

# Work Integrated Education

Standard



Activity Book



Government of Kerala  
Department of General Education

*Prepared by*  
State Council of Educational Research and Training (SCERT) Kerala  
2025

## THE NATIONAL ANTHEM

Jana-gana-mana-adhinayaka, jaya he  
Bharata-bhagya-vidhata.  
Punjab-Sindh-Gujarat-Maratha  
Dravida-Utkala-Banga  
Vindhya-Himachala-Yamuna-Ganga  
Uchchala-Jaladhi-taranga.  
Tava shubha name jage,  
Tava shubha asisa mage,  
Gahe tava jaya gatha,  
Jana-gana-mangala-dayaka jaya he  
Bharata-bhagya-vidhata.  
Jaya he, jaya he, jaya he,  
Jaya jaya jaya, jaya he!

## PLEDGE

India is my country. All Indians are my brothers and sisters.

I love my country, and I am proud of its rich and varied heritage.

I shall always strive to be worthy of it.

I shall give my parents, teachers and all elders, respect and treat everyone with courtesy.

To my country and my people, I pledge my devotion. In their well-being and prosperity alone, lies my happiness.



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## Foreword

A beautiful and safe childhood is our right. It is during this period that we understand and assimilate our surroundings. Thus we integrate our surroundings into this era. Have you ever wondered who created the food, clothing, shelter, tools, roads, and everything else we see around us? The foundation of our lives is built upon the intelligence and hard work of countless individuals.

Much of the knowledge that we acquire is meant to be applied in various life situations. When we think in this manner, we can understand that we, too, have certain responsibilities towards our society. The ideas that we gain through the subjects that we study should be used for various careers. “Work-Integrated Education” is designed to help students obtain the skills necessary for this and apply them in real life. It is made possible by combining many skills, such as working with hands, making preparations, having a willingness to engage, using tools carefully, and co-ordinating our abilities with a clear sense of purpose. Work-integrated education becomes possible when all these skills come together.

Every subject that we study provides career-oriented perspectives, skills, opportunities and possibilities for its application. This book has been designed with this goal in mind. This book should be approached by considering factors such as the employment scenario, availability of materials, and the possibilities of the area we live in. This is not merely a book to read; it is an activity book meant for practice, analysis and skill development. It should help to foster an interest and positive attitude for the profession. We have a brain capable of imagination and hands capable of independent action. This activity book provides an opportunity to introduce new ideas and explore them through creative activities. May the work-integrated activity book enables you to approach life with confidence.

Warm regards

**Dr. Jayaprakash R K**

Director  
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|           |                                                               |         |
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Activity



Trivia



Moving Ahead



Key Takeaways

# **THE CONSTITUTION OF INDIA**

## **PREAMBLE**

**WE, THE PEOPLE OF INDIA**, having solemnly resolved to constitute India into a <sup>1</sup>**[SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC]** and to secure to all its citizens :

**JUSTICE**, social, economic and political;

**LIBERTY** of thought, expression, belief, faith and worship;

**EQUALITY** of status and of opportunity; and to promote among them all

**FRATERNITY** assuring the dignity of the individual and the <sup>2</sup>[unity and integrity of the Nation];

**IN OUR CONSTITUENT ASSEMBLY** this twenty-sixth day of November, 1949 do **HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.**

1. Subs. by the Constitution (Forty-second Amendment) Act, 1976, Sec.2, for "Sovereign Democratic Republic" (w.e.f. 3.1.1977)
2. Subs. by the Constitution (Forty-second Amendment) Act, 1976, Sec.2, for "Unity of the Nation" (w.e.f. 3.1.1977)

# Area 1



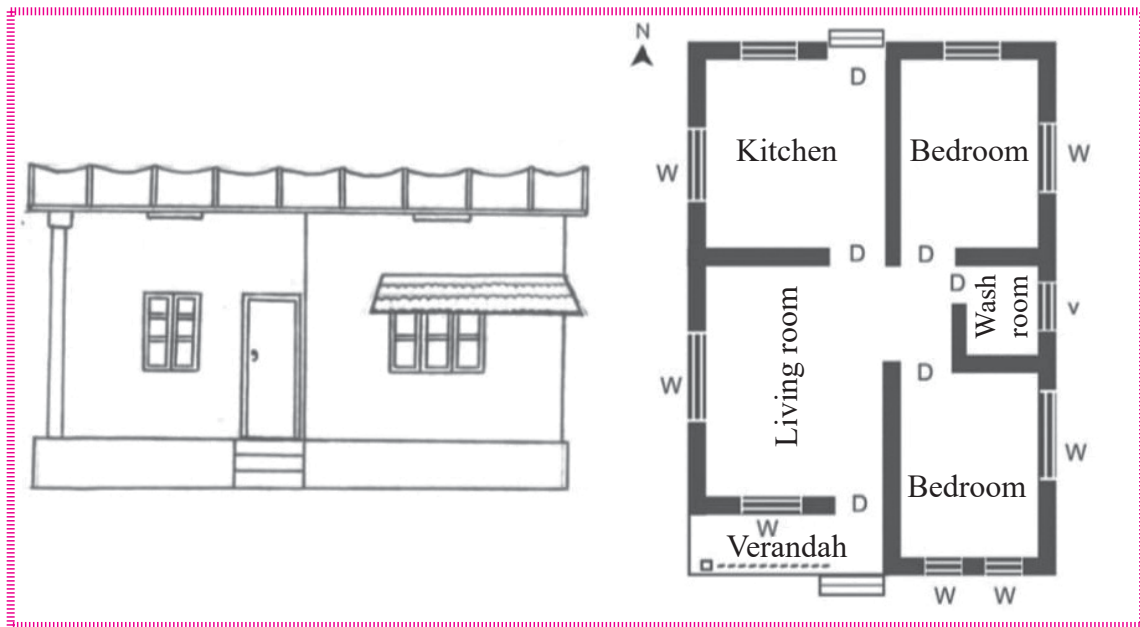
## Housing



**A dwelling  
must be in harmony with its  
surroundings and also communicate  
with nature and the people  
living there.**



# Organise with Orderliness



Pic 1.1

The picture of Sherin's new house is shown above. Sherin and her family are preparing to buy furniture and appliances to make the house suitable for living. Write down the furniture and appliances are needed for each room of the house in the table (1.1) given below.



## Activity 1

**Let's find and write**

| Kitchen | Living room | Bedroom | Dining room  |
|---------|-------------|---------|--------------|
| Stove   | Teapoy      | Cot     | Dining Table |
|         |             |         |              |
|         |             |         |              |
|         |             |         |              |
|         |             |         |              |

Table 1.1

The members of the family have indicated the required furniture and appliances using signs. They are given in Table 1.2. Identify which sign indicates which furniture/appliance and write them.

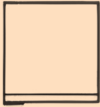
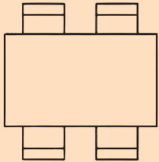
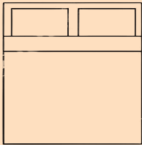
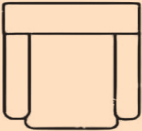
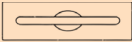
|                                                                                     |        |
|-------------------------------------------------------------------------------------|--------|
|    | Fridge |
|   |        |
|  |        |
|  |        |
|  |        |
|  |        |
|  |        |

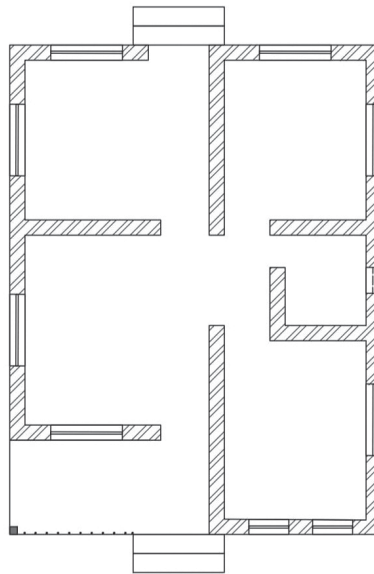
Table 1.2



## Activity 2

### Illustration

Illustrate how the listed appliances and furniture can be arranged in different rooms according to the needs of the house.



Pic 1.2

What factors were considered while arranging the appliances and furniture in each room?

- Ease of movement
- 
- 
- 

### Complete the table

What all things should be considered while arranging the appliances and furniture in each room of our house? Complete the table 1.3 given below.



|             |                                                                                                                                                                                                                                                                 |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Living room | <ul style="list-style-type: none"> <li>• Seating arrangements in the living room should be arranged in such a way that they should be face to face.</li> <li>• Should be able to sit comfortably.</li> <li>• Utilise the available area effectively.</li> </ul> |
| Bed room    |                                                                                                                                                                                                                                                                 |
| Dining room |                                                                                                                                                                                                                                                                 |
| Kitchen     |                                                                                                                                                                                                                                                                 |
| Study room  |                                                                                                                                                                                                                                                                 |
|             |                                                                                                                                                                                                                                                                 |

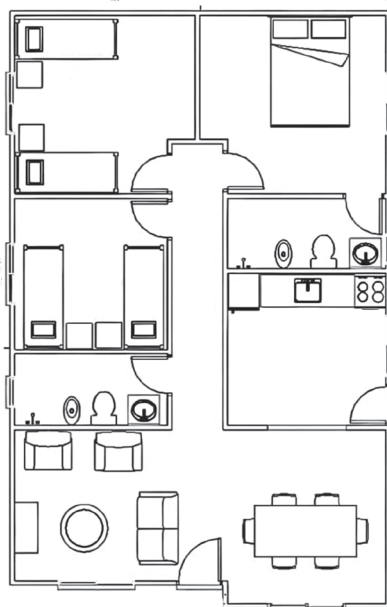
Table 1.3



### Activity 3

## Let's build and arrange

Now that you have understood the necessary aspects and the furniture to be considered while arranging the room, create a miniature model of the house using cardboard or foam board. Design the required furniture and appliances appropriately, and try arranging them in different ways in the rooms.



Pic 1.3

Prepare the list of materials needed for the construction.

- Cardboard, Sponge, midrib, Coloured clay, bamboo sticks.
- Foam board
- Clay/A mixture of all purpose flour (maida) and salt 50% each.
- .....
- .....
- .....

Make models using materials available to you. Display them in the class.



### Moving Ahead

Observe the way furniture and appliances are arranged in your class and illustrate how to arrange them in such a way that all children in the class get equal opportunities.



### Key Takeaways

| Gains                                                                |  |  |  |
|----------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Know the tools and materials needed to make the house liveable.      |                                                                                      |                                                                                       |                                                                                       |
| Know how to arrange furniture in rooms according to different needs. |                                                                                      |                                                                                       |                                                                                       |





## The Art of Clothing



“I don’t design clothes,  
I design dreams”

-Ralph Lauren



# Sew, Decorate



pic 2.1

Alan came home from school happily. "Why do you look so happy today? Did you get any prize from school?" asked mother.

"You may say that I have got a prize". Said Alan.

"I learned something new today. In sewing class, the teacher talked about various types of hand stitches. We all tried different hand stitches. Teacher introduced embroidery also. Let me try it. First I will sew up my new shirt which was tangled in the wire and got torn the other day. I am thinking of doing embroidery and taking it to school. I will do it beautifully and take it tomorrow itself". Alan said in a single breath.

Seeing Alan's enthusiasm, his mother realised his interest in sewing.

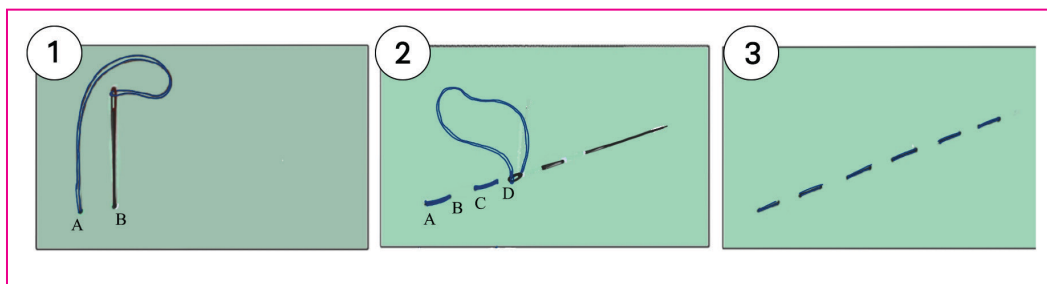
Have you ever had the experience of dresses torn or ripped like Alan's shirt while playing?

What do you do in such cases? You can solve the problem on your own if you learn some simple hand stitches.

Let's familiarise with some simple hand stitches used to mend clothes and join fabric like Alan did.

## Running stitch

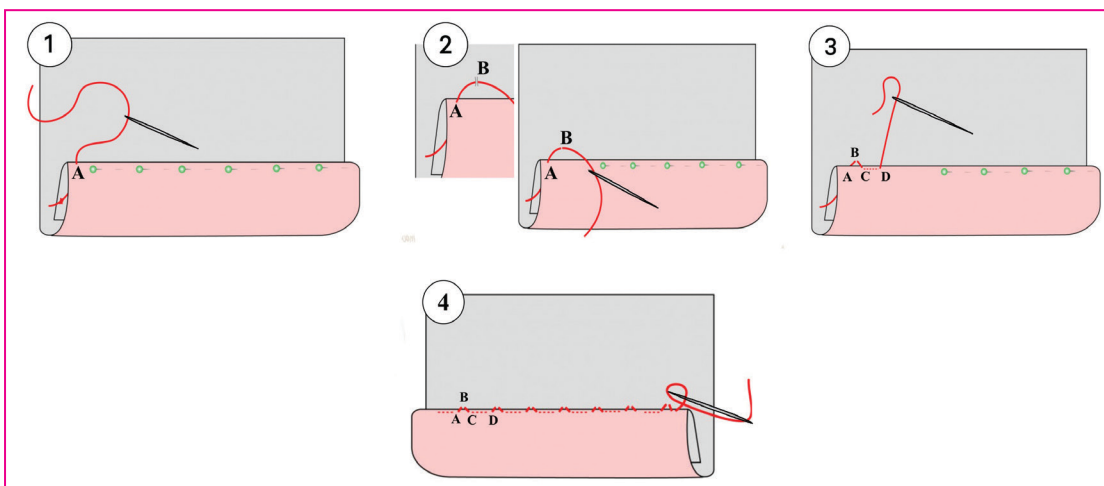
Running stitch is the simplest and fastest hand stitch used in sewing.



Pic 2.2

## Hemming

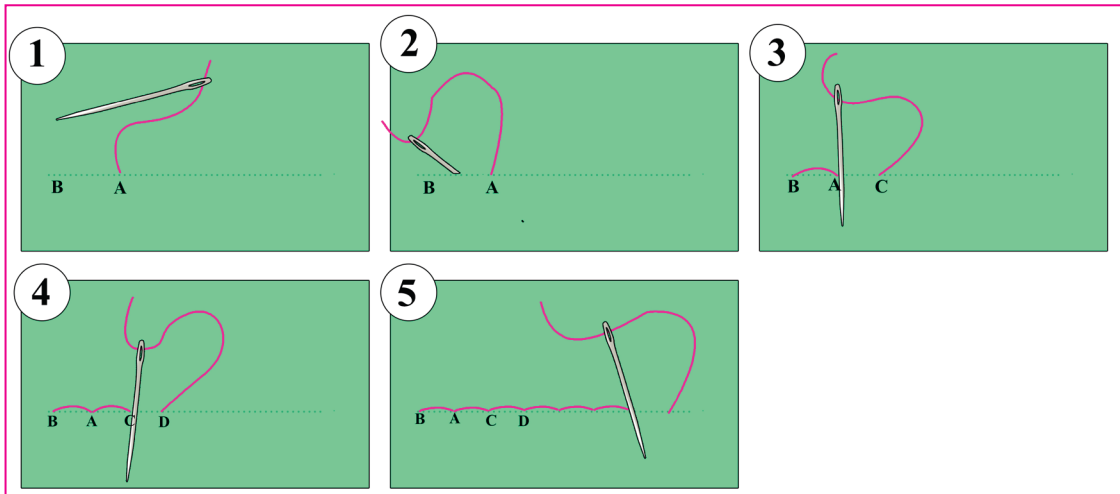
Hemming is a method of stitching the edge by folding the fabric and making small, slanted stitches.



Pic 2.3

## Back stitch

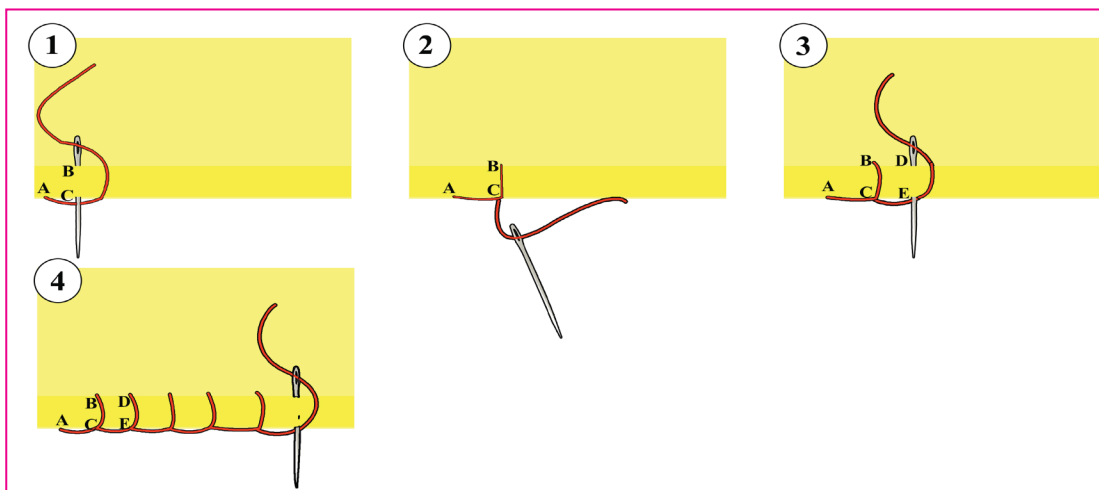
Back stitch is a hand stitch used as an alternative to machine stitch. This is one of the strongest stitches.



pic 2.4

## Blanket stitch

Blanket stitch is used to keep the threads from fraying at the edges of the fabric and to add beauty to the edges.



Pic 2.5

What are the materials required to complete the hand stitch given in the picture?

- Needle
- 
-



## Activity 1

### Let's Learn to sew

Try different hand stitches with the help of necessary sewing materials and display them in the class.

### Embroidery



pic 2.6

Note the pic 2.6. The embroidery work made the dress look more attractive. You must have seen many such embroidery works. Don't you prefer dresses with beautiful embroidery works? Even a simple embroidery can enhance the beauty and attractiveness of the dress.

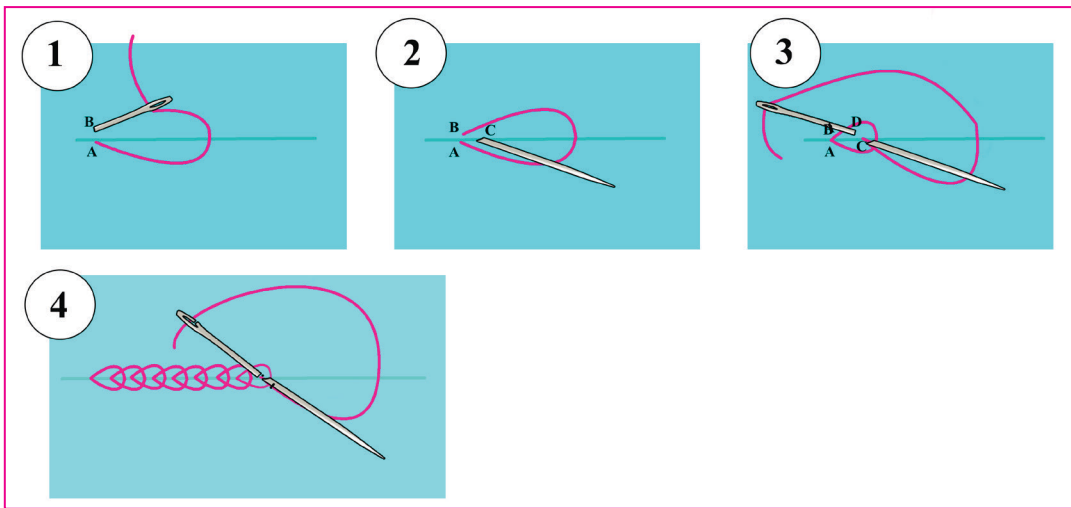
Is embroidery seen only on dresses ?

Different types of embroidery works are used to add beauty to various textile products. Eg : bed sheet, hand kerchief, bag etc.

Let's practice some of the embroidery works used for decorating clothes.



## Chain stitch

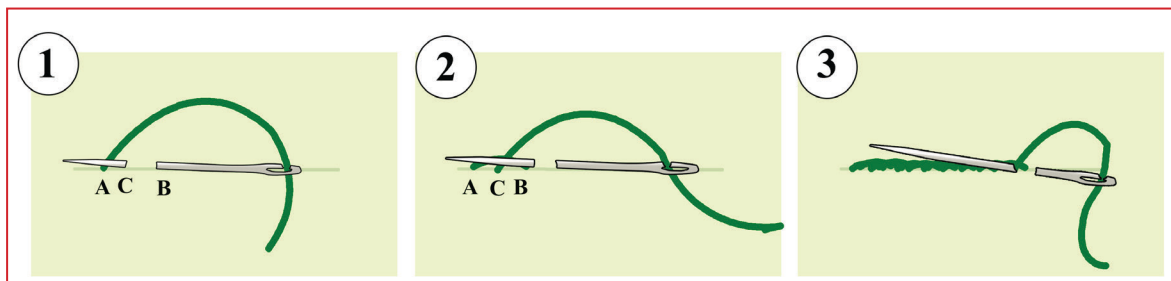


Pic 2.7

Chain stitch is used to create chain like patterns and prepare outline to the designs.

## Stem stitch

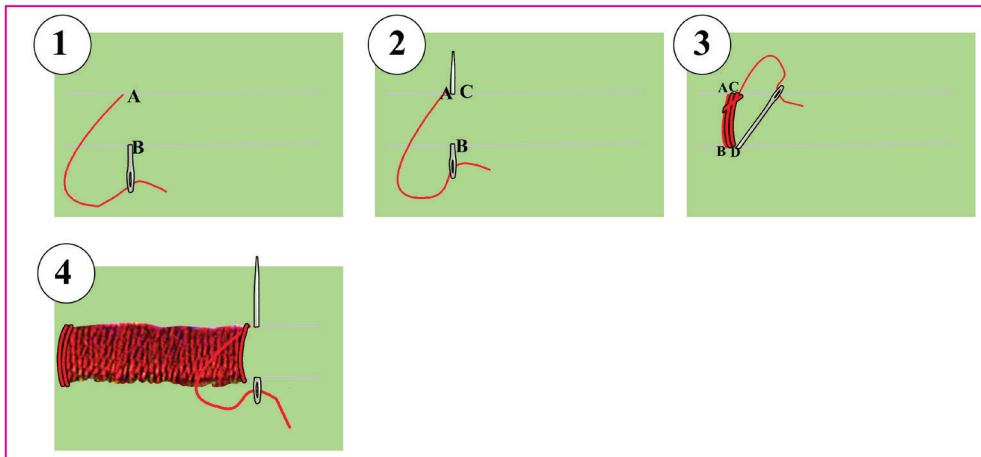
Stem stitch is used to sew plant stems, vines etc while doing embroidery.



Pic 2.8

## Satin stitch

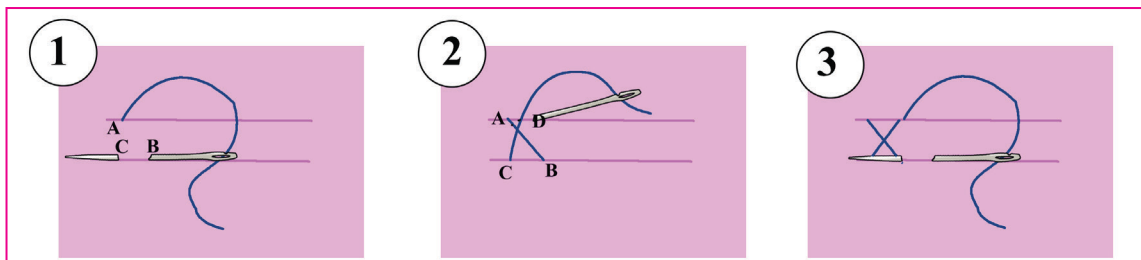
This stitch is suitable to sew the shapes like geometrical pattern, narrow petals and leaves.



Pic 2.9

## Cross stitch

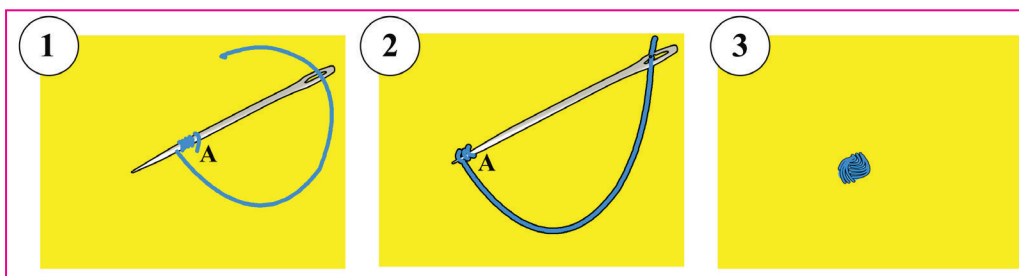
Cross stitch is used to embroider patterns similar to the multiplication symbol.



Pic 2.10

## French knot

French knot is used to do embroidery similar to pollen.



Pic 2.11



Now you have become familiar with the different types of embroidery works.

What are the preparations needed to do embroidery?

- The needle, scissors, frame and thread are required for embroidery.
- Choose a suitable design
- The design can be copied directly onto the fabric with the help of carbon paper
- Fasten the fabric to the embroidery frame
- While using the thread, choose colours that goes well with the design
- Before sewing, insert as much thread as needed into the needle
- The stitching should be started after ensuring that the back stitch has been done. Don't forget to fasten the thread in the end.



Be careful...

Never pull the needle towards your eyes, face or others while doing needle work.

A thimble can be used to prevent dangers caused by a needle. A thimble is a covering that can be worn on the finger while doing hand stitches.



pic 2.12  
Thimble

Different types of threads and needles are used for embroidery work.

### Threads

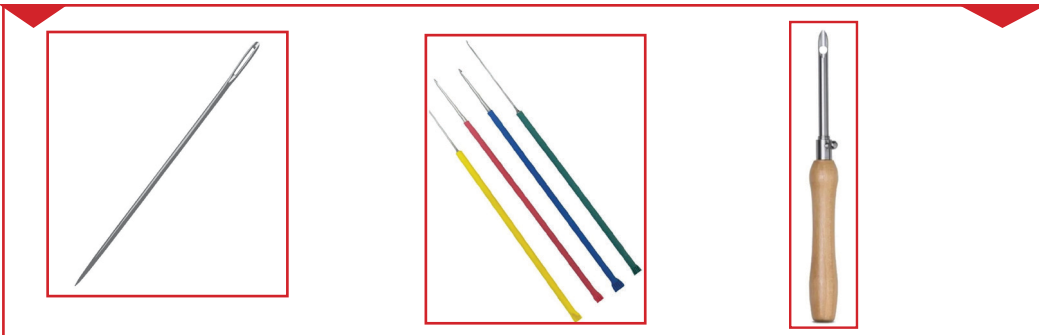


Pic 2.13  
Cotton threads

Pic 2.14  
Metallic threads

Pic 2.15  
Silk threads

### Needles



Pic 2.16  
Embroidery needle

Pic2.17  
Aari work needle

Pic 2.18  
Punch needle

### Frames



Pic 2.19  
Round frame

Pic 2.20  
Aari work stand

Pic 2.21  
Square frame



## Activity 2

### Let's sew motifs

Observe Pic 2.22.



Pic 2.22



### Embroidery motif

An embroidery motif is a simple design or pattern stitched on to fabric to enhance aesthetic appeal. For this we can use pictures or shapes of flowers, animals, geometrical patterns and signs.

Try drawing different motifs (pictures) and embroider them.

Hope you will collect the opinions of your friends and teachers after doing the embroidery on the clothes.



### Activity 3

Try writing names and messages using embroidery work you are familiar with. Bags, umbrellas, cushion covers, bedsheets, hand kerchiefs, etc. can be decorated with embroidery work.



Pic 2.23



### Moving Ahead

## Varieties in Embroidery works

Add different types of beads, mirrors, stones and ribbons etc. to decorate the embroidery work.



Pic 2.23  
Beads work



Pic 2.24  
Ribbon work



Pic 2.25  
Zardosi work



Pic 2.26  
Mirror work

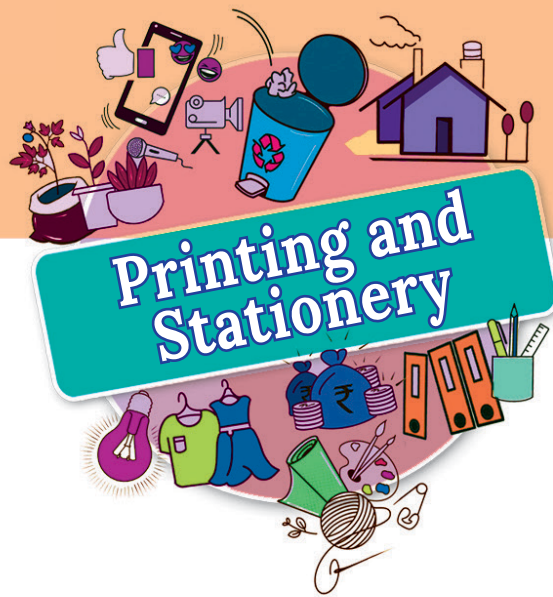


### Key Takeaways

| Gains                                                          |  |  |  |
|----------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Can do basic stitches                                          |                                                                                    |                                                                                     |                                                                                     |
| Knows how to choose and use the necessary tools for embroidery |                                                                                    |                                                                                     |                                                                                     |
| Can do embroidery work                                         |                                                                                    |                                                                                     |                                                                                     |



# Area 3



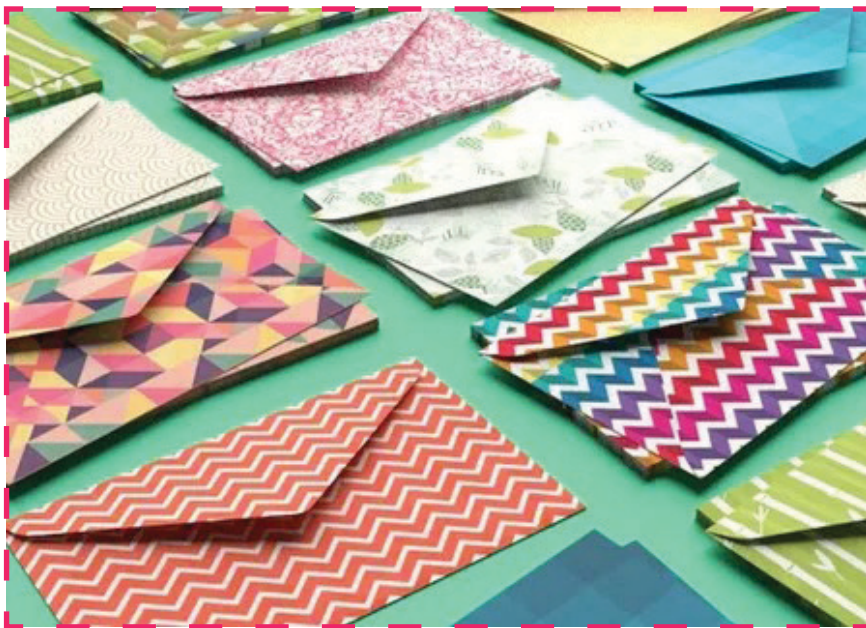
## Printing and Stationery



Each envelope is  
a token of hope



# Heartfelt Handovers



Pic 3.1

Observe the pic 3.1.

How pretty these envelopes are! There are varieties of envelopes available in the market. Envelopes are used to keep and hand over cards like greeting cards, intimation for interview, wedding invitation cards etc.

Don't you make and gift attractive greeting cards to your friends on their birthdays and on other celebrations? Can't we present these cards in a self-made pretty envelope? What are the things to be considered while making an envelope?

- Why do we make an envelope?
- What should be the measurements?



- What are the materials needed?
- How can we use the materials without wastage?
- .....
- .....



## Activity 1

### Let's make an envelope

Let's get to know how to make a normal envelope.

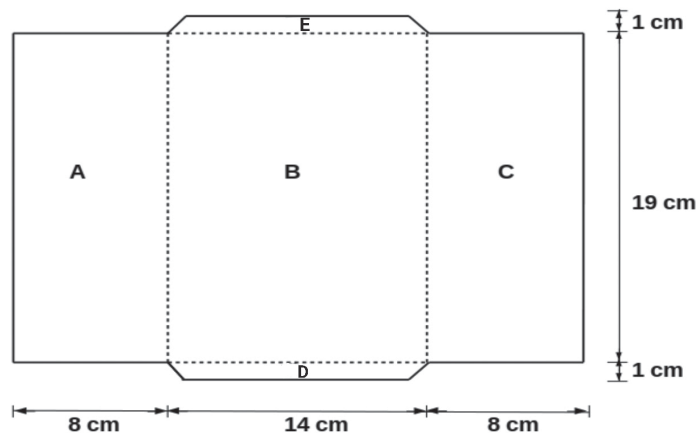
#### Materials needed

- Attractive magazine papers/A4 size paper/any other available papers
- Steel scale
- Scissors
- Gum



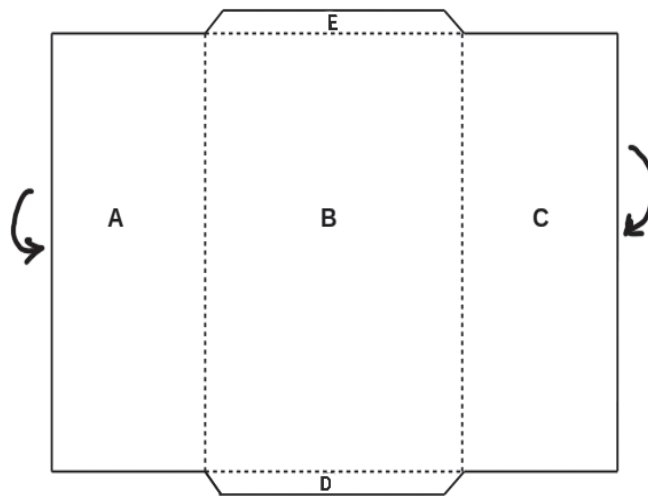
Pic 3.2

#### Method



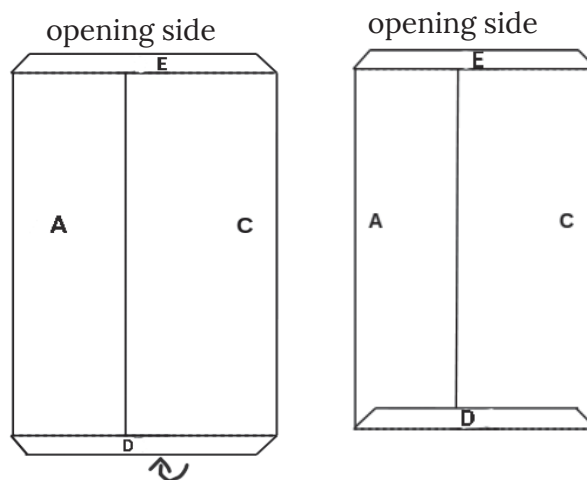
Pic 3.3

- Take a paper of A4 size paper (30cm × 21cm)
- Fold the paper lengthwise into three parts – 8cm, 14cm, and 8 cm as shown in Pic 3.4.
- Cut one centimetre each on the upper side and the lower side of A, C as shown in Pic 3.3.



Pic 3.4

- Cut the angles of D and E as shown in Pic 3.4.
- Fold the sides A and C. Paste side C over side A.
- Fold D and paste it over AC.
- The envelope is ready.



Pic 3.5



## Activity 2

### Let's make a Window Type Envelope



Pic 3.6

What is the peculiarity of the envelope shown in Pic 3.6?

Transparent envelopes are commonly made with a transparent material on one side. It helps to see the address or important data inside a sealed envelope.

These are known as window type envelopes. Try to make such an envelope.

Let's prepare the list of materials to make a window type envelope.

- OHP sheet/Glass paper
- .....
- .....



## Activity 3

Haven't you noticed that different types of greeting cards and invitation cards that arrive at your home are in beautifully designed envelopes?

Let's learn a new technique to make our envelopes attractive.

## Let's print a leaf

Let's make the envelope attractive by printing a leaf on it.



Pic 3.7

### Materials needed

- A big leaf like a shoe flower leaf/banyan tree leaf
- Envelope
- Poster colour
- Tooth brush
- Coconut leaf stick (Erkkil)

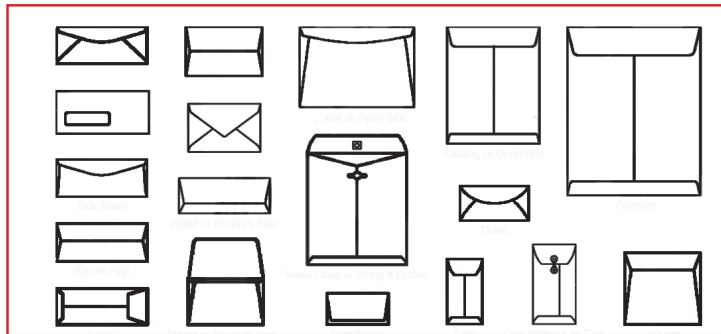
### Method of printing

Keep a shoe flower or banyan tree leaf upside down on the front side of the envelope. Dip the toothbrush in any of your favourite poster colours. Rub the brush with a coconut leaf stick (erkkil) and sprinkle the colour on the sides of the leaf. Remove the leaf after the paint dries. The leaf print is ready.

What are the other ways to make envelopes attractive? Present your ideas in your classroom.



1. Collect different types of envelopes and compare the designs.



Pic 3.8

2. Make greeting cards with various designs and exchange with your friends.



Pic 3.9

3. Design envelopes for different purposes and conduct an exhibition at your school.



### Key Takeaways

| Gains                                                             | 😊 | 😐 | 😞 |
|-------------------------------------------------------------------|---|---|---|
| Understood how to make different types of envelopes.              |   |   |   |
| Understood the ways to design the envelopes attractively.         |   |   |   |
| Understood the different techniques to make envelopes attractive. |   |   |   |



**Rethink and turn problems  
into possibilities**





## Let's Practise Eco-friendly Habits

In the densely populated village of Chengalkkara, there is a small playground where children gather every evening to play various games. One day when they went to play, they noticed a small crowd in the playground. A pile of garbage with a foul smell at one end of the ground! 'How could they play in such a condition? The children became sad.



Pic 4.1

The children moved closer to the crowd. Among them were the ward member Saji and the local residents. The children noticed that they were engaged in a serious discussion.

“Sajiyetta, this is so unfortunate. It happened this morning. We don’t know who did this.” Anuchechi, who lives near the ground told the ward member.

Ward member : “Don’t worry. We will take necessary action. I will inform the police right away. We will make those responsible clean this place. They will be punished. The children will be able to play here from tomorrow onwards.”

Just then, Eliayamma teacher, who lives nearby, came there.

“Saji Member, a serious crime has happened here. Such anti-social activities should be punished accordingly.”

“Definitely, teacher. All this happened because of the ignorance about the consequences of carelessly dumping garbage in open spaces. Schools must create awareness among children about such issues. Teacher, please take the initiative. The panchayat will also support you with campaigns like ‘Haritha Vidyalayam, Suchitwa Vidyalayam,’ ‘Malinya Muktha Nava Keralam,’” said the ward member.

Lima : Teacher, the stench here is unbearable! I can’t stand it.

Teacher : Be careful of stray dogs that search for food in garbage dumps. Their bites are dangerous. Also, flies and mosquitoes that breed in such wastes spread diseases. Can you find anything useful in this garbage heap?

Children : Yes, teacher. Definitely.

Anu : I was looking at the toy.

Aman : Look! There is one ball.

Teacher : There are many reusable items that are discarded by people. They harm the environment when transformed to waste.

Lima : What is the solution for this?

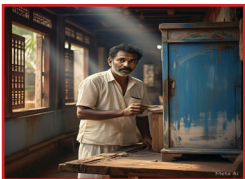
Teacher : We shall discuss it in class. Now, all of you can return home. We shall meet tomorrow.

Haven’t you read the conversation carefully? Have there been any such incidents in your surroundings? Lima has raised a very relevant question. We all know how severe the waste problem is.

How can we solve the garbage crisis?

What can we do?

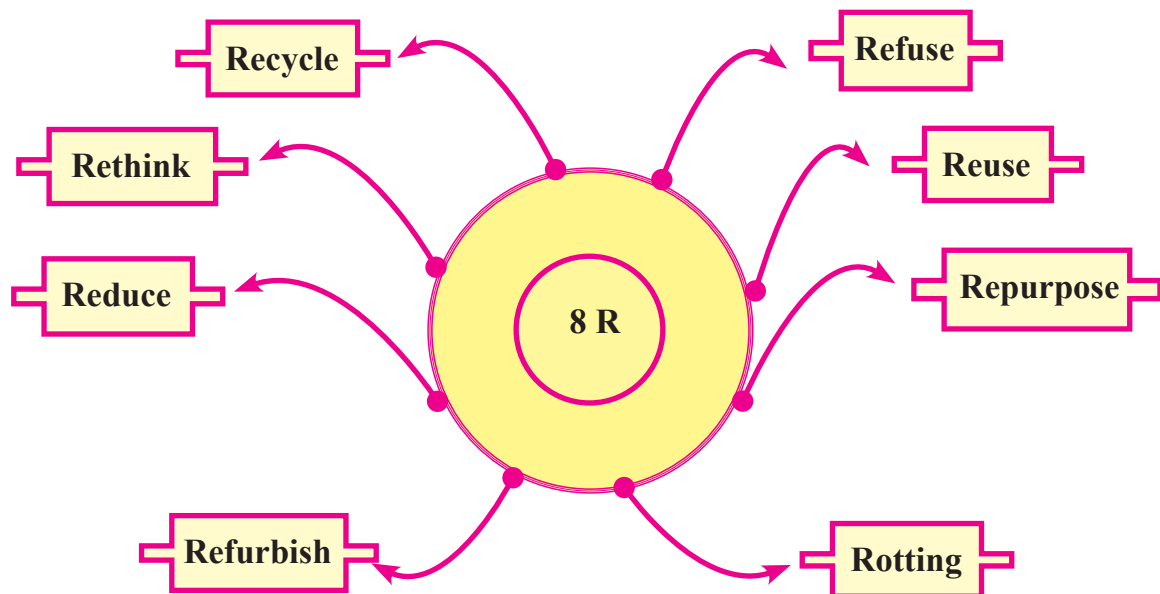
Look at Table 4.1 below:-

| Number | Activities                                                                          | Details                                                                                                                                                                        |
|--------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      |    | <p>Minimise the use of products that may become waste (Refuse).</p> <p>Example : Refuse plastic bags and use cloth bags instead.</p>                                           |
| 2      |    | <p>Reuse old or used products (Reuse)</p> <p>Example : Refurbish and use old furniture instead of discarding it.</p>                                                           |
| 3      |   | <p>Repurpose old or unwanted items for other needs (Repurpose)</p> <p>Example: Use old tyres as planters for growing plants.</p>                                               |
| 4      |  | <p>Compost organic waste to enrich the soil (Rotting).</p> <p>Example : Vegetable and food waste are composted.</p>                                                            |
| 5      |  | <p>Refurbish and donate used items instead of discarding them (Refurbish).</p> <p>Example : Restore an unused bicycle at home and sell it to a needy child at a low price.</p> |

|   |                                                                                   |                                                                                                                                                                                                        |
|---|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6 |  | Before buying an item, think again whether it is necessary (Rethink).                                                                                                                                  |
| 7 |  | Buy only what is necessary and reduce excess consumption (Reduce).<br>Example: Purchase only four or five sets of clothing per year and use them as much as possible.                                  |
| 8 |  | Recycle items that cannot be used again (Recycle).<br>Example : Torn bags, worn-out shoes and plastic waste are handed over to the members of Haritha Karma Sena, who collect them on designated days. |

Table 4.1

## Waste Management- Eight types of methods



Pic 4.2



## Significance of 8R

The concept of 8R provides a comprehensive framework for reducing waste, conserving resources and minimising environmental impact. It promotes a sustainable and eco-friendly lifestyle through responsible production, consumption and waste management. The 8R model has been recognized by governments and organizations worldwide as a strategic approach to sustainable waste management. By following the 8R principles, life skills are developed, thereby contributing to the conservation of natural resources. Integrating responsible behaviour, problem solving, creative thinking and sustainable living into everyday life fosters personal growth, environmental responsibility and social well-being. Collective efforts such as community clean-up drives and zero-waste initiatives play a crucial role in establishing a healthier and sustainable way of life.



### Activity 1

## Waste Management through 8R

Let us find out how waste management can be made possible through the concept of 8R.

### Step 1 : Waste materials and their sources- An enquiry

Observe Pic 4.3.



Pic 4.3



Investigate and identify the various sources of waste materials.

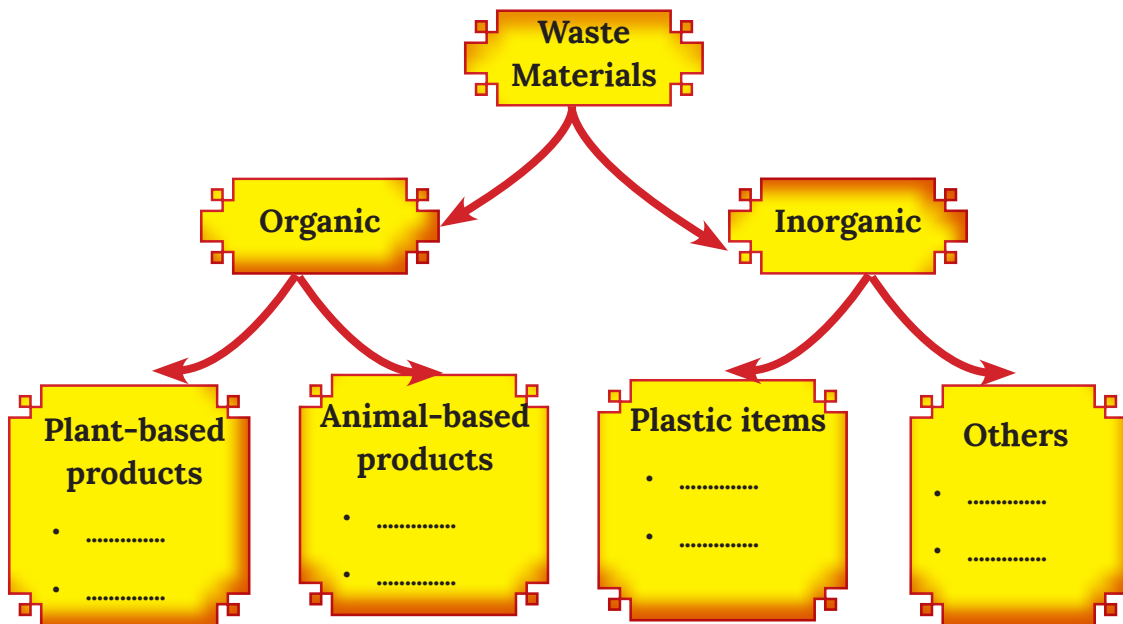
- .....
- .....

What are the waste materials around us? Prepare a list of waste materials found in your home and surroundings.

- .....
- .....

## Step 2 : Waste Materials- Classification

Classify the waste materials that you have listed in the model given below.



## Step 3 : Identifying 8R possibilities for waste management

Observe the waste materials that you have classified.

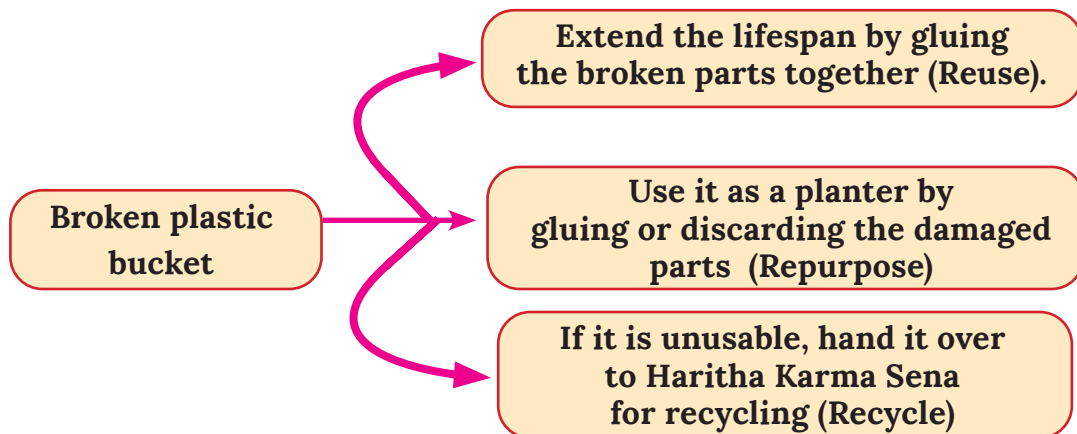
- Which among the classified waste materials could be used less?
- Which among them can be reused?
- How can they be reused?



Discuss your findings with your friends and consolidate your results.  
What ideas would you suggest for managing waste materials effectively?

#### Step 4 : Documenting the possibilities of 8R

Based on our discussion of the 8R concepts, how and which of these waste materials can be managed?



Find more examples and list them out.

- .....
- .....

#### Step 5 : Creating an 8R Model

- Manage the available waste materials using the 8R model.
- Present and explain your findings in class.
- Try to include models and pictures in your presentation.
- 

Example : Repurpose- Pictures



(a)



(b)



(c)

Pic 4.4



Organise an expo at school to raise awareness about 8R. Ensure the active participation of parents in the event.

What could be included in the expo?

- Models
- Video presentations and displays using LED screens
- Photographs, charts
- Other visual presentations



### **Sustainable Lifestyles**

Sustainable development refers to a way of organizing growth and progress in a manner that ensures a healthy future for upcoming generations. The United Nations has outlined 17 Sustainable Development Goals (SDGs) with the aim of achieving global sustainability by 2030. These goals are based on a wide range of 17 areas including environmental conservation activities, use of eco-friendly and renewable energy sources, protection and responsible use of water resources, scope of agriculture, food and sanitation and sustaining life in soil and water. Achieving these goals requires conscious efforts from every individual. It focuses on balancing societal progress, economic growth and environmental conservation. Sustainable living practices should be nurtured in every person to ensure a better future.



## Key Takeaways

| Gains                                               |  |  |  |
|-----------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Realised the importance of waste management.        |                                                                                    |                                                                                     |                                                                                     |
| Realised the importance of 8Rs in waste management. |                                                                                    |                                                                                     |                                                                                     |
| Can practise the ideas of 8R in day- to- day life.  |                                                                                    |                                                                                     |                                                                                     |

**Waste free living for sustainable life**

# Area 5



## Media and Entertainment



**“The power of radio is not that it speaks to millions but that it speaks intimately and privately to each one of those millions”**

**-Hallie Flanagan**



# School Radio



Pic 5.1

Today students of 6 B have to present the radio news at school. Renu and her friends are getting ready for it.

Is there a school radio in your school? If yes, what are the programmes broadcast through it? List out.

- News
- Interview
- 
- 
-



Is there a radio in your home?

Do you listen to radio programmes?

A few years ago there was a radio in most of the houses in Kerala before television became common. Before that, there was a time when people went to local teashops and libraries to listen to radio programmes.



Pic 5.2

Radio has almost disappeared from the houses when TV and smartphone became common.

When there was no TV or internet, people relied mostly on radio for news and entertainment.

### Radio

It cannot be said that radio was invented by a particular person. Many scientists and researchers have played a role in the invention of radio. But the credit of developing the first practical wireless telegraph is given to Guglielmo Marconi. He was an electrician.



**Guglielmo Marconi**  
(1874-1937)

The invention of radio has made a great change in the field of communication. Radio broadcasting in India began in 1923. It began in Kerala in 1943.



Pic 5.3

Even today, in most of the houses people start their day by listening to music and news from the radio.



What are the ways and devices available now to hear and enjoy radio programmes without a radio transistor?

Where do you listen to the radio programmes?

- Car stereo
- Mobile phone
- 
- 

Now mobile applications and websites are available to listen to radio channels.

Download such a mobile radio app and listen to it.

Present in the class the programmes that you heard on the radio.



Pic 5.4

Radio Jockey presents news and programmes in an attractive and entertaining manner.

What are the skills and abilities needed to become a Radio Jockey?

- Deep subject knowledge in the programmes to be presented
- Fluency
- Must be able to Present the programme in a simple language

There are two types of radio programmes.

- Recorded programmes
- Live broadcast

Recorded programmes are pre-recorded in studio and then edited for broadcast.

Live programmes cannot be edited.



## Activity 1

### Presenting a radio programme

What are the preparations required for presenting a programme on the radio?

First, select a theme or subject for presentation.

Different types of programmes can be broadcast through a school radio. There are lots of possibilities such as news reading, speech in connection with observation of days, presenting stories and poems in different languages as radio skits, interviews, programmes of differently abled classmates and introducing local experts.

Prepare a radio script for any of the above-mentioned programmes.

#### Setting up a studio

Devices needed to prepare radio programmes

- Microphone/sound recorder
- Editing suite (system for sound editing)
- Headphone
- Speaker
- Recording



#### വേദികയെ അഭിനന്ദിച്ച് വിദ്യാഭ്യാസ മന്ത്രി

കാഞ്ഞങ്ങാട്: വാർത്താ വായനയിൽ ആയിരം ദിവസം പൂർത്തിയാക്കിയ കാഞ്ഞങ്ങാട് ദുർഗ ഹയർ സെക്കൻഡറി സ്കൂൾ വിദ്യാർത്ഥിനി വേദികയ്ക്ക് വിദ്യാഭ്യാസ മന്ത്രി ശിവൻകുട്ടിയുടെ അഭിനന്ദനം. തന്റെ എഫ്.ബി.ആക്കൗണ്ടിൽ നന്മയുടെ കണ്ണെങ്ങൾ എത്ര സ്വാർത്ഥ ആയാണ് കാര്യങ്ങൾ ചെയ്യുന്നതെന്ന് മന്ത്രി കവിച്ചു. എഫ്.ബി.പോസ്റ്റിന്റെ പൂർണ്ണ രൂപം: വാർത്താ വായനയിൽ വിസ്മയമാകുകയാണ് കാഞ്ഞങ്ങാട് ദുർഗ ഹയർ സെക്കൻഡറി സ്കൂളിലെ എട്ടാം ക്ലാസ് വിദ്യാർത്ഥിനി വേദിക. സമൂഹമാധ്യമത്തിലൂടെ വാർത്ത വായിച്ച് ആയിരം ദിവസം പൂർത്തിയാക്കിയിരിക്കുകയാണ് ഈ മിടുക്കി. അഭിനന്ദനങ്ങൾ. വേദിക വാർത്ത വായിക്കുന്ന വീഡിയോയും മന്ത്രി ഷെയർ ചെയ്തിട്ടുണ്ട്.

Vedika, a ninth standard student from Kasaragod has been consistently broadcasting radio news every morning for the past three years without fail. She has completed thousand days and is still continuing.

Pic 5.5

Remember these while recording sound.

- Record in a noise-free area.
- Turn off the fan/AC
- Speak with clarity and necessary voice modulation

## Editing

- Correct the mistakes of the pre-recorded programmes after repeated listening. Record again if necessary.
- Different types of software and mobile apps can be used for editing.

### Editing Suite

An editing suite is a room equipped with electronic equipment and software to edit video, audio, photography etc.

Eg : Audacity, Inshot etc.

## Moving Ahead

- Prepare the radio script of any of the lessons from your language texts with your friends. Record and present it in the class and on the school radio.
- Organize an interview with the radio jockey from a radio channel near your school premises. Clear your doubts about radio broadcasting through the interview and learn more.

## Key Takeaways

| Gains                                                               |  |  |  |
|---------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Realized the features of radio broadcasting.                        |                                                                                      |                                                                                       |                                                                                       |
| Learned how to prepare programmes for school radio.                 |                                                                                      |                                                                                       |                                                                                       |
| Learned the particulars to be noticed while doing radio programmes. |                                                                                      |                                                                                       |                                                                                       |

# Area 6



## Agriculture



**‘Manuring and fecund land  
lights the way for good yield’**



# A New Nest for Plants

The magic bottle placed on the table was a curious sight for the friends who visited Raju's house. There was a typical white granule-like mixture inside the bottle. A small plant stood slightly above it. No soil, but the plant bloomed!

“How is it possible”? Raju's friends asked several times. “This is not a miracle, but science,” Raju replied. Later, everyone tried to find out the secret behind this. Some of them named it ‘Magic Mix.’

Let's find out the secret of Raju's magic bottle.

“Can plants grow without soil”?

Can something else be used instead of soil? Find out the answer.

Besides soil, there are many other growing mediums used to cultivate plants.



Pic 6.1



**Factors Required for the Growth of Plants :**

- Can you list the factors necessary for the growth of plants?

1. Water
2. Light
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

Nutrients, air, favourable temperature, space for growth, medium etc are necessary for the growth of plants.

If these are supplied, plants can be grown in other mediums instead of soil.

While some mediums provide nutrients to the plants, others help in the fixing of roots and some others help in holding of water.

The growing mediums mainly act as a substitute for soil in plant growth. Hydroponics is a method of growing plants in nutrient-rich water without soil.

**Hydroponics**

Hydroponics is a modern agricultural technique for growing plants without soil (pic 6.2). In this method, mediums other than soil are used for the growth of plants. The nutrients required for plants are dissolved in water and supplied directly. This ensures the use of less water and higher productivity. In this method, plants grow faster and also save water and space. This is an eco-friendly method of farming, as there are no problems of soil-borne pest and diseases.



Pic 6.2



## Beyond Soil : Diversity of Growing Mediums

The mixture in which plants grow is commonly called 'growing medium' or 'potting medium.' This mixture is very important for plants to grow well .

Potting medium helps to transport nutrients, air and water to the root of the plants. Besides, it provides strong support to the plant and helps it to stay fixed to the soil well, allowing it to grow against gravity. The main function of a growing medium is to provide such circumstances.

A suitable growing medium is essential not only for good plant growth but also for the healthy growth and better yield. We are introduced to modern agricultural methods by many excellent growing mediums, not just the soil itself. Let's get familiarised with different types of growing medium.

### Garden soil

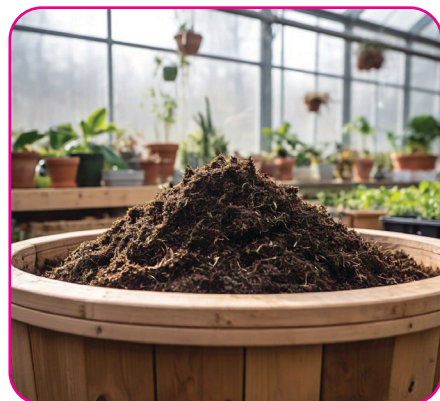
Garden soil is a common, easily available and comparatively cheaper medium. This is the most commonly used medium for cultivation.

### Sand

Compared to soil, sand has higher aeration, drainage and porosity. It is relatively cheap and heavy but less nutritious.

### Compost

Compost is an eco-friendly organic fertilizer. It can be easily made using household organic kitchen wastes. It increases the nutrient value and water holding capacity of the soil and helps in better yield. Compost itself is also used as a separate medium.



Pic 6.3

### **Sphagnum moss**

Sphagnum moss is a waste-free and ecofriendly medium. It has a high water holding capacity and helps to retain soil moisture.

### **Peat**

Peat is formed from the residues of marshy land. It is commonly used for growing seedlings and rooting of cuttings.

### **Coir peat**

Coir peat is a medium made from coco peat. It is eco-friendly and reusable, making it suitable for gardening purposes.

### **Vermiculite**

Vermiculite is manufactured by heating the minerals that are mined from nature at a high temperature. It is light in weight, porous and has good water holding capacity. This acts as an effective medium for growing vegetables and flowering plants.

### **Perlite**

Perlites are materials that are formed by heating natural minerals obtained from volcanoes. It is a suitable medium for growing vegetables, seeds of flowering plants etc.



Pic 6.4



Pic 6.5



Pic 6.6



Pic 6.7

### Saw dust

This is the dust that comes from cutting logs in lumber mills. It is a light weight growing medium with good water holding capacity.



Pic 6.8

### Basic Plant Nutrients Required

#### Primary Elements (Macro nutrients)

**Nitrogen (N)** : Essential for leaf growth and protein production of green cells.

**Phosphorus (P)** : Helps in the development and transformation of roots.

**Potash (K)** : Increases water balance and resistance to diseases.

#### Secondary Elements

Calcium (Ca), Magnesium (Mg) Sulphur (S)

Apart from this, there are some micro elements that are necessary for the plant growth. Though they are required in very small quantities, their deficiency can cause diseases in plants.

#### Micro Nutrients

Iron (Fe), Manganese (Mn), Zinc (Zn), Copper (Cu), Boron (B), Molybdenum (Mo), Chlorine (Cl) and Nickel (Ni) are the main micronutrients.

### Preparation of Potting Mixture

Let's see how to prepare a good potting mixture by adding organic materials from nature and essential nutrients for plant growth. It is very important to prepare the suitable mixture for plants to grow. Let us learn how to mix different types of growing medium in the right proportion to prepare a good mixture.

### Method 1

Potting mixture can be prepared by adding soil, sand (or coirpeat), and dried cow dung (or compost) in the ratio 1 : 1 : 1. Usually potting mixture is prepared in this way. They are mainly used for the rooting of cuttings and raising the seedlings.

### Method 2

A potting mixture prepared by adding sand, soil and powdered cow dung in the ratio 2:1:1 are used for planting big plants.

### Method 3

This potting mixture is prepared by mixing coco peat, vermiculite, and perlite in the ratio of 3:1:1. This is the basic potting mixture used in soilless farming.

### Method 4

A potting mixture can also be prepared using two parts sand, four parts soil, two parts dry leaf powder and one part dried and powdered cow dung.



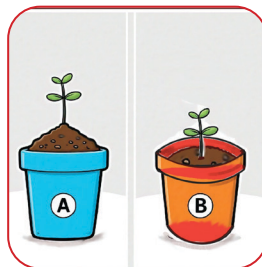
### Activity 1

Prepare a potting mixture using any one of the scientific methods.

### Potting

Potting refers to planting in a pot or container filled with potting mixture.

Observe the pic 6.9. Plants are planted in two pots A and B. Which pot is filled with the right quantity of potting mixture?



Pic 6.9



Pic 6.10



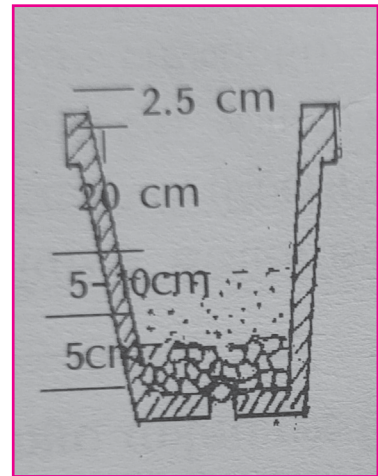


## Activity 2

Scientifically fill the pot with potting mixture and do planting.

### Potting Procedure

1. Choose pots of appropriate size according to the plants you want to grow.
2. Make sure that there are holes in the bottom of the pot.
3. Cover the holes of the pot with broken pieces of terracotta tiles.
4. Terracotta tiles are placed at the bottom of the pot to drain the water.
5. Spread a layer of sand on top of it.
6. Fill the prepared potting mixture on top of this.
7. Fill the pot with the mixture after leaving a gap of  $2\frac{1}{2}$  cm from the top.
8. After filling the pots with potting mixture, seeds can be sown or seedlings can be planted.
9. Planting may be done after removing some soil from the centre. After planting, press the soil well without damaging the plants. Then, water the plant and it should be kept in shade for two weeks.



Pic 6.11

### Pot Bound Condition

Have you ever seen a plant grow for a long time in a small pot? Have you ever wondered what to do with its roots? As time passes, these roots will begin to grow around the pot. Eventually, the roots of the plant will start crowding. This is called 'pot bound condition'. In such a condition, what will happen to the plant?



Pic 6.12

- Roots have less space to grow.
- It becomes difficult for the plant to get water and nutrients.
- Retarded growth of the plant.
- Its leaves and flowers become smaller or disappear.

## Repotting

Repotting is the process of transferring a plant from its current pot to a new, larger pot. Its main purpose is to provide ample root space thereby providing enough space for growth and provide necessary nutrients and water for growth.

By transferring the plant to a larger pot, the roots have more space to grow and the plant grows better with more nutrients. Repotting helps in better plant health and good growth.

## Depotting

The plant needs to be removed from the pot before repotting. Depotting is the process of removing plants from the pot. It is done under potbound conditions.



Pic 6.13

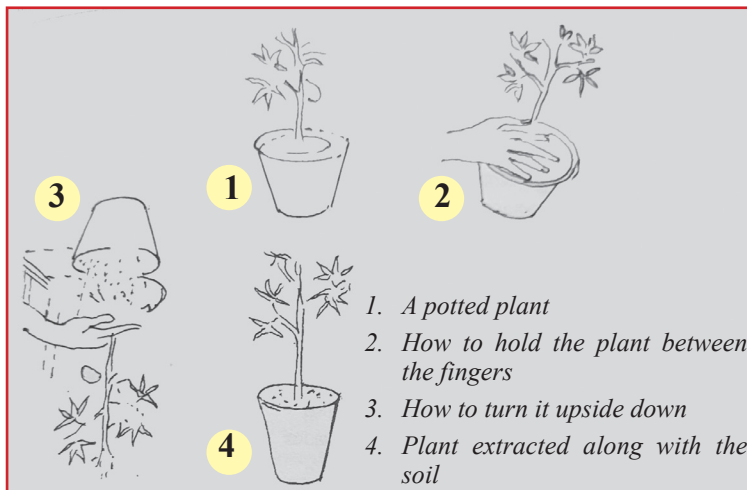
## Method of Depotting

Water the plants well before removing them from the pot. Plants should be removed in a specific method. Observe pic 6.14. For this, hold the stem of the plant between the second and third finger and turn the pot upside down. Then tap the bottom of the pot lightly to remove the plant along with the mixture.

## Method of Repotting

You know that repotting is the process of transferring a depotted plant to a larger pot. A larger pot of suitable size can be chosen for this. Cut off all the rotten, tangled or dry roots before planting them into the new pot. Cutting back a few leaves and stems will help the plant grow by reducing water loss through transpiration. This plant should be repotted in the above said method.





Pic 6.14



Pic 6.15



### Moving Ahead

1. Plant and cultivate plants using different growing mediums and compare their growth.
2. Prepare different kinds of potting mixture by yourself. Plant and compare the growth.



### Key Takeaways

| Gains                                               |  |  |  |
|-----------------------------------------------------|--|--|--|
| I learned about different types of growing mediums. |  |  |  |
| I know how to prepare potting mixture.              |  |  |  |
| I learned to practice potting scientifically.       |  |  |  |
| I understood about the potbound condition.          |  |  |  |
| I learned to do repotting and depotting.            |  |  |  |

# Area 7



## Finance



**It is not what you do or how much you do, but the quality of what you do that truly matters!**

**- Mahatma Gandhi**



# Financial Activities



Pic 7.1



Pic 7.2

Take a look at the pictures (Pic 7.1, Pic 7.2).

What are the similarities and differences between the activities shown in the two pictures?

Our world moves forward through mutual cooperation and unity of its people. New inventions and developments are all a result of this harmony.

All adults including your parents are individuals who engage in different activities and professions. What are the activities and professions that they engage in?

Activities that humans engage in to fulfil their needs are called human activities. Are all these activities of the same kind? Besides the ones for making money, humans also engage in activities for public service. Thus there are economic activities and non-economic activities. The pictures given above denote two types of activities, don't they?

## Economic Activities

Money is essential for an individual to live in the society. Therefore everyone needs to engage in activities that would help them earn money. Only then would livelihood and survival be possible.

How many examples of economic activities can you find out? Write them down.

- Person who works in a factory
- Farmer who runs a cattle farm
- A teacher who works in a school
- 
- 
- 
- 

## Different kinds of Economic Activities

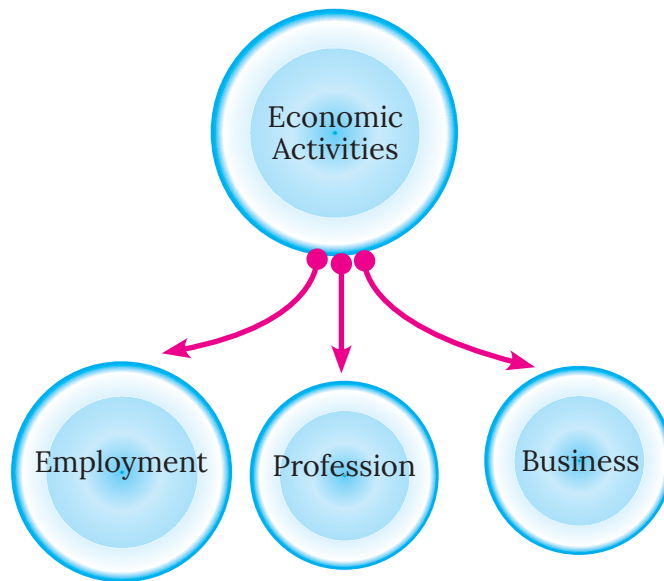
Are all the economic activities that you have mentioned above of the same kind?

What are the differences between the work done by a factory owner, a factory manager and a chartered accountant who does a financial audit of the factory accounts?

These three individuals engage in different kinds of economic activities. The factory owner runs a business. The manager does a job (employment). But the chartered accountant is engaged in a specialised profession.

It is obvious from the above example that economic activities can be categorised into three kinds – Business, Employment and Profession.

Take a look at Pic 7.3



Pic 7.3

## Employment

Employment refers to working under someone to receive an income. In other words, employees work under an employer. They receive a specific wage/salary for the work done. They are required to have the qualifications specified by the employer. Government officials, bank employees, factory workers, agricultural workers – all fall under this category.

## Profession

Profession requires a professional to provide individual services that entails special expertise. This requires professional qualifications and experience. For example, a doctor needs to have a medical degree and practice in a recognized hospital before they are allowed to start practising elsewhere. Their income is the fees received from customers; in this case, patients. Doctors, advocates and chartered accountants who work in their own institutions are all professionals.



## Business

A business is an economic activity continuously engaged in for profit, involving the production, distribution and sale of goods and services. Business aims to reap profits through customer satisfaction. Factories, agricultural farms, shops, banks, insurance corporations, transportation and communication services – all fall under business.

Though the activity areas, size, character and ownership of businesses are bound to vary widely, what are some of the common characteristics that all businesses have?

Engaged in economic activity

- Engaged in any of the collection, production, distribution or sale of goods and services
- Helps in fulfilling human needs
- Continuously performs financial transactions
- Aims to make profits
- Has an uncertainty regarding income
- 



### Activity 1

## Classification of Economic Activities

Cut out a piece of paper 7 cms long and 3 cms wide. Write down the name of the economic activity that your parent/guardian engages in. If more than one member in your family is engaged in an economic activity, write it down on a separate slip. This means that only one economic activity can be recorded on a paper slip, and that one can prepare more than one paper slip.

Drop the paper slips similarly written by all students in a cardboard box. Read aloud the paper slips after all students have dropped their slips into the box. Prepare a table (Table 1.1) as shown in your work diary. As the slips are read out, write down each on the appropriate column on the table, classifying the economic activities into three categories – Employment, Profession and Business.

| S.I. No | Employment | Profession | Business |
|---------|------------|------------|----------|
|         |            |            |          |
|         |            |            |          |
|         |            |            |          |
|         |            |            |          |
|         |            |            |          |
|         |            |            |          |
|         |            |            |          |
|         |            |            |          |

Table 1.1

After all paper slips have been read out, cross check the entries and make corrections, if necessary.

### Post-activity findings to be made

- How many entries were made under each category?
- Which category recorded the maximum number of entries?
- Which category recorded the least number of entries?
- What are your observation/findings from this?
- Prepare a brief note



### Activity 2

## Different types of Occupations and their Specialties

You have understood the specialties of business, employment and profession. Compare these three and complete Table 1.2 given below.

| Sl. No | Basis                   | Business                    | Profession                         | Employment                                 |
|--------|-------------------------|-----------------------------|------------------------------------|--------------------------------------------|
| 1      | Mode of Activity        | Provides goods and services |                                    | Does what the employer asks to do          |
| 2      | Required qualifications |                             | Professional degree and experience | Qualifications as required by the employer |
| 3      | Remuneration            | Profit                      |                                    |                                            |
| 4      | Investment              |                             | Limited                            | Not required                               |
| 5      | Risk of Loss            | High                        |                                    |                                            |

Table 1.2

## START-UP VENTURES

### What are start-ups?

Dream big. Make it happen! Have you ever had a great idea and thought of starting new ventures. You might have read the life stories of many children and youths who have successfully started innovative ventures with a simple idea?

Start ups are business ventures begun by people who want to introduce new ideas to solve common problems and thereby make a difference in society. Think about companies like Google, Apple or your favourite apps – they all started as small ideas in someone’s mind. You don’t need to be an adult to begin a new venture. With creativity, determination and hard work, many children and youth are starting their ventures and making it successful. Innovative ideas, hard work and confidence are the keys to make them successful. Such startups enable us to become problem solvers in the society and take the risk of loss at the right level. Start-ups remind us that age is not a barrier to implement innovative ideas and make them successful. So dream big and be curious. Don’t be afraid to take the first step. Yours could be the next startup making news headlines.

## Non-economic activities

Non-economic activities are actions that are performed without the expectation of monetary gain. These include activities done out of love or sympathy, or for entertainment (recreational) or public service. To move ahead in life with a sense of collaboration and unity, humans need to engage in several non-economic activities. This leads to the expansion of humanity and culture. Lots of clubs and organizations function to promote non-economic activities. In addition to indigenous organizations, there are many other organizations that function worldwide that are engaged in non-economic activities. Identify a few of these.

Add your own examples of non-economic activities to the ones provided below.

- Helps a blind person cross the road
- Transfers a person involved in a road accident to the hospital
- Local residents clean up the roads on a holiday
- Residents clear the waste and garbage that has accumulated in a local waterbody
- 
- 

### Every activity is a public service

When an individual engages in an activity to earn money, it contributes to the improvement of life standards of not just the person, but also those of the public in one way or the other.

A person who engages in economic activities should be aware that a remuneration is received for the same and hence should engage in the activities with utmost responsibility.

One should not engage in fraudulent activities or ones that cheat others. Individuals who do so are called corrupt individuals.

**Remember..**

We become excellent citizens when we successfully and skillfully undertake in both economic and non-economic activities.



### Moving Ahead

- Prepare a collage on chart paper, using ads of various employments cut out from newspapers.
- Prepare a table on the set of basic qualifications required for different professions.
- What type of economic activity would you select when you grow up? Why? Explain.



### Key Takeaways

| Gains                                                                    |  |  |  |
|--------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Realised that humans engage in different activities                      |                                                                                    |                                                                                     |                                                                                     |
| Recognised the importance of economic activities in human life           |                                                                                    |                                                                                     |                                                                                     |
| Identified the specialties of employment, profession and business        |                                                                                    |                                                                                     |                                                                                     |
| Realised that non-economic activities are very important                 |                                                                                    |                                                                                     |                                                                                     |
| Understood that any activity needs to be done with utmost responsibility |                                                                                    |                                                                                     |                                                                                     |

# Area 8



## Craft



**“Believe you can and  
you’re half way there.”**

**- Theodore Roosevelt**





# Designing New Models !



Pic 8.1

Sayan is very busy today. Even though it is Sunday, he is seriously engaged in some other activity.

On Saturday, he was gathering and preparing some materials.

He, along with his friends, made a moving vehicle during the craft period with the teacher's support.

He is excited to make a self designed vehicle.

His sister is equally curious and joins in as well.

Come, let's observe what Sayan is doing. Let's make a new vehicle along with him.

Are you ready?

**What are the materials needed to make this?**

Cardboard, glue, battery, battery connector, switch, motor, wire, midrib, small stick, scissors/cutter, pencil, insulation tape, wheels, scale etc.



Pic 8.2

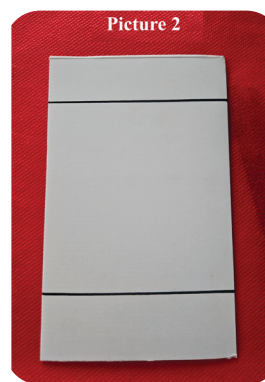
You can select the model of any vehicle of your interest. Try to find out a new design.

**Let's begin with the base of the vehicle.**

**Method of making the vehicle :**



Pic 8.3



Pic 8.4

### Step 1

Cut a cardboard 10 cm × 18 cm in size

### Step 2

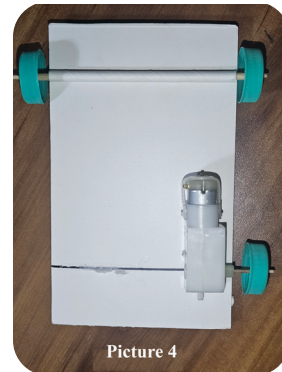
Draw two equal lines from the two edges of the cardboard to fix the wheels.



Pic 8.5

### Step 3

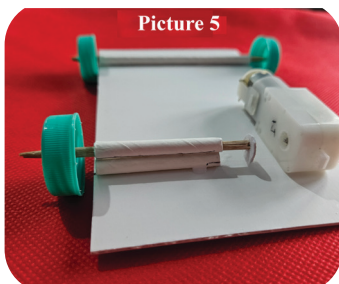
Paste a 10cm long straw to one of the lines drawn. Pass a midrib or thin bamboo through the straw and fix the tyres.



Pic 8.6

### Step 4

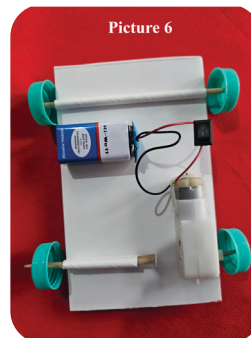
Fix the third tyre into the connection part of the gear motor using an Midrib or thin bamboo stick. Paste the gear motor onto the cardboard using double-sided tape. Fix the tyre on the outer side of the board ensuring smooth rotation.



Pic 8.7

### Step 5

Fix the fourth tyre with precision to the level of the tyre attached to the gear motor. Paste the straws one above the other and arrange the level. Pass the Midrib or thin bamboo stick through the straw to fix the tyre. Secure the other end with a button/bush to prevent it from coming off.



Pic 8.8

### Step 6

Connect the battery connector to the battery. Fix the battery to the cardboard using double-sided tape. Connect one end of the connection wire to the gear motor and the other end to the switch. Complete the circuit by connecting switch and motor using another wire. We can see the chassis running when switched on.

Now the main part of a moving vehicle is ready. Now, we need a design for our vehicle.

You can draw a model on drawing paper, paste it into the cardboard and cut it out.

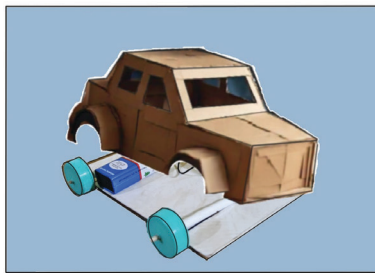
Make sure that your creation is innovative.

Don't forget to exhibit the models of the vehicles you made.

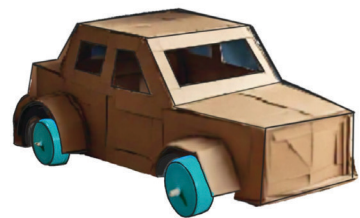
You can move the vehicle even without using a motor by twisted Midrib or inflated balloon. Try other methods also.



Pic 8.9



Pic 8.10



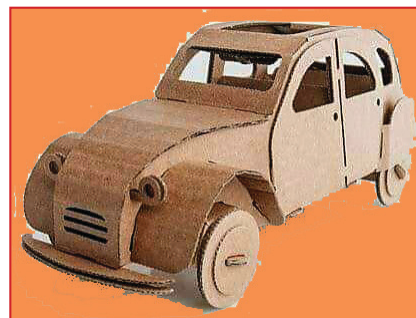
Pic 8.11



- Collect pictures and models of different types of vehicles and find out their features.



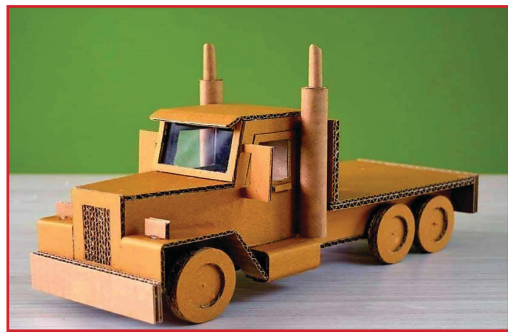
Pic 8.12



Pic 8.13



Pic 8.14



Pic 8.15

Make moving toys. Use different methods to make it move.



### Key Takeaways

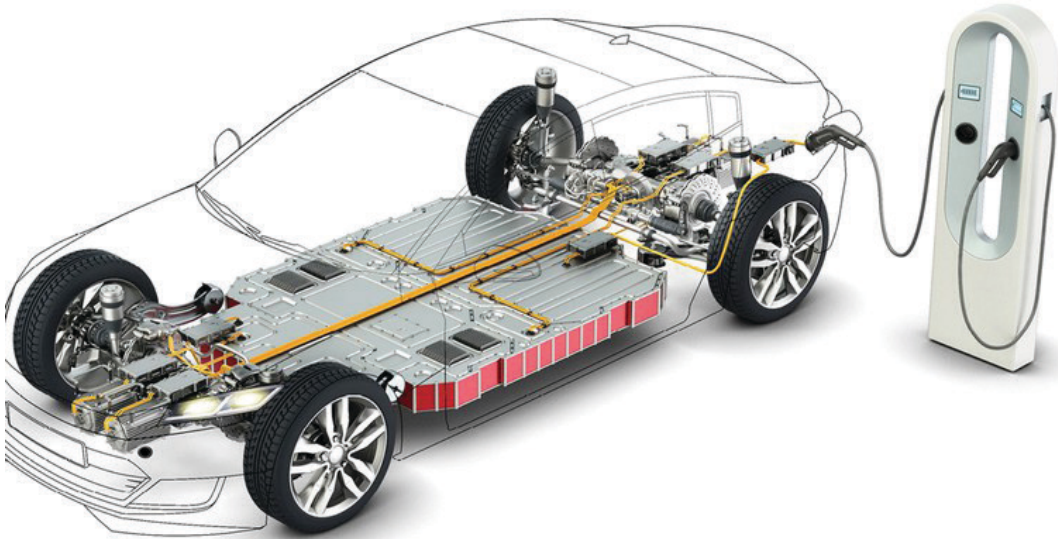
| Gains                                           |  |  |  |
|-------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Can make models of different types of vehicles. |                                                                                    |                                                                                     |                                                                                     |
| Can make moving toys.                           |                                                                                    |                                                                                     |                                                                                     |



# Area 9



## Electrical and Electronics



**The future of energy conservation  
lies in developing more efficient,  
sustainable, and cost-effective batteries.**

**- Dr. Yet Ming Chiang**





# The World of Cells



Pic 9.1



Pic 9.2



Pic 9.3



Pic 9.4



Pic 9.5



Pic 9.6



Pic 9.7



Pic 9.8

You have seen electric vehicles (EVs), haven't you? While conventional vehicles run on petrol or diesel, electric vehicles operate using electrical energy stored in batteries. You know that generating energy from sources like sunlight, wind and waves is beneficial for the environment. However, at night, there is no sunlight. If the wind isn't blowing, wind energy cannot be harnessed. So, what can be done in such situations? This is where batteries become essential. When more electrical energy is available, it can be stored in batteries and used later when needed.

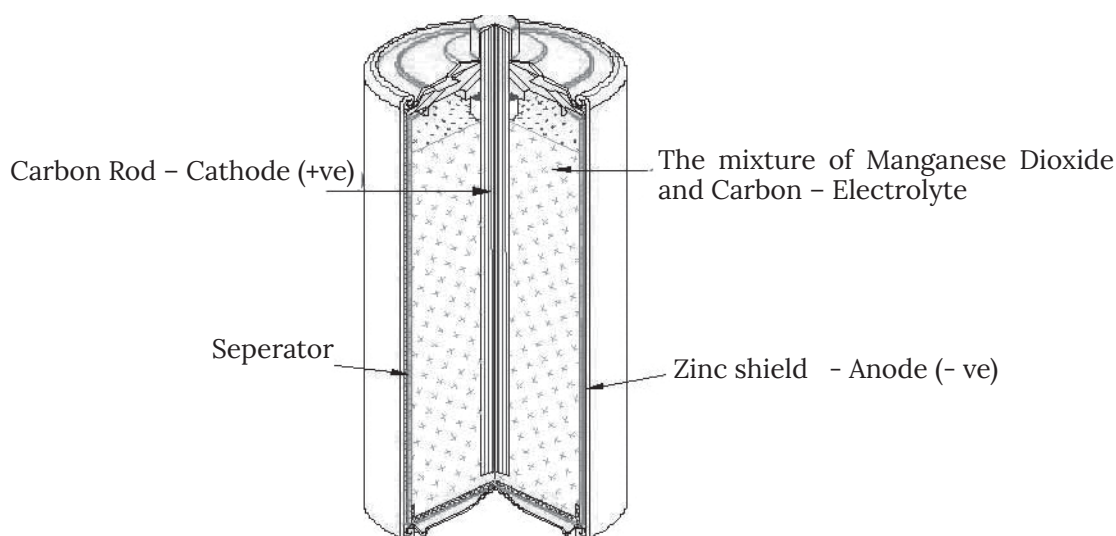
Various types of electrical sources are displayed in the picture given in the beginning. Among these which of the sources are familiar to you? In what situations are these typically used? Find out.

Various types of batteries are manufactured to cater to different requirements and devices.

Let's have a look on how electricity is generated in a cell.

Open a cell and take a look inside. With the help of a hacksaw blade cells should be opened and examined under the supervision of a teacher (wearing gloves is mandatory).

Observe Pic 9.9



Pic 9.9

### Parts of Cell

Carbon Rod – Cathode (+ve)

Zinc shield – Anode (-ve)

The mixture of Manganese Dioxide, Carbon mixture – Electrolyte

Separator – prevents the exchange of +ve and -ve charges through the electrolyte

Were you able to identify the different parts as shown in the picture from the cell you have examined?

Note down your observations.

- 
-



## Activity 1

### Assemble a cell and identify the presence of electricity

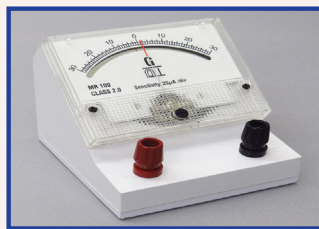
Let's make a cell. Haven't you understood that we require +ve, -ve rods and electrolytes to assemble a cell?

#### Required materials

1. Lemon/Potato/Tomato -1
2. Copper and zinc rods- 1 each
3. Galvanometer-1
4. Connecting wire-20cm

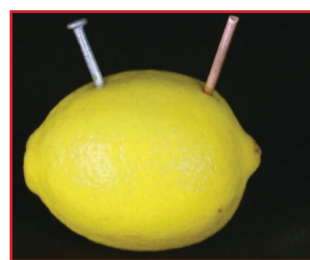
#### Galvanometer

A galvanometer is a device used to detect the presence of electricity.



Pic 9.10

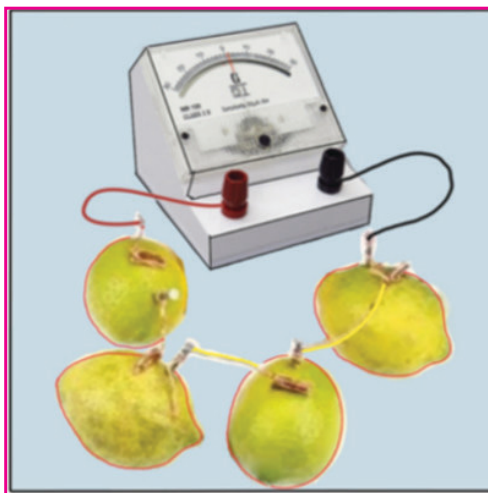
Take a copper rod and a zinc rod. Insert the rods into any one of the lemon, potato or tomato as shown in Figure 9.11. After that, connect the galvanometer to the two rods and observe the movement of the needle. Here the liquid inside the lemon/potato/tomato acts as an electrolyte.



Pic.9.11

- Observe and compare the changes in the galvanometer reading while using lemon, potato and tomato separately.
- Repeat the previous experiment by increasing the distance between the two rods and observe. What difference do you see in the galvanometer reading? Why?

- When only one lemon was used, only a minimal amount of electricity was produced. What if more lemons are used? What change can be observed?
- Observe the picture 9.12



Pic 9.12

When multiple cells are arranged together it is called a battery.



## Activity 2

### Finding the voltage and amperage of a cell

Observe the cells used in the clock, remote and toys in your homes. What are the markings that you find on it?

•

You might have noticed that some of them have AA and some AAA written on them. What is the difference between them?

•

Two main terms related to electricity are Potential Difference (Voltage) and Intensity of Electric Current. Volt (V) is the unit of potential difference. Ampere (A) is the unit of intensity of electric current.



Cells are classified as AAA, AA, C, D, etc based on their size.



Pic 9.13

The basic characteristics of an electric cell are its voltage and current. Why don't you measure the voltage and current of a cell that is available to you?

The device used for this purpose is called a multimeter.

### Multimeter

A multimeter is an device used to measure the voltage, current etc. of a circuit or electrical source.



Pic 9.14

Let's first see how to measure voltage. Insert one end of the multimeter's black-coloured probe into the black knob (COM). Insert one end of the red-coloured probe into the first visible red knob. Set the selector of the multimeter to a voltage of 2V. Connect the other end of the black probe of the multimeter to the -ve end of the AA cell and the other end of the red probe to the +ve end of the cell and note the readings displayed on the screen. This is the voltage of that cell.

To measure amperage, insert one end of the multimeter black probe into the black knob (COM) and insert one end of the red probe into the first visible red knob. Set the selector of the multimeter to an amperage of  $200\mu\text{A}$ . Connect the black probe of the multimeter to the -ve end of the AA cell and the red probe to the +ve end of the cell and note the reading on the screen. This is the amperage of that cell.

Observe the voltage marked on the four types of cells given in picture 9.13. What peculiarity do you notice? Find out.

The voltage of all four cells is the same. Then why do we use four different types of cells?

You have already found the voltage and current of one of these four cells using a multimeter. Find out and measure the voltage and current of the other cells and complete the Table 9.1

| Sl.No | Cell | Voltage | Current |
|-------|------|---------|---------|
| 1     | AAA  |         |         |
| 2     | AA   |         |         |
| 3     | C    |         |         |
| 4     | D    |         |         |

Table 9.1

Analyze Table 9.1 and note the findings.

It is understood that even though the voltage of the four cells is the same, the amount of the current flowing through them is different.

Another measurement found in cells is milliampere-hour or ampere-hour (Ah). An ampere-hour represents the amount of electric current flowing through a circuit at a rate of one ampere for one hour.

An ampere-hour or milliampere-hour is a unit of electrical charge that measures how much current a battery can deliver in a given period. It is the unit used to determine the capacity of a battery or other energy storage device.



### Activity 3

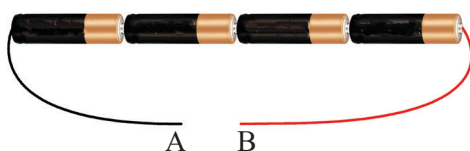
## Measurement of voltage by connecting cells in different ways.

In what ways can cells be connected to a circuit?

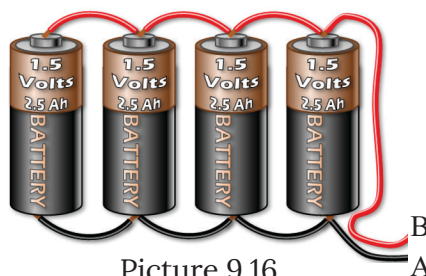
Will there be a difference in voltage and current when two cells are connected in different ways?



Observe the picture and find out.



Picture 9.15



Picture 9.16

Connecting cells in the manner shown in pic 9.15 is called series connection

Connecting cells in the manner shown in pic 9.16 is called parallel connection.

### Required Items

1. 1.5 V cell x 4
2. Multimeter-1
3. Connecting wire- 20 cm

Connect the cells in both ways and insert the multimeter probes at points A and B.

Find out the voltage and current and complete the table.

|          | current | voltage |
|----------|---------|---------|
| Pic 9.15 |         |         |
| Pic 9.16 |         |         |

Table 9.2

Analyze the table 9.2 and note down the findings.

#### Primary cell

Primary cells are non-rechargeable cells.

#### Secondary cell

Secondary cells are cells that can be recharged and used again.





1. Find out the situations and circumstances under which cells are connected in series and parallel and note them in your activity book.
2. Find out and prepare notes on batteries used in electric vehicles and the advanced technologies used in it.



| Gains                                                                             |  |  |  |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Able to identify the parts of a cell.                                             |                                                                                   |                                                                                     |                                                                                     |
| Can measure the voltage and current of a cell using a multimeter.                 |                                                                                   |                                                                                     |                                                                                     |
| Know how to make a cell.                                                          |                                                                                   |                                                                                     |                                                                                     |
| Able to distinguish between the cells which are connected in series and parallel. |                                                                                   |                                                                                     |                                                                                     |

# Area 10



## Food Industry



**“Food Preservation is the basic method of human culture to exceed time and period.”**

**- Michael Pollan**



## Let's Preserve for Future Use



Pic 10.1

While on a tour, Shanu and his family visited a vineyard.

Shanu was fascinated by the splendid sight of bunches of grapes hanging in the vineyard. Considering his interest, they bought a large quantity of grapes from there.

He was fed up with eating grapes after two or three days. Some of them have started getting stale. What should he do with the remaining ones? He contemplated on the methods of preserving grapes for a long time. He enquired about it to his parents. His father asked, ‘ Last year, we had a lot of jackfruits left even after giving many to friends and relatives. Do you remember what we did with the remaining ones?’

He recalled how they had dried and preserved the jackfruits.

Mother said, ‘Your father knows how to make jam. Don’t you remember that he made jam out of pineapple once?’

Shanu said enthusiastically, ‘Let us make grape jam. I had insisted on buying these grapes. I myself will prepare the jam. Just tell me the method of preparation exactly! Don’t you want to know how he prepared the jam according to his father’s instruction? Shall we prepare a jam like this?’



### Activity 1

## Preparation of Grape Jam



Pic 10.2

These are the ingredients required to prepare jam out of one kilogram grapes.



1. Black grapes - 1 kg
2. Sugar - 50 gm
3. Lemon extract - 2 tablespoon
4. Water - 1 cup
5. Steel /nonstick utensil for cooking

### Method of Preparation

- Pluck each grape from the bunch, sort out and soak it in salt or vinegar for half an hour. Wash them in clean water.
- Add one cup of water to the cleaned grapes and cook well.
- After cooling, separate the juice using a sieve.
- Add sugar to grape juice and cook on a low flame in a steel or nonstick pan. Stir well.
- Then, add lemon extract and stir for 30 minutes.
- Turn off the flame when the jam reaches the setting point.

[Take a glass of water and drop a little bit of jam into it. If it settles down and dissolves in water, it is not cooked well. If it drops down without dissolving in water and remains in the same form, it is an indication that the jam has reached the correct setting point.]

- Tasty grape jam is ready for use.
- After cooling, transfer the jam to an airtight glass container for a longer shelf life.
- 

Jam is a delicious dish. The excess amount of sugar in it may lead to increase in body weight and occurrence of health problems like heart diseases.

It is advisable to use jam in a small quantity. Consumption of jam on a regular basis may cause health problems.







## Activity -2

### Let us preserve without wasting

Won't you prepare jams using locally available fruits like papaya or pineapple with the help of your family?

You are familiar with other methods of preserving fruits. Note them down.

- 
- 
- 



Pic 10.3

From ancient times people have discovered different food preservation methods. After consuming the meat of hunted animals, the remains were dried and preserved for future use.

### Drying

Drying is an age old method of food preservation. Food items can be preserved for a long time by reducing the water content in it. [can be dried by adding salt or otherwise]

List down preservation methods of food items that are locally available and could be preserved for a long time.

| No | Item      | Preservation Method  |
|----|-----------|----------------------|
| 1. | Jackfruit | Drying, jam, salting |
| 2. |           |                      |
| 3. |           |                      |
| 4. |           |                      |

Table 10.1

### Salting

Food items can be preserved for a long time by adding salt to them. This is one of the most ancient methods [It is advisable to use rock salt]  
Eg: salted mango and salted gooseberries.



### Squash

Add fruit pulp /juice to sugar solution of a specific quantity. Add lemon extract to it, boil and bring it to correct setting point. After cooling, preserve it in an air tight container.



### Food Preservatives

Food preservatives are substances that are added to food for preventing decay and to conserve it for a long period.

Eg: salt, sugar, honey, vinegar, citric acid

On an industrial basis, citric acid and other chemicals are used instead of lemon extract.





- In school fair, demonstrate the preparation of mixed jam using fruits available to you. Display the recipe as well.
- Note down the food preservation methods adopted at home in your work diary.



| Gains                                                    |  |  |  |
|----------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Know how to preserve food items without wastage.         |                                                                                   |                                                                                     |                                                                                     |
| Understood the different methods of food preservation.   |                                                                                   |                                                                                     |                                                                                     |
| Learned how to prepare mixed jam using different fruits. |                                                                                   |                                                                                     |                                                                                     |

