activity***

Some enterprise needs frequent climbing up and down from the staircase in different places. How can this job be made safer? Discuss it in your classroom.

### **Exercise**

**Answer the following questions.**

1. Write five safety measures that should be followed while working at industrial business.
2. What can happen if safety rules are not followed? Write in clear words.
3. Why should the ventilators be kept opened in room with gas heater or stove?
4. What happens if electric appliances are touched with wet hands?
5. Why are helpers needed during work?

**Lesson: 3****Principles of Some Indigenous Technologies**

Technology means to gain higher output by allocating fewer resources. Non application of applied technology will lead to labor and fuel loss. Our indigenous technology is based on this principle.

**1. Janto (Grinding technology)**

Indigenous grinding machine is a very old technology. It has two parts. Upper part is the wheel of this grinding machine. It is made by cutting stone in a circular shape. The centre of the stone consists of a hole from where grinding materials are fed. One end of its upper part consists of a small hole on which a wooden plank is fitted with the help of which upper part is rotated using hand. The lower part of this machine is permanently fixed into the ground. Thus, this lower part is also known as pivot of this technology which has facilitated the movement of this machine.

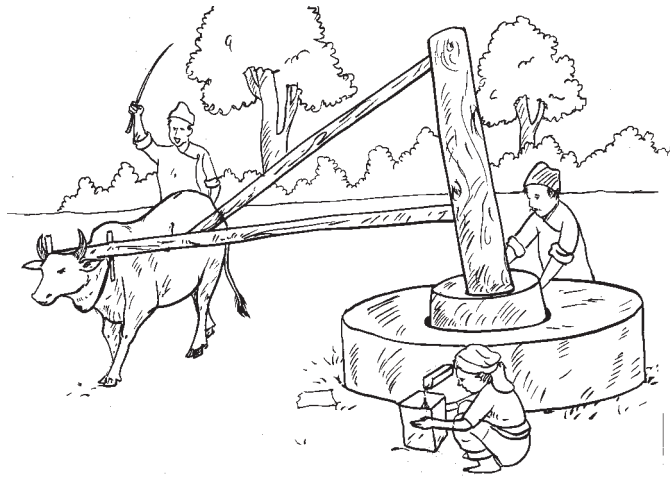
There is a difference between stone grinder (lohor) and Janto. One can grind maize, wheat, finger millet etc in it in larger amount. This is possible only through technology. Many modern technologies are developed from these indigenous technologies. Rice beating solar mill, wheat, maize, finger millet grinding mill are few examples of grinding technology.

**2. Cole**

Cole is a simple machine used in mustard grinding. This uses only lever. Mustard used to be ground from this lever technology from ancient time.

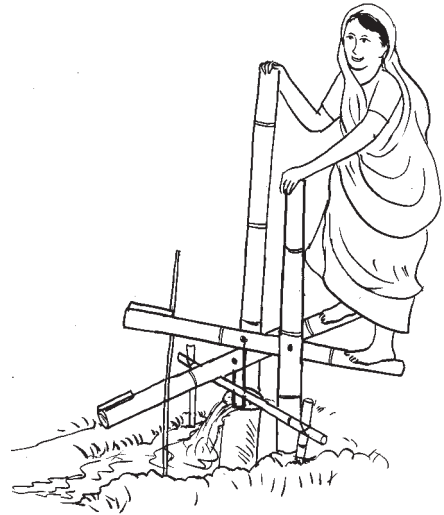
Heated mustard is kept inside a Cole and mustard oil is extracted with the help of moving roller around the Cole. Modern oil crushing mill also uses roller for oil extraction.

Cole works on rotating technology. This is a century old technology of Nepal.

**3. Water pumping dhiki pump**

*Dhiki* pump is made using lever technology (Pivot). It pulls underground water. Irrigation in agricultural field is done through this technology.

Its process is similar to that of playing sea-saw. It rotates, will go up and down when we press its paddle with our leg. Water pumping *dhiki* pump works under lever technology. This technology has still been used in Nepal for many years. Large amount of water can be pulled from less force by using *dhiki* pump.



### **Activity**

1. What types of technology are being used in your community? Visit your place and discuss it in your classroom.
2. Where are lever used in other ancient technology. Discuss.

### **Exercise**

**Answer the following questions.**

1. What do you mean by *Janto*. Write its working principle.
2. What are the major things in lever technology? Draw a figure of lever.

**Lesson: 1 Utilization of Electricity for Household Purposes**

We are using many kinds of electrical appliances upon our necessity in our houses. As electricity is needed to operate these household appliances their use should be safely done. The important information on major electrical components and appliances are described as follows:

**A. Switch**

Switch is an electrical component. It is used to break an electrical circuit interrupting the flow of current. It can directly manipulated by a human upon the necessity of the electric current. It is shown in the figure. There are many types of switches with small or large size and shape available in the market.

**How switch works?**

Electric bulbs and other devices are connected to the electricity supply with the help of wire. The switch should be turned on while utilizing the electricity. As we turn on the switch, it makes connection in the break circuit. It is shown in the picture. However, when we don't need the electricity, we turn off the switch. While we turn off the switch, there will be a breakage in the electric circuit and the supply of electricity stops. It is also shown in the picture.

**Things to be considered**

- a) Sometimes the electric shock might flow in the outside of the wire. At this time, do not touch the wire with bare hands. Inform electricians immediately.
- b) Do not touch the live wire and switch with wet hands.
- c) Use wires properly and tightly on wiring in house.
- d) Switch off the mains while you do not need power.

**B. Joint**

It is an electrical component used in wiring. It is put on the wall of our house. From the joint box many wires are connected to supply electric current in different rooms and other necessary places. It is made up of PVC, wood, tin, etc. The joint box consists of a cover. It is shown in the picture.





### How Joint box works?

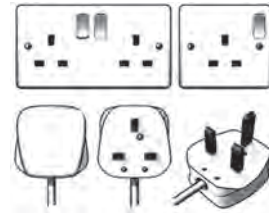
The joint box is connected with main power supply to different wires. The joint box supplies the electric current to required places using the electric wires. It is shown in the picture below.

### Precautions and things to be considered

- a) The wires placed in the joint box should be covered properly using tapes and covered the box with the front cover properly.
- b) The wires should be properly connected and tied.
- c) Sometimes the electric shock might flow over the outside of the wire. At this time it is necessary to inform quickly to the electrician for the repair of wires.

### 3. Socket Plug

Socket plug is another important electrical component used to supply the electric current. These are of two types: one with a switch and other without it. Generally, the socket contains switch, indicator and plug. It helps in electric safety and also provides the information about power supply.



Socket plug is placed to use the electric current in different areas arriving from the joint box in the wire. It supplies electric current either to the multi-plug or directly to the electrical appliances.

### Precautions and things to be considered

- a) It should not be placed in the wet places.
- b) It should be placed away from the reach of children.
- c) Electric conductors, metallic wire, metallic pins should not be inserted in the holes of the socket.

### 4. Electric Wires

Electric wires are made of copper or aluminum. They are used to transfer electric current from one place to another. They are of different types with the demand and upon the electrical appliances. They are in the form of machine cable, power cable, etc. Electric wires are used to supply electric current to switch, bulb, fan, etc.



There are two types of assistant wires namely live and neutral inside the main wire. When we have to work in any electrical appliances, these two wires are connected with each other. After the wires are connected, the appliances start working.

### **Precautions and things to be considered**

- a) It should not be placed in wet places.
- b) It should be far away from the reach of children.
- c) Electric conductors should not be placed in the holes of the socket plug.
- d) The electric wires should not be bare.

### **5. Volt Guard**

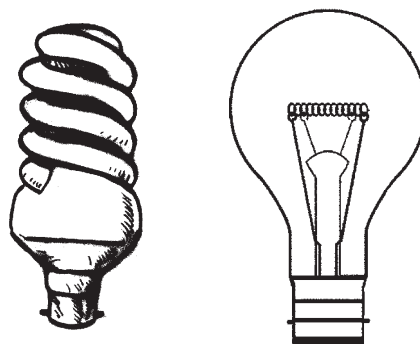
Volt Guard is an electrical component. It saves our household appliances from the risk of high electric current supply. It is used to regulate the low and high electric current supply. It has a knob for controlling the electric current supply. It supplies the electric current in the proper level of voltage.

#### **Things to be considered**

- a) The voltage should be lowered or raised upon the capacity of the household electric appliances.
- b) The household electric appliances should be connected only after regulating the voltage.

### **6. Electric Bulb**

Electric bulb is an electric device used for providing light. The electrical device used to provide light is called electric bulb. A bulb has a thin coil shaped filament inside. When power is supplied to the bulb, filament heats up, becomes red and then gives light. We can obtain light after providing electric current to the filament. Electric bulbs are of different types upon the capacity and the mode of use. The generally available bulbs are: simple bulb, tube light, CFL bulbs, etc.



#### **Things to be considered**

- a) Do not touch or change the lightening bulb or tube light.
- b) Turn off the switch while placed in the holder.
- c) Fit the bulb tightly and properly in the holder.
- d) Do not shake the bulb or tube light.

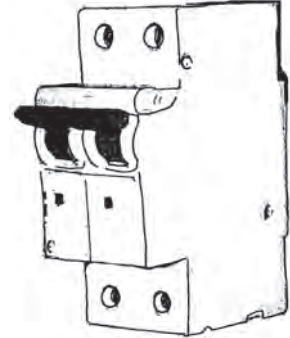
### **7. Miniature Circuit Breaker (MCB)**

MCB is an electrical component. It saves the electrical circuit from electric short. It

is one of the modern electrical components used in the form of fuse. It saves the household electrical appliances from electric burn due to short in the circuit. It automatically closes with the overloaded current and saves from the electric burn and other further accidents.

### Things to be considered

- a) Use M.C.B. with the capacity (Watt) equivalent to the capacity of the electric appliances.
- b) Do not turn on the M.C.B. if it switches off or turns down suddenly. If it happens for a long time, get help from the electrician to maintain and repair the circuit.



### Activity

1. What electrical appliances are used in your house, community and school for daily household purposes? Prepare a list and discuss it in your classroom.
2. Note the electrical appliances used in your house and mention their household use. Discuss in your classroom.
3. Collect the pictures or map of different electrical appliances used in your community and demonstrate in your classroom. Also discuss the method of their use.

### Exercise

#### Answer the following questions.

1. Give a short introduction of electric switch.
2. How does joint box work?
3. Write any two things to be considered while using the socket plug?
4. How does electric switch work? Explain it with a figure.
5. Why is volt guard necessary for us?
6. Give short introduction of electric bulb and mention any three things to be considered while using the electric bulb?
7. What is MCB. and mention its major works?
8. What do you mean by switch? Explain with figure.
9. Write any five electrical appliances that are used in the household purposes?

## Lesson: 2      **Modern Household Equipment**

We use different types of electrical appliances in our houses. Some of the household appliances are described as follows:

### **1. Oven**

An oven is an electrical appliance used to cook and warm our food. It converts electrical energy into the heat energy so as to cook or warm our food. There are different types of oven depending upon the work and capacity. Generally, there are two types of oven available in market. One is simple oven and other micro oven.



#### **a) Simple Oven**

Simple Oven is an electrical equipment used to warm or cook food. There can be one or two halogen electric rod inside the oven. While supplying the electric current to the oven, the rod heats and then warms or cooks food. There is one switch for turning on and turning off the electric current. We can start or stop the oven with this switch. There is one door in front of the oven for its opening and closing. We put on our foods to warm or cook after opening this door. In its right front side, there are two small buttons. The time and temperature of the oven can be maintained by using these buttons. The work and time taken by an oven varies in accordance with food type.

#### **b) Micro Oven**

Micro Oven looks like the Simple Oven. However, its working mechanism is different from the simple oven. It does not have rods inside. When connected to the electricity, current produces microwaves and then warms or cooks food. It also has one door and buttons like in the simple oven. It can be used to warm or cook our food too. Before the food is cooked, this oven gives a signal. This signal is the indication that the food is cooked inside. This type of signal is present in simple oven too.

#### **Things to be considered**

- a) Utensils used in oven are of special type. We cannot use simple type of utensils. These utensils used are different for simple and micro oven.
- b) Plastic utensils should not be placed in simple oven. In this, utensils made of glasses or metals are only used.
- c) In case of micro oven, utensils made of plastic and glasses are only used. The

metallic utensils must not be used.

- d) After the food is cooked, either the electric plug should be unplugged or turned off the switch.
- e) Do not touch the hot oven with your bare hands. Also do not open the door until the oven is fully stops working.
- f) Operating Manual Book should clearly be studied before its use.

## 2. Vacuum cleaner

A vacuum cleaner is the household equipment. It can be operated with the electricity. Different types of electric machines are connected inside it which creates vacuum. The vacuum pulls the small dirt and dust particles. It is used to pick up the small dirt and dust particles from the carpet.



### How does vacuum cleaner work?

A vacuum cleaner is small electrical equipment in a box shape. There is a small rounded hole in its front side, in which the pipe of vacuum cleaner is spirally attached. The assistant pipes attached in the main pipe are of different shapes and types; and are used according to the nature of work. There is a power switch on the backside of the vacuum cleaner. The machine can be turned on and turned off by pressing this power switch. In its lower part there is a wire in which power plug is connected to supply the electrical current for its work.

### Things to be considered

- a) If the pipe of vacuum cleaner is blocked, we have to stop the machine and clean the mouth of the pipe for continuing the work.
- b) Vacuum cleaner should not be used to pick up water or other wet substances.
- c) Be careful while connecting the vacuum cleaner to the electric plug. If finger touches the plug or with wet hand, electric current transfers to your body.
- d) Clean the dirt particles collection chamber timely.
- e) Clean all the parts properly after its use and place it in a safe place.
- f) Operating Manual Book should be clearly studied before its use.

### 3. Grinder

Grinder is one of the modern grinding machines using the electric motor. Different types of grinder machine with mixture are available in the market. These grinder machines are used to grind mainly pulses, cumin, pepper, spices, etc.



#### How grinder works?

Grinder is a modern electrically conducted grinding machine. It has two parts. The grinding things are placed in its first part. The second or lower layer contains an electrical motor. The grinding things are placed in its first part for grinding works. It has a switch or button for turning on and turning off. The button or switch should be pressed while working.

#### Things to be considered

- a) Do not plug the naked wire.
- b) Do not touch the working grinder machine.
- c) Remove the grinded materials safely from the grinder machine if the blades are made up of tin (metal)
- d) The base plate should be hold properly while working with grinder machine.
- e) Do not put hard things on the grinder. These things may damage the blade and motor.
- f) It should be cleaned well after its use.
- g) Operating Manual Book should clearly be studied before its use.

### 4. Juice Maker Machine

A Juice maker machine or Juicer is modern technology equipment used for preparing of juice from fruits, sugarcane, etc. In its one side, fruits are placed; and are then squeezed using hand or the use of electricity. The liquid obtained in this way is called Juice.



#### How it works?

It is electrically driven machine like the grinder. It also has two parts. First part or chamber which

is in the upper side is used for inserting the fruit or other materials. The lower side is equipped with the electric motor by which squeezing works can be done. There is one on and off regulating button or switch. When we turn on the switch, the juicer starts and the juice is obtained. There are juice making machines of different types and capacity in the market.

### **Things to be considered**

- a) Keep the juice maker machine clean.
- b) Do not touch the revolving parts and roller of the juicer with hands.
- c) Turn off the switch after extracting all the juices.

### ***Activity***

1. Have you seen the electrical appliances as mentioned in this chapter in your, friends and relative's house? If so, how do these appliance work? Discuss it with your friends in the classroom.
2. What types of appliances are used in your house? What precautions should be taken in their use? Discuss it with your friends.

### **Exercise**

#### **Answer the following questions.**

1. Give short introduction of oven and list the things to be considered in its use.
2. What type of work does a mixture grinder do?
3. Write the things to be considered in the use of vacuum cleaner.
4. How does the juice maker machine work? Elaborate it.
5. What is the difference between grinder and juice maker machine?
6. Why is it necessary to read the operation manual book before the use of any appliances?

## Lesson: 3      **Introduction of Technology and its Importance**

The advancement in technology has made our life simpler. Therefore, we cannot imagine our life without the technology. We are using newspaper, book, pen, pencil, radio, telephone, television, computer, ATM, e-commerce, etc. Which are the advanced form of technology. These technologies make our life simpler and convenient. The phenomenon of bringing our life simpler and convenient is called technology.

### **Importance of Technology**

Technology can be used in different sectors for various works. Audio visuals, multimedia, TV, Radio, Computer and Internet technologies are being used in educational sector so as to enhance teaching and learning effectively. Similarly, modern technologies are being used in different sectors such as banking, business, commerce, industry, etc. Modern technologies like Radio, FM, Television and the internet are being used for the effective information and news transmission. So, the technology has a great role in every sector of our livelihood. Nobody can be isolated with the use of technology.

### ***Activity***

1. What type of technologies have been used in your house, school and community? Observe and prepare a list, then discuss it in your classroom.
2. Discuss the "Impact of modern technology" in your classroom.
3. How do these technologies help in your learning process? Discuss with your parents, friends and teachers, and write about it in your notebook.

### **Exercise**

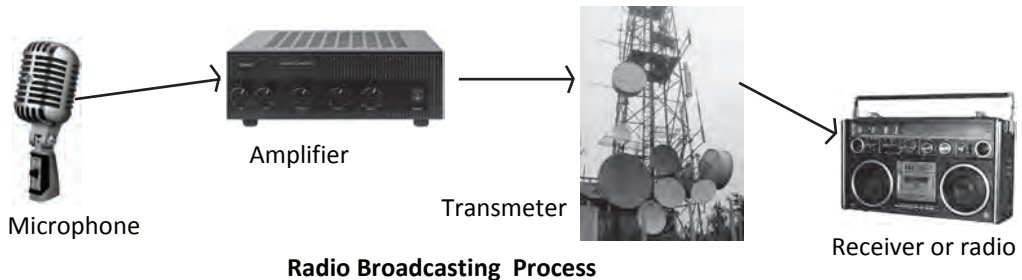
#### **Give answers to the following questions**

1. Give introduction of technology with examples.
2. What is the importance of technology in your life? Write with examples.



## Lesson: 4      **Broadcasting Process by means of Radios, F.M., and Television**

The technologies we are using may be simple or complex. We are using different technologies like: radios, television, F.M., telephone, cell phones, computer, the internet etc. We can see or hear information, message, news or any activities around the world. These technologies are broadcasting different types of information and messages easily. Here are the details of the process of broadcasting through these technologies.



### **Broadcasting Process of Radios and F.M.**

Marconi developed the broadcasting mechanism of Radios and F.M. A radio station is needed to broadcast the information and news. From the station, wireless waves are released and which consists of different type of news and information. This form of technology is called Radio. Different songs, music, national and international news can be heard from the radio.

#### **How broadcasting happens in Radio?**

Different equipments are needed in the radio station while broadcasting the different programs. The major equipments are microphone, amplifier, transmitters, Ariel, etc.

Microphone turns the sound waves or voice into electrical waves in the radio station. These electrical waves are transferred through the medium of wires to the amplifier. Amplifiers make the electric waves more powerful and are transmitted to transmitter through the medium of wires. The transmitter then transfers them into radio waves and is transmitted throughout the places. These waves can reach the entire world within a second. The radio receiver inside our radio catches these waves and we can easily hear the sound from the small speaker of radio. In this way, we can listen songs, music and news. The tuning button in the radio makes the sound clearer.

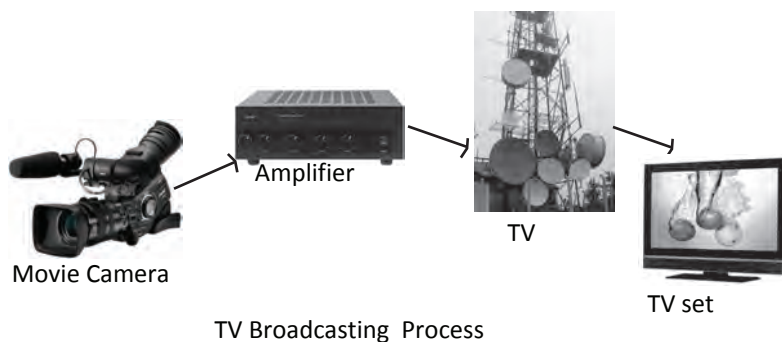
In modern days, the use of radio is not limited to listening to songs, music and news. It can also be used in different areas like air plane, police, army, education, education, etc.

Frequency Modulation (FM) is also a popular radio waves broadcasting technology. Radio waves of FM are extra more powerful but the broadcasting area is limited than that of radio. The programs broadcasted through FM are of high quality. That's why the FM is gaining popularity day by day.

### **Broadcasting process of Television**

Television is also an effective means of transmission like radio. Different types of information, news, songs and movies can be seen and heard at the same time. Television is an English word. It is called television as the pictures and sounds of distance can be seen and heard at a time. British citizen, John L. Betard discovered the modern television in 1926 A.D. The modern television is being developed using his technologies.

### **How does broadcasting take place through television?**



The programs going to be broadcasted through television are firstly recorded by a television camera. The recorded items are edited; and then broadcasted from the television center. During broadcasting, the recorded items are converted into electrical waves using different equipments. Amplifier transfers these waves to transmitter and converts these waves into radio waves, which are then transmitted across the world through antennae. These radio waves transmitted are captured by the receiver of the television set of our house and are converted into the audio and visual medium in the screen.

To make the broadcasting process more effective, many countries have established the satellite stations. As the television programs are broadcasted using satellite stations, these types of programs are also called as satellite programs. Many television programs have been broadcasted through satellite station. Knowledgeable and entertaining programs of different sectors like education, health, agriculture, industry and business have been broadcasted from television.

### ***Activity***

1. Visit a FM station of your community or refer to knowledgeable person to ask about different broadcasting programs and discuss it in your classroom.
2. Make a list of different FM and their frequency waves. Present it in a table and discuss with your friends.
3. Make a list of television programs that you watch. Discuss it with your friends.
4. How are the television programs helping your learning process? Write in your notebook and discuss with your friends.
5. What are the impacts of modern communication means in your society? Prepare a list and discuss in your classroom.

### **Exercise**

#### **Give answers to the following questions**

1. What do you mean by modern communication media? Explain it with examples.
2. How does broadcasting happen in Radio and FM?
3. Mention the process of broadcasting in television.
4. Differentiate between simple radio and FM.
5. What are the impacts of modern communication media in you and your community? Explain them with examples.
6. Write the importance of modern communication media.

## Lesson: 5      **Computers as a communication Device**

Computer can be used as a fast, easy and easily accessible communication device in the modern world. It is an electronic machine used for storing, organizing information and statistics. So, its use has been increasing these days. We can do chat, video chat, etc with our relatives living



any corner of the world through computer. Different software should be installed in computer for these purposes. Details on some communication devices are as follows:

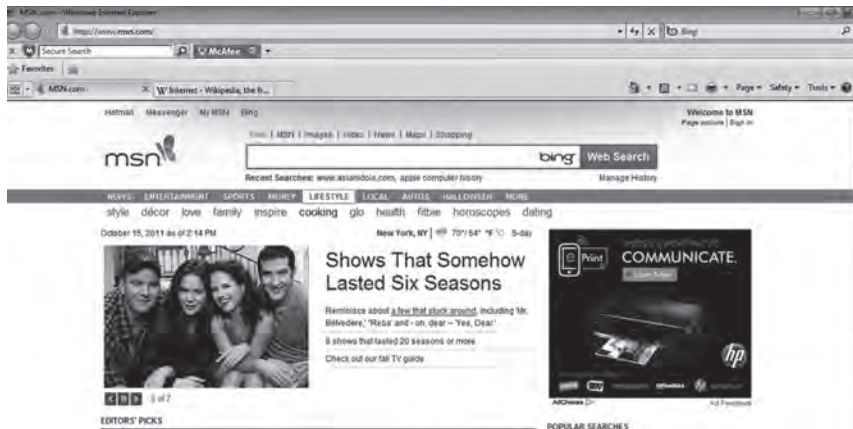
### **Communication Devices used in Information and Technology:**

#### **1. The Internet**

The internet is a quickly developed new technology. It is a global system of interconnected computer networks to link several billion devices worldwide invisibly. The internet carries an extensive range of information resources and statistics. Information resources about education, health, agriculture, trade, industry and other services can be found either freely or with charge in internet. Several information and ideas can be published and transferred from the internet. Internet browser should have been installed in the computer for the use of internet. The internet can only be opened from the browser.

Any type of information sources and data can be published in the internet using special program. Once the materials prepared formatted in the hypertext will complete for the transmission to a web browser. The information taken in the internet is placed on a special type of format which is technically called Webpage. In webpage there is space where address is searched by typing the web address.

## Website address



### *One specimen of Webpage*

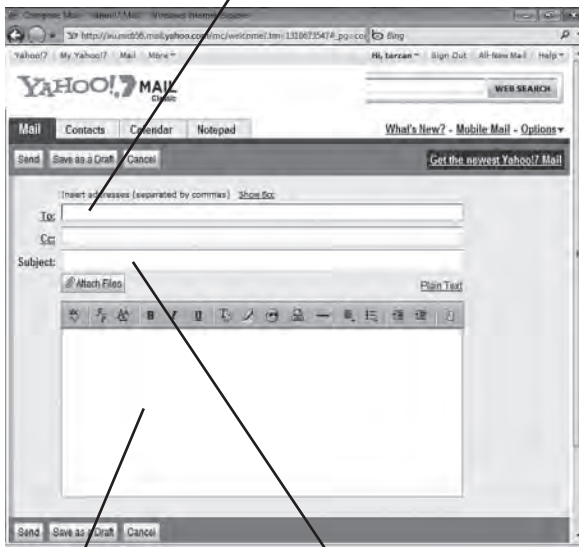
#### **Following works can be accomplished using the internet:**

- Different research articles, papers, books and statistics can be easily found for education.
- It can be used to receive and transmit data for electronic trade, industry and professional services.
- It can be utilized personally and in an organization.
- Email, chat and video chat can be done by individuals or organizations in communication works.
- It can be used as a transmission and trade of songs, music, arts and literature.
- Open learning or e-learning through online can be done using the internet.
- Many information and data about health, agriculture, communication and other sectors can be found from the internet.

## **2. E-mail**

E-mail is the method of exchanging digital messages. It is one of the facilities of internet service. We can send our message through email to our relatives lying over the world. We need to log up an account to use email service. Account can be opened in any of the service providers like: yahoo, gmail, hotmail, face book, etc. Otherwise we cannot use the service. Here is one example of yahoo mail. The format of other email service providers is similar with this yahoo mail. After the message in the format, clicking on the send bottom will send the message to the recipient.

*Recipient person's email address written here*



*Detailed message  
is written in this  
space.*

*Subject is mentioned here*

**Following are the advantages of email:**

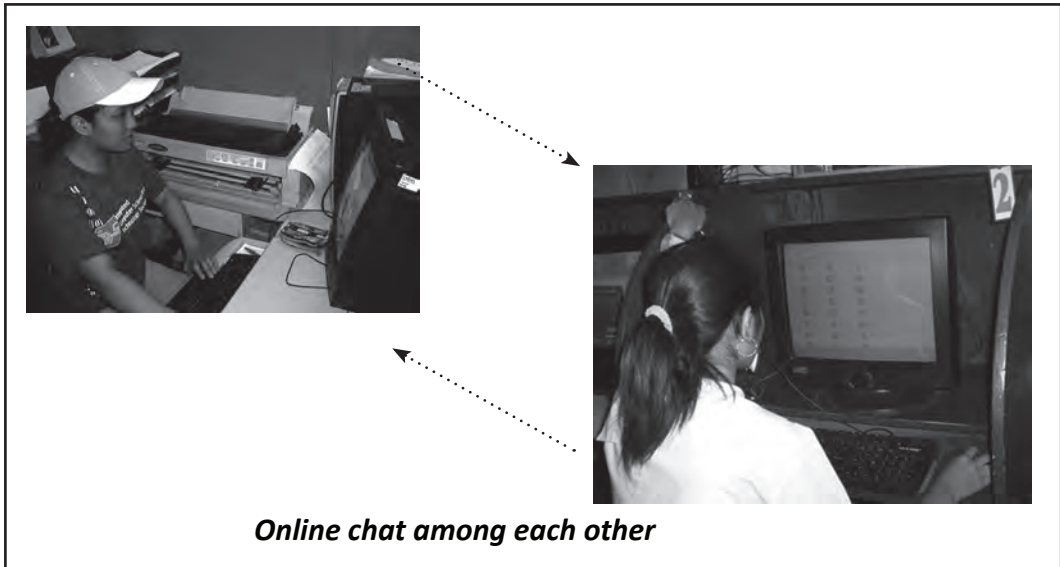
- a) Digital messaging can be done freely.
- b) A single message can be delivered to a large number of recipients at a time.
- c) It is easy, simple, reliable way of exchanging digital data with large volumes.
- d) Messages can be stored safely.

**Following are the constraints of email:**

- a) Virus files may arrive on computer using email message. The virus files will create trouble in computer.
- b) Email accounts can be hacked.
- c) E-mail can only be used through online.
- d) Computer is needed for email.

### 3. Online Chat

In simple words chat means to talk. Online chat refers to the kind of communication over the internet that offers the transmission of text based messages from sender to receiver. Computer and the internet are essential for this purpose. It is impossible to perform without computer.



There are several websites for online chat these days. Online chat can be done using Yahoo Messenger, Face book, AOL Instant Messenger (AIM), Google Talk, Internet Relay Chat (IRC) etc.

#### **Following are the advantages of Online Chat:**

- a) Online chat offers one-on-one chat or one-to-many group chat at a same time.
- b) Both long and short type of messages can be transmitted easily.
- c) It does' not need proper language and correct grammar.

#### **Following are the constraints of Online Chat:**

- a) As online chat is indirect conversation, right information about the recipient or sender will not found.
- b) Many cyber crimes can happen from online chat.
- c) It can be utilized personally and in an organization.
- d) Its excessive use consumes our time and also damages eye vision.

#### 4. Video Chatting

Video chatting is similar with online chatting in which the sender and recipients are shown lively along with the conversations. In this chatting, both the sender and recipient can use the audio and visual aids. Headphone with microphone, webcam are essential devices; and the computer program like Skype, Talkbox, Teamspeak, Spikko, Sightspeed, Phonerlite, Mirial Soft phone, Homer, Eyeball chat, Twinkle, etc are needed for video chatting. Among these, Skype is most popular. Many people are talking through video chatting technology as daily routine.



***video chatting***

#### ***Activity***

1. Collect information about computers using the internet and discuss with your friends.
2. Have you ever used email? If Yes, discuss about email with your friends.
3. Email any one of your friend about either your Dashain or Tihar celebration.

#### **Exercise**

**Give answers to the following questions.**

1. What do you mean by the internet?
2. Write about the importance of internet and its any two areas of use with examples.
3. Write any four advantages and disadvantages of the internet.
4. What type of service is email? Write any four advantages.
5. What is the difference between online chat and video chat?



## Lesson: 6      **Alternative Energy**

We are using different types of energy sources, which include petroleum products, coal, wood, hydroelectricity, etc. Alternative energy is that source of energies which can be used instead of natural energy. Mineral fuel is the major source of energy. This is extinguishing continually from our earth. So, instead of these mineral fuels, alternative energy can be used. Alternative energy helps in the protection of our environment. The major sources of alternative energy include hydroelectricity, solar energy, air energy, etc. Some information on alternative energy is mentioned in this chapter.

### **Bio Gas**

Biological wastes, manure, human urine, etc are the decomposable materials. Providing necessary amount of water in these decomposable materials in a pit will release gases after attaining a certain temperature. Bio Gas refers to a gas containing methane that is produced after the decay of biological waste, manure, human excreta and urine. Bio Gas can also be called *Gobar Gas*.

### **Gobar Gas**

First of all, *Gobar* gas plant should be established as shown in the figure. The *Gobar* gas plant should be made from cement or metal in a pit. The cattle manure mixed in water will be kept in the inlet of the plant. After complete decay of the manure gases are produced.

*Gobar* gas produced will store in the upper part of the digester. The gas produced in this way is fixed to the gas stove, light, etc through pipe from the gas outlet. This gas comprises 50-70% Methane gas, 30-40% Carbon dioxide gas and other gases in very few amounts. The bio-slurry produced from the outlet can be used as fertilizer.

### **How does Gobar gas work?**

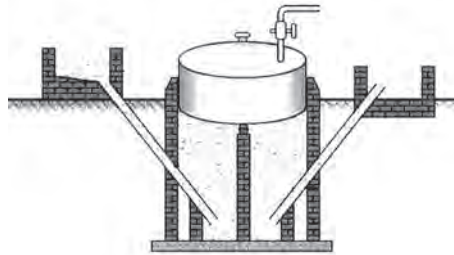
There are three pipes fitted with three apertures in *Gobar* gas plant. Gases are released in temperature of 30-35 degree centigrade. The gas produced will get stored in the upper part of the digester and fixed to gas stove, light etc through the pipe lying in the upper part. The turning on and off process of this gas is similar with the other household gases. The cattle manure mixed with water is fed from the pipe of inlet. Similarly, the bio-slurry released from the outlet pipe can be used as fertilizer.

### **Precautions to be taken**

a) During the installation of *Gobar* gas plant, we need to analyze about the

suitable temperature and geographical condition. This technology is not suitable in Himalayan region.

- b) Before preparing *Gobar* gas plant, we need to select the appropriate site, cattle and cattle manure.
- c) Well mixed cattle manure with water should be fed in the *Gobar* gas plant.
- d) While mixing the cattle manure with water the grass and other foreign matters should be removed before feeding into the digester.
- e) The pipes should be fitted properly. If there is leak in the pipe, it is necessary to call plumber and repair for its smooth use.



### Importances of *Gobar* gas

It is advantageous if gas released from *Gobar* gas plant be used in the form of fuel or energy. Many advantages can be reaped if we select the appropriate environment and suitable technology for the *Gobar* gas preparation. Following are its importance:

- a) It can be used as viable alternative to mineral fuels like kerosene, wood, coal, etc.
- b) Once kept, it can work for about 20-30 years.
- c) It is healthier to cook food in it because it doesn't emit any smokes.
- d) It can be used for both cooking and lighting purposes.
- e) Bio-slurry released can be used as fertilizer.
- f) It protects our environment and saves the money.

### Wind Mill

Wind mill refers to the technology in which the blades made from light metals are turned by the force of wind and convert into the electric energy. Electricity can be generated from wind mill. It can also be used in pumping water out of the ground.



*Irrigation through wind mill*

### **Importance of Wind Mill**

Many parts of our country consist of hills. These regions lack hydroelectricity and transportation. These areas are potential of wind mill because of high wind flow. The wind mill can be installed utilizing wind current as an alternative energy. Electricity can be generated from wind mill. Water pumping, small scale household machine operation, irrigation, etc can be done with the help of this wind mill.



### **How does Wind Mill work?**

The wind current rotates the blades of wind mill. It creates centripetal movement. Electricity can be produced through the moving motor or generator. Wind turbine produces power to make electricity. It works as shown in the figure. The generated electricity can be used in several electrical deviances. Small scale household industries like grain crushing mill, water mill, hand instruments, etc, can be operated by using electricity generated by wind mill.

### **Precautions to be taken**

- a) Do not go near and touch the forcedly moving blades.
- b) Do not touch the transmitted wires as it carries current.
- c) Select the site with better flow of air current while installing.

### **Briquette (Coal)**

Briquette is technology in which the biological materials are converted to physical materials for the potential of fuel in a fire. In this, plant matters, agricultural materials and industrial residues are used. Clay soil and water is also mixed in these materials. *Bhuse* briquette and Beehive briquette are more popular in Nepal these days. *Bhuse* briquette is prepared by heating husk up to 300 degree centigrade and keeping it in special type of frame to give the bamboo piece shape. Likewise Lantana weeds (*Banmara*) and other grasses are also used in its preparation. For fine burning, briquette is placed in metallic or mud made stove. In some stoves, there is a mechanism for self air current control.

### **How does Briquette work?**

Briquette coal is placed in metallic or mud made briquette stove. It is lightened with the help of fire. It will start burning and produces heat. This heat is used in cooking foods.

### **Importance of Briquette**

Briquette coal is mostly used in briquette stove. This works as the alternative source of energy. It is a simple technology. It can be moved easily to desired place. It is comparatively a cheaper source of energy. It is suitable in all geographical regions.

### **Precautions to be taken**

Following things should be kept in mind while using the briquette.

- a) Briquette coal should be placed properly in the briquette stove.
- b) It should be blown out after use.
- c) It should be placed far away from cold and children.

### ***Activity***

1. Discuss in your classroom about the alternative energy sources used in your community.
2. Visit any place that uses alternative energy and prepare a report.

### **Exercise**

#### **Answer the following questions:**

1. Give introduction and importance of Bio gas.
2. How does *Gobar* gas work?
3. What type of works can be done through Wind Mill?
4. Give introduction of Briquette coal and its area of use.
5. Why is Briquette coal important? Explain with examples.
6. Why is alternative energy crucial in Nepal? Describe with causes.
7. Can we establish Wind Mill in our country? Explain with examples.