

BASIC SCIENCE

Part - 2

Class V



**Government of Kerala
Department of General Education**

Prepared by

State Council of Educational Research and Training (SCERT), Kerala

2024

The National Anthem

Jana-gana-mana adhinayaka, jaya he
Bharatha-bhagya-vidhata.
Punjab-Sindh-Gujarat-Maratha
Dravida-Utkala-Banga
Vindhya-Himachala-Yamuna-Ganga
Uchchala-Jaladhi-taranga
Tava subha name jage,
Tava subha asisa mage,
Gahe tava jaya gatha.
Jana-gana-mangala-dayaka jaya he
Bharatha-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 respect to my parents, teachers and all elders and treat everyone with courtesy.

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

Basic Science V

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Friends,

This textbook contains fundamental information and a variety of activities for observing deeply and studying the environment in which we live. When you observe in this way, you can understand the features of creatures and things, and the connections among them. The book also provides the opportunity to understand the basic factors that influence human life as a social animal. This book includes many activities that you can do along with your friends. The Basic Science textbook offers occasions for creating knowledge through fun activities including observation, queries, discussions, debates, simple experiments, and projects. We hope that the information given in the textbook will prompt you to seek out further knowledge. Learn and enjoy..

Wishes,

Dr. Jayaprakash R.K.

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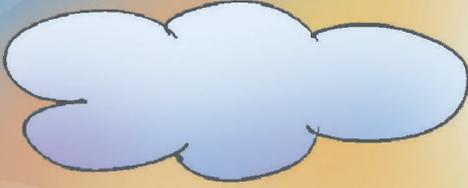
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Certain icons are used in this
textbook for convenience



For further reading
(Evaluation not required)



ICT possibilities for
making concepts clear



Let us assess



Extended activities



THE CONSTITUTION OF INDIA

PREAMBLE

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

JUSTICE, social, economic and political;

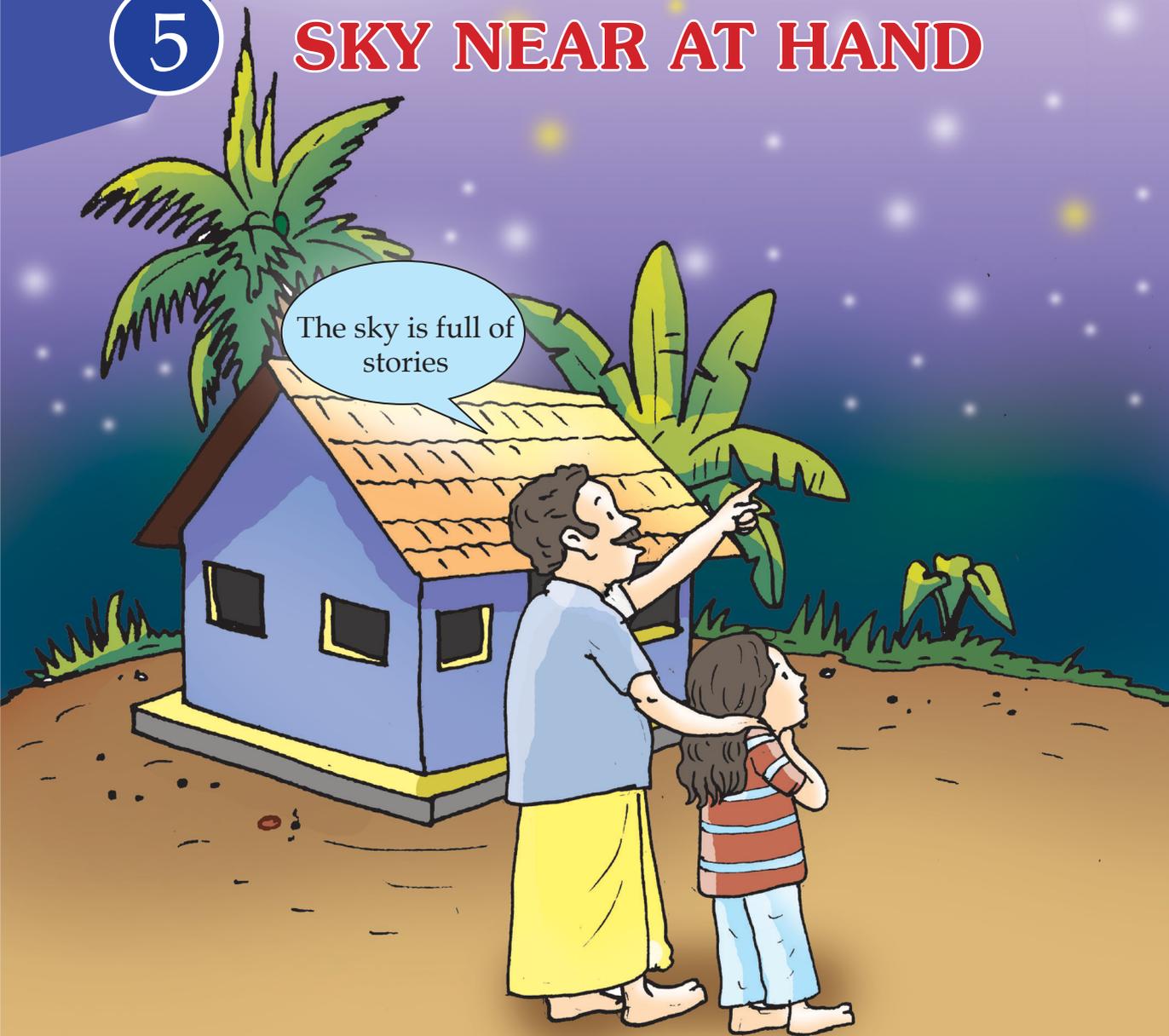
LIBERTY of thought, expression, belief, faith and worship;

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

FRATERNITY assuring the dignity of the individual and the ²[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)



Picture 5.1

Why did grandpa say so?

Is it correct to say so?

What is your opinion?

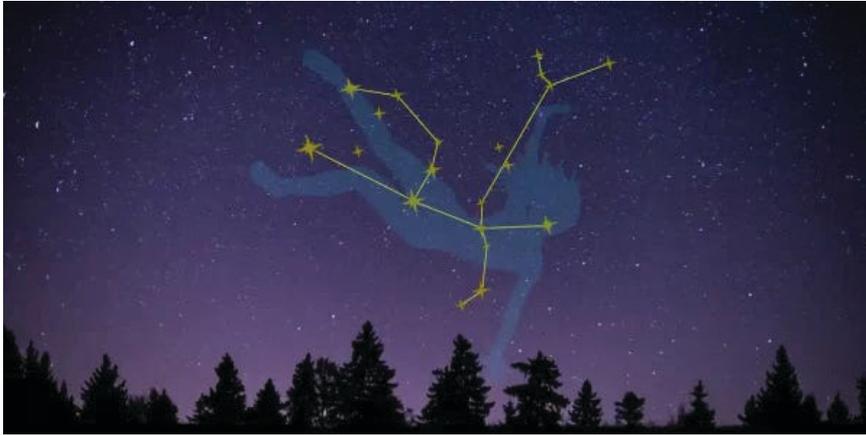
Discuss.

Beyond Stories

Since ancient times, the sky has been a wonder for humans. People often made up and propagated numerous stories about the



celestial bodies. It is human nature to cook up stories about the things they don't know and can't explain.

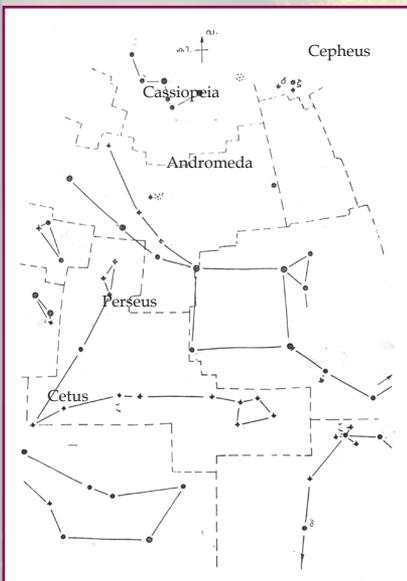


Picture 5.2

If each star of a star cluster is connected to one another, figure of a girl can be seen. The story popular among the Greeks was that she was a princess and she was chained. The princess's name was Andromeda. The name Andromeda is still used to identify this cluster of stars.



The Story of Andromeda



Andromeda was the daughter of Cepheus, the King of Ethiopia and his Queen Cassiopeia. Cassiopeia was so proud that her daughter Andromeda was even more beautiful than the goddesses. This angered Poseidon, the God of the sea. He sent Cetus, a monster to attack Ethiopia and thus to put an end to Cassiopeia's arrogance. King Cepheus was ready to sacrifice his daughter Andromeda to save the kingdom. She was chained to a rock by the sea. Perseus, a heroic figure, then arrived and killed the monster. He rescued Andromeda and married her.

Picture 5.3



Stories similar to Andromeda's are found in Indian, Chinese and Arab cultures.

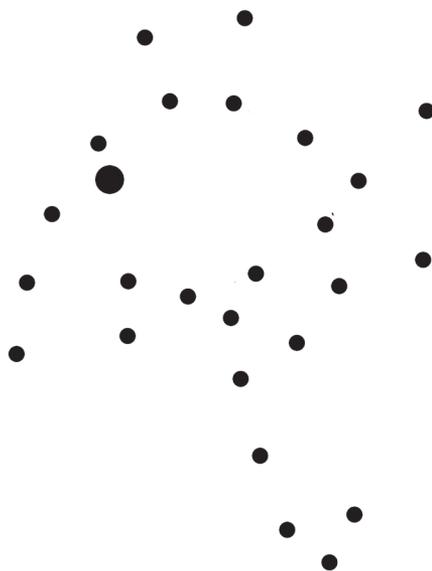
But there were people who searched for the reality beyond these stories. They are the astronomers. Galileo, Copernicus and Newton are just some of them. In India too there were astronomers like Aryabhata and Bhaskaracharya.

Didn't the sky view amaze you too?

Sky Watching

Can you imagine any shape in the dots given in the picture? Connect the dots and draw the shape you see.

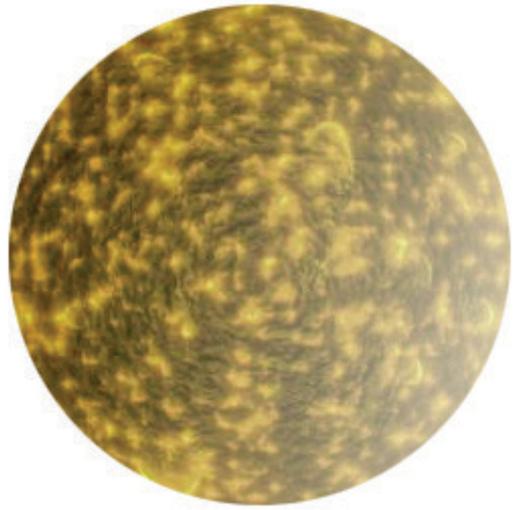
Did everyone get the same shape?



Picture 5.4

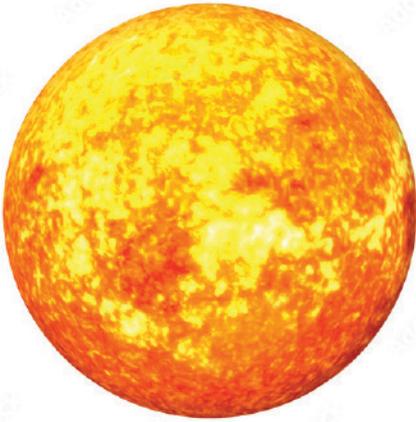
Like this we can imagine different shapes connecting the nearby stars which are seen in the sky. Many stories about the stars evolved in this manner. The ancient people imagined certain shapes connecting the neighbouring stars. They gave the names of mythological characters existed in the respective regions to identify the stars. They observed and understood the relationship between the position of stars and the climate. The farmers identified





Alpha Centauri A

Large enough to accommodate
16 lakh earths.
40 lakh crore km far from the Earth



Sun

Large enough to accommodate
13 lakh earths.
15 crore km away from Earth.



Earth

Large enough to
accommodate 50 moons



Moon

3.84 lakh km away from
the Earth.

Picture 5.6

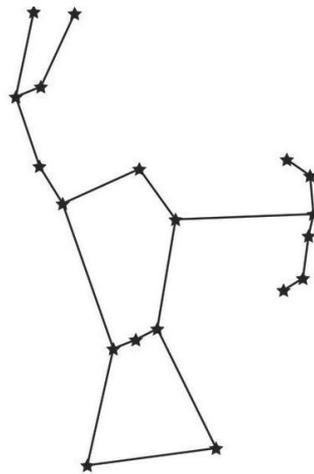


Star clusters are known as constellations.

Let us familiarize ourselves with some constellations.

The Hunter (Orion)

This is a constellation visible in the eastern horizon at dusk in December. When the stars are connected, we can imagine the shape of a hunter and hence given the name Hunter. The Greeks gave the name Orion to this constellation which is the name of a hunter in their mythology.



Picture 5.7

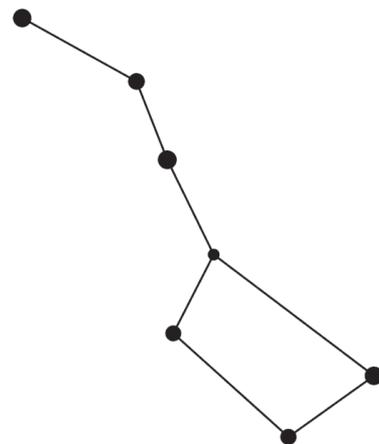
Saptarshis

This is a constellation in the northern horizon clearly visible during the month of April without the aid of a telescope.

The name 'Saptarshis' was given by Indians because seven stars could be seen very clearly in this constellation.

In European countries it is known as 'the Big Dipper' as it has the shape of a big spoon. It is a part of the constellation, Ursa Major.

Collect information about more constellations like this and draw them in the Science Diary.



Picture 5.8



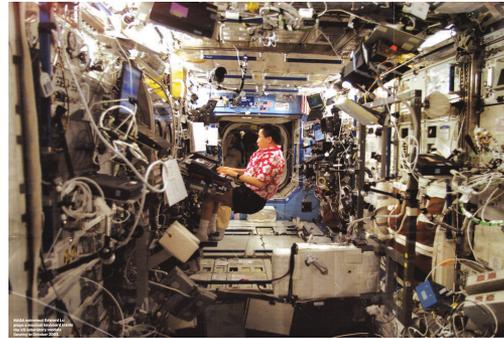
Look at the pictures of a space station.



Picture 5.10



Picture 5.11



Picture 5.12

What problems can be faced by the people who reach the space station for experiments?

- No air
-
-

What special arrangements are needed to overcome such problems?
Collect more information and record it in the Science Diary.

Explorations related to outer space are progressing at a greater pace nowadays. It is the sky watching that inspired all these explorations and experiments.



The Moon

The Moon is the biggest and the brightest body in the sky at night, isn't it? What could be the reason?



Picture 5.13

The Moon is the closest celestial body to the Earth. Is the Moon bigger than the stars? Can the Moon shine on its own?

The Moon revolves around the Earth. Satellites are the celestial bodies which revolve around the planets. The Moon is a satellite of the Earth. The light of the sun that falls on the Moon gets reflected. The reflected light makes the moon glow and we see it as the light of the Moon. What are some other features of the Moon? Write them in your Science Diary.

- Spherical
-
-

What all luminous objects are there in the sky?

The Sun is the closest star to Earth. Like the Sun, there are billions of stars in the universe. Many stars have planets and their satellites.

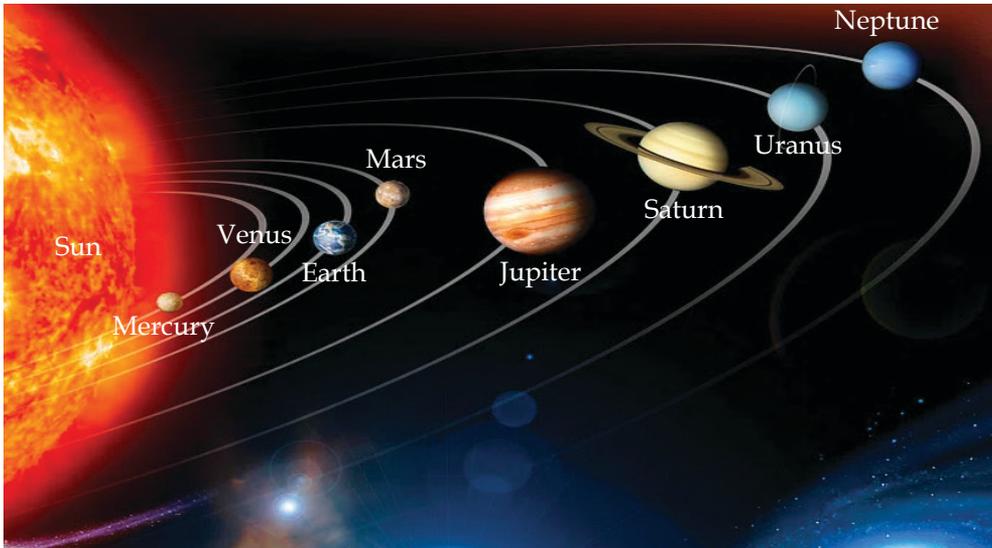
How to differentiate the stars and other celestial bodies?

Stars are self-luminous celestial bodies. But planets and satellites are not self-luminous. The light that falls on these bodies gets reflected and it makes them glow. We perceive them as luminous because of the reflection of light. While observing the sky, we see the stars twinkling where as the planets shine without twinkling.



The Solar System

Look at the picture.



Picture 5.14

Like the Moon revolves around the Earth, the Earth and the other planets of the solar system revolve around the Sun.

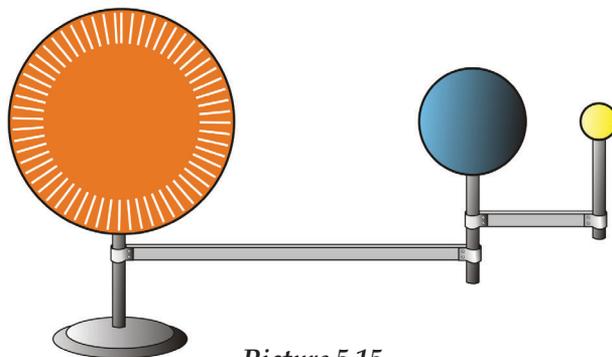
The path of the celestial bodies is called the orbit.

The solar system consists of the Sun, the planets around the Sun, satellites and many other celestial bodies

How many planets are there in the solar system?

Write down the names of planets in the solar system.

Between the orbits of which planets does the Earth's orbit lie?



Picture 5.15

Make a model of the Sun, the Earth and the Moon as seen in the picture. Demonstrate their movement with the model you have made.



Artificial Satellites

Let's play a game.

A blindfolded person should reach at a predetermined place in the classroom.

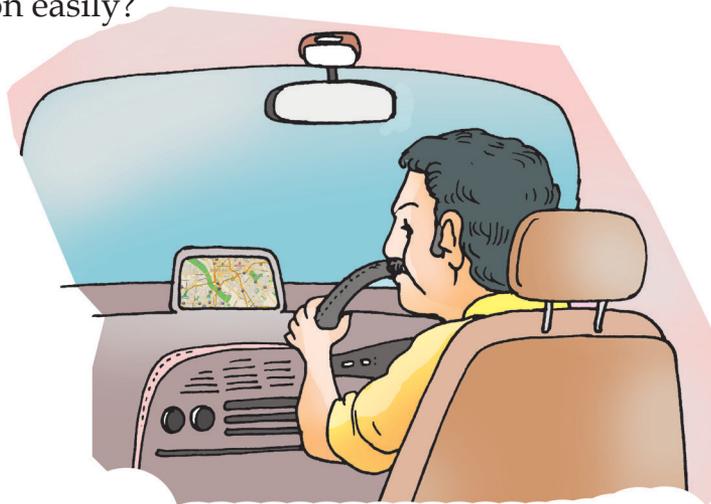
First, try to reach that place without anyone's help. At the next stage, he can follow the instructions of a helper.

When was it possible to reach the target easily?



Picture 5.16

While travelling through an unknown and unfamiliar route, what is the method adopted by the driver of a vehicle to reach the destination easily?



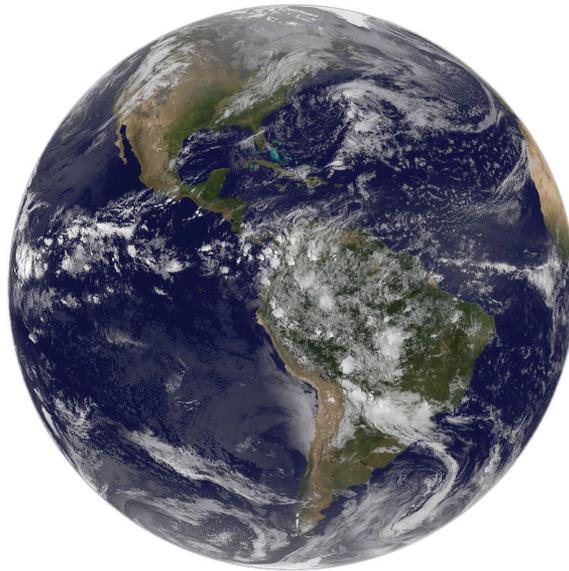
Picture 5.17

Do you know how we get such services?



Imagine an object orbiting the Earth. We can take pictures of the Earth with a camera attached to that object.

Look at the picture taken that way.



Picture 5.18

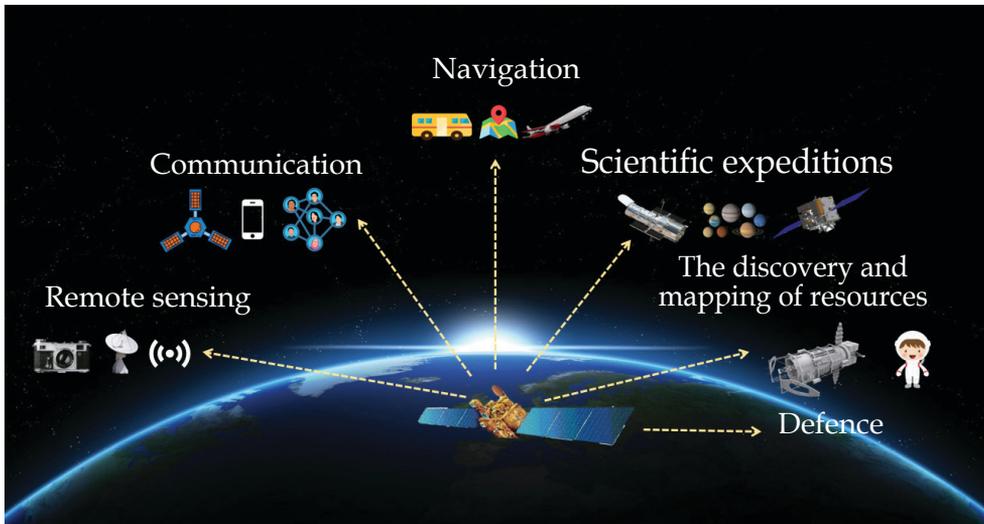
Many mechanical devices, including cameras and various instruments, created by humans have been sent to the space. They constantly revolve around the Earth. These human-made devices are called artificial satellites. Such artificial satellites provide services like GPS (Global Positioning System). They enable us to view the satellite images of your house, school and other places using mobile phones or computers.



Picture 5.19



What are some other services that artificial satellites provide?
Observe the picture and write them down.



Picture 5.20

- Telecommunication.
- Weather forecast.
-
-
-

Artificial Satellites of India

Check out the list of artificial satellites launched by our country and their purposes.

Artificial satellites	Primary purposes
INSAT	Satellite communication
EDUSAT	Education
IRNSS	Navigation
CARTOSAT	Geographical observation.
ASTROSAT	Astronomy and astrophysics research
G SAT- 7, EMISAT	Defence

Table 5.1



The Indian Regional Navigation Satellite System (IRNSS) is an indigenous regional satellite navigation system developed by India. It is equivalent to GPS (Global Positioning System).

Rockets

How are artificial satellites launched to the space?

Read the newspaper report.

Satellite Launch on May 29

Bangaluru: The launch of a navigational satellite, indigenously developed by our country will take place on May 29. The satellite will be placed into its orbit using GSLV-F12. It will be raised to its orbit by the rocket in 18 minutes.

Rockets are the vehicles used to launch satellites and spacecrafts into space.



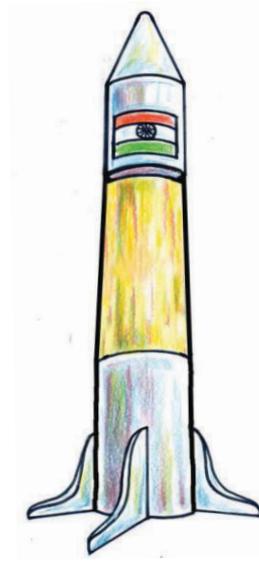
The Indian Space Research Organization (ISRO) is the space agency responsible for planning and executing the space missions of our country. Collect the names of space research institutes of other countries and note them in your Science Diary.

Make the model of a rocket using paper as seen in the picture.





Picture 5.21



Picture 5.22

Our Rocket Launching Stations

The launching of rockets is done from some special facilities. Some information about such centers in our country is given. Collect and add more.

Thumba Rocket Launching Station

Located in Thiruvananthapuram district of Kerala.
India's first rocket launch station.
Established on 21st November 1963.

.....
.....
.....

Satish Dhawan Space Centre

Located in Sriharikota, Andhra Pradesh.
Started operations in October 1971.
There are two launch pads.

.....
.....
.....





Vikram Sarabhai



Vikram Sarabhai is known as the father of Indian space programme. He played a crucial role in developing India's indigenous space technologies. Recognising his contributions, Vikram Sarabhai Space Centre (VSSC) in Thiruvananthapuram and the lunar lander (*Vikram*) of the Chandrayaan mission are named after him.

Satish Dhawan



Satish Dhawan was the chairman of ISRO. He took the leadership role in developing India's unique space technologies. Satish Dhawan Space Centre, located in Sriharikota, is named so in memory of him.

Voyages to the Moon

The desire to reach the Moon, Earth's nearest celestial body, was a longstanding aspiration of the humanity. This dream was realized on July 21, 1969. This was the result of continuous research since 1960. In NASA's Apollo 11 lunar exploration module, astronauts Neil Armstrong and Edwin (Buzz) Aldrin, first landed on the Moon. Michael Collins was the pilot of the spacecraft which took them to the Moon.



Picture 5.23



THE SPACE WEEK



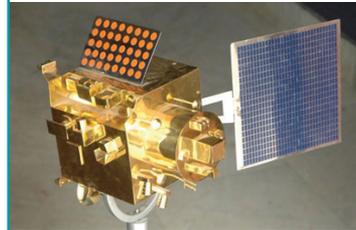
Sputnik 1, launched by the Soviet Union is the first artificial satellite. The beginning of the Space Age is marked by its launch on October 4, 1957. The International Space Week is observed annually from October 4 to 10. It is observed to commemorate the launch of Sputnik 1, and the signing of the International Outer Space Treaty (to use outer space only for peaceful purposes) on October 10, 1967.

India's Lunar Missions

Our nation conducts lunar exploration missions in the name 'Chandrayaan'.

Chandrayaan 1

Chandrayaan 1 is the first lunar exploration mission of our nation. It was launched on October 22, 2008 from Sriharikota. It entered the moon's orbit at an altitude of 100 kilometers and conducted studies of the lunar surface.



Picture 5.24

Chandrayaan 2

Chandrayaan 2 is India's second lunar exploration mission launched on July 22, 2019. Its goal was to study the features of rocks and soil on the lunar surface.



Picture 5.25

Chandrayaan 3

Chandrayaan 3 is the first mission to land on the south pole of the Moon. It was launched on July 14, 2023. It landed on the lunar surface on August 23, 2023. The rover separated from it, roamed on the lunar surface and conducted experiments.

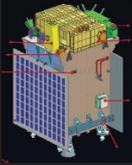
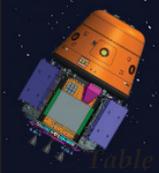


Picture 5.26



Other Indian Projects

We have projects to study not only about the Moon but about the other celestial bodies also.

Mission		Objective
Mangalyaan		Mars expedition
Aditya L1		Solar expedition
Gaganyaan		Space expedition

Gather more information about such projects and prepare 'The Indian Space Booklet'.





Let's assess.....

1. Here are some key milestones of India's space exploration. Rearrange them in the chronological order.

- | | |
|----------------------------|---------|
| 1. Launch of Mangalyaan | 1. |
| 2. Launch of INSAT-1 | 2. |
| 3. Launch of Aditya-L1 | 3. |
| 4. ISRO was established | 4. |
| 5. Launch of Chandrayaan-1 | 5. |
| 6. Launch of Aryabhata | 6. |

2. Match the following.

Earth's satellite	Sun
Weather forecasting	Moon
To launch artificial satellites	Satellite
Celestial bodies that orbit planets	Rocket
Self glowing	Artificial satellite





Extended activities.....

- Complete this crossword puzzle. Construct new similar ones.

To the right

- NASA's first mission to send women to the moon.
- The only rocket launching station in Kerala.

Downwards

- India's first space telescope.
- The name of an Indian satellite.
- Largest satellite of Saturn.
- India's telecommunication satellite.
- The first artificial satellite.

Upwards

- The orange red planet in the solar system.

1 A	2 R	3 T			5	6 S
4 T			7			



2. Construction of water rockets

You know that satellites are launched using rockets, don't you?
Shall we make a model?

Materials Required

PVC pipe : Half inch

Elbow pipe : Two

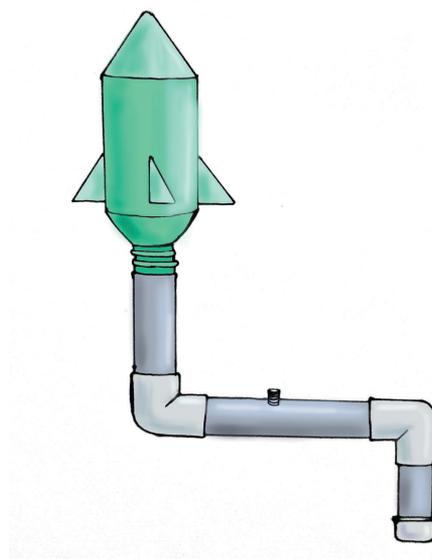
Stopper : One

Cycle valve : One

Water bottle (preferably one with a narrow neck)

Method of Construction

Prepare the launching pad with a half inch PVC pipe as seen in the picture. Put a small hole in the middle of the central pipe and fix the cycle valve, without air gap. (Attach tail and wings to the bottle to form a rocket shape which will help it to rise higher). Fill quarter part of the bottle with water and fix it upright at the open end of the launch pad pipe.



Fill air in the bottle using a cycle pump. Once the pressure inside the bottle exceeds a certain limit, the rocket will take off into the sky. Everyone may make such rockets, with the help of elders.



6

SOURCES OF ENERGY



Picture 6.1

Don't you also play such games?

Don't you feel tired when continuously involved in games?

What could be the reason for feeling tired?

When we play, our body is doing various works.

The ability to do work is called energy. We cannot see energy. It manifests through different actions. Heat and light are forms of energy that we can experience.

What are the situations in your house where energy is utilized?

Write them down.

- For cooking
-
-

What are the sources from which energy for cooking is obtained?

Fuels

Observe the pictures below.



Picture 6.2
Open hearth



Picture 6.3
Kerosene stove



Picture 6.4
Gas stove

What types of stoves are used in homes? Which type do you have in your home?

We use stoves for cooking food. Food items are cooked when they receive energy from heat. How is heat generated in the stoves shown in the picture? Which material burns in each type of stove? Which are the other materials used to generate heat?

Write down.

Fuels are substances that generate heat when burned. Many materials such as wood, kerosene, LPG, petrol, diesel and coal are fuels.

What Helps in Burning?

Does the firewood always burn well in the hearth?

What is to be done to make the firewood burn well?

- Blowing air using a pipe.
-



Picture 6.5

What is the purpose of blowing air using a pipe?

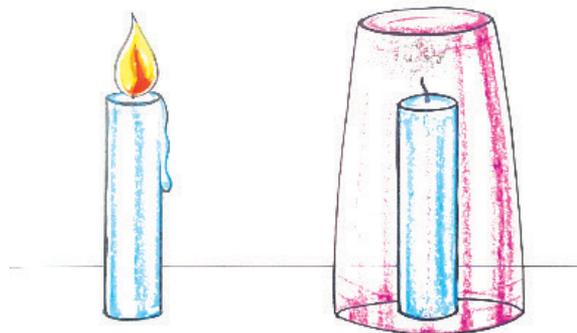
Is Air Necessary for Burning?

Let's conduct an experiment.

Take two candles of the same size. Light both the candles. Cover one of them with a glass. Observe both the candles. What happened to them?

What conclusion do you arrive at from this experiment?

Prepare an experiment note.



Picture 6.6



How to Use a Hearth?

You observed the picture of a hearth (*Picture 6.5*), didn't you?

Is it possible to utilize all the heat energy generated?

What can be done to reduce heat loss?

- The gap between the vessel and the hearth should be minimized.
-
-
-

Other Uses of Fuels

Diesel is generally used as a fuel in heavy vehicles like buses, trucks and excavators. However petrol, diesel and gas are used in light vehicles like cars and auto-rickshaws. Factories utilize coal, gas and naphtha. Jet fuel is used in aircrafts.

What are the other uses of fuels? Discuss.

What is the Source?

Investigate and find out how petrol and diesel reach the petrol pumps.

They are obtained from the crude oil extracted from the earth.

Do you know how crude oil is formed?

Coal, crude oil and natural gas are made from the organic matter trapped underground millions of years ago.

Fuels used in daily life such as petrol, diesel, kerosene and LPG used for cooking are all refined products obtained from crude oil.

Coal was used as fuel for running trains and ships and also for operating industries before diesel and electricity became popular. Nowadays, coal is primarily used in thermal power plants.





Picture 6.7
Oil rig



Picture 6.8
Petroleum refinery



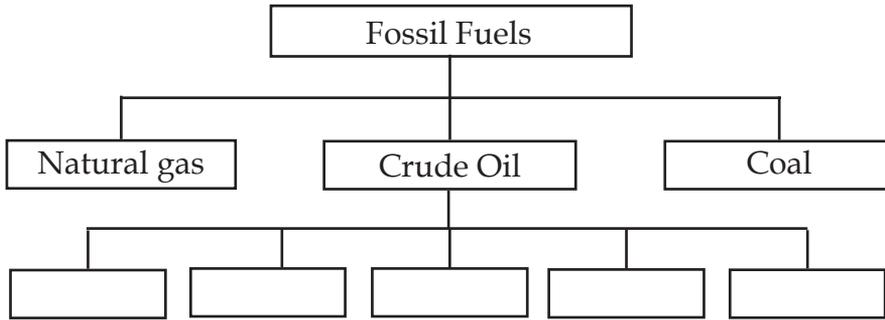
Picture 6.9 Petrol pump



Picture 6.10
LPG Cylinder

Fossil fuels are formed from the remains of living organisms that existed on Earth millions of years ago. Their stock decreases and eventually runs out by consumption. These are referred to as non-renewable energy sources.

Complete the Flowchart



Different Forms of Fuels

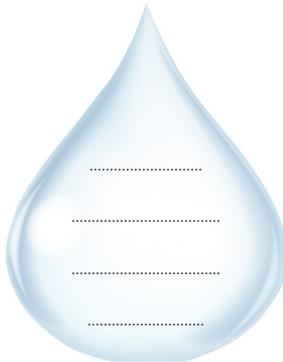
We have learned about various types of fuels. Some of them are wood, kerosene, diesel, petrol, jet fuel, naphtha, coal and LPG.

In addition to the above mentioned, find out other fuels and group them based on their physical states.

Solid



Liquid



Gas

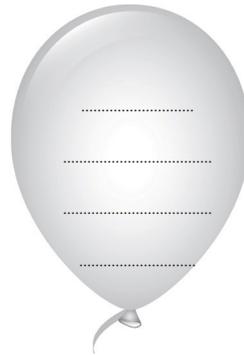


Table 6.2

Observe the pictures given below.

Look at the changes of fuel usage in trains over time.



Picture 6.11
Coal Train



Picture 6.12
Diesel Train



Picture 6.13
Electric Train



Currently, electric trains are common in operation. Electricity is an alternative form of energy which can be used instead of fuels. We can't imagine a life without electricity now a days.

What are the various needs in houses that require electricity?

How is electricity generated?

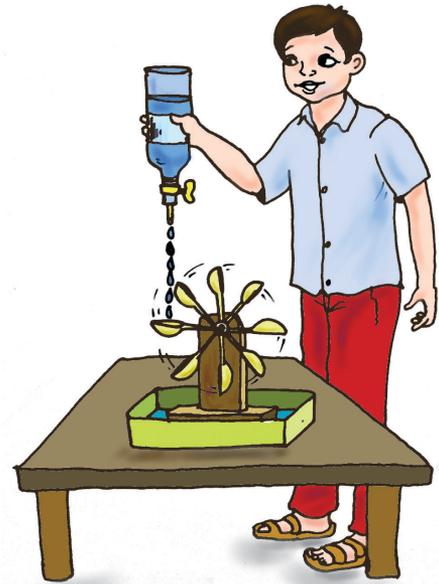
Hydroelectricity

We can construct a model of a turbine (water wheel) and conduct an experiment as shown in the picture.

Write down notes on the construction of the model in your Science Diary.

What should be included in the construction note?

- Name of the equipment
- Objective of the construction
- Materials required
- Diagram
- Steps of the construction



Picture 6.14

How does the turbine rotate?

Does the variation in the force of the falling water influence the speed of the turbine?

Will the change in the height of the bottle affect the speed of the turbine?



Picture 6.15



Hydroelectric power is generated using the energy present in the water stored in dams. The water is released downwards as per demand to turn the turbines and drive the generator to generate electricity.

Electricity from the Wind



Picture 6.16
Palm leaf windfan



Picture 6.17
Windmill

Create a fan using palm leaves or paper.

Stand outside holding this fan.

Does the fan rotate? When does the fan rotate better?

Wind has the ability to move objects. We can generate electricity, utilising this ability of the wind. When the blades of a windmill rotate, they drive a connected turbine and a generator and electricity is generated.

In Kerala, electricity is generated from wind energy in places like Ramakkalmedu, Kanjikode and Attappadi.

Why are windmills installed in those places?

Wind is an energy source that humans have used since ancient times. The power of wind was utilised for travelling in rivers and oceans.

Storms cause damages and calamities as they are rich in energy. Nowadays the possibility of storms can be predicted through weather forecast and warnings. We can reduce the rate of calamities and losses if we take precautions according to them.



Energy from the Sunlight

Keep a steel vessel in a place where sunlight is available.

Touch the vessel after sometime. What did you experience? What is the reason? What will happen if some water is poured into the vessel?

In what ways are the energy from sunlight utilized?

- For drying objects.
-
-

Devices that use heat from solar energy include solar cookers and solar water heaters.



Picture 6.18
Solar stove/cooker



Picture 6.19
Solar water heater

What are the devices in the pictures given below?



Picture 6.20



Picture 6.21



Picture 6.22

-
-
-

From where do they get the energy to function?

The solar panels in these devices convert sunlight into electricity.

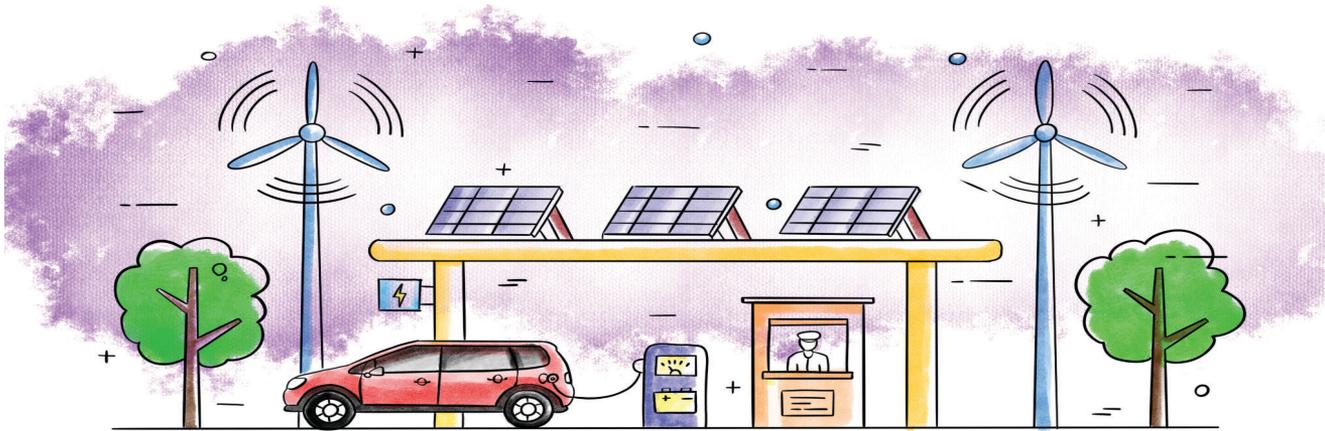
When sunlight falls on the solar cells in the solar panel, electricity is generated.

Devices that generate electricity from sunlight are widely used in homes and other establishments.

Electric Vehicles

Have you noticed vehicles with green number plates? What are their special features?

-
-



Picture 6.23

Observe the types of electric vehicles present in your area and write them in your Science Diary.

Renewable Energy Sources

What are the specific features of renewable energy sources such as sunlight and wind?



Energy sources like sunlight and wind do not get exhausted due to consumption. These are known as renewable energy sources. These energy sources do not cause air pollution.



Picture 6.24

Cochin Airport

Cochin Airport is the world's first fully solar-powered airport. This international airport generates the electricity needed for its operations using solar panels.

Biogas

We can generate fuel from biowaste which causes environmental problems. Biogas is a type of fuel derived from bio wastes. What are the benefits of setting up biogas plants in our school and home?

Visit a biogas plant and understand how it is operated?



Picture 6.25

You have learned about different methods of energy production, haven't you? Can these sources satisfy all our energy needs?



The methods provided below are also used for energy production:

- Thermal power plants using diesel and coal.
- Electricity generation from tidal energy.
- Geothermal energy.
- Nuclear energy.

Collect more information about these and prepare an essay.

Hot Box

We can reduce the consumption of fuels by minimizing energy loss.

Hot box is a very simple device to keep the food from losing its heat. If we keep the half cooked food items in this box they get cooked. It saves energy by preserving the heat inside it.

What other devices are used in houses to prevent energy loss? Identify and write down.



Picture 6.26

Fuels of the Future

You have understood the various uses of fossil fuels, haven't you? What are their limitations?

- Get exhausted with use.
-

Solar energy, wind and tidal waves are the energy sources without these limitations.

Is sunlight available everywhere at all times?

Is the speed of wind uniform?

What about the tidal waves?

We can't generate electricity always at the same rate from these sources. The scientists are in search for new energy sources that can overcome these limitations. Fuels like hydrogen and bio-diesel are examples for such promising fuels.

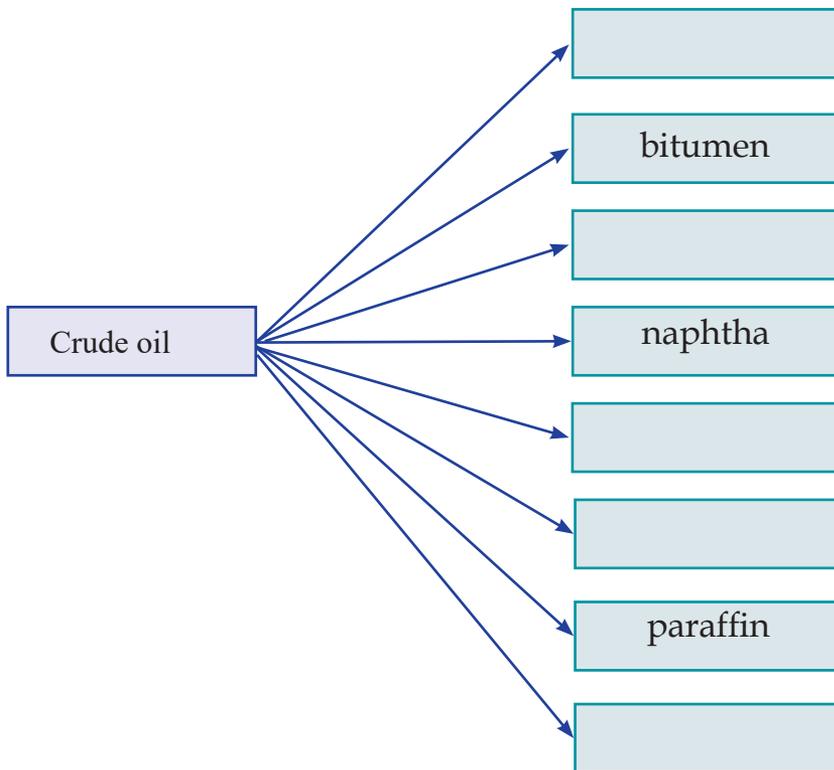
Collect more information about these fuels and prepare a report.





Let's assess.....

1. Categorise the following items in to appropriate groups. Give the reason for categorising them.
Petrol, Coal, Solar energy, Electricity from wind, Hydroelectric power, Diesel
2. Complete the concept map by adding the products obtained when crude oil is processed.



3. People still use open hearths, don't they?
What can be done to improve the efficiency of this?





Extended activities.....

1. Conduct a survey in five houses in your neighbourhood to find out what types of fuels are used for cooking and whether any methods are employed to reduce fuel consumption. Collect the information and present it in the class.

House number	Name of the house owner	Fuel used for cooking					Methods used to reduce the consumption of fuel
		Fire wood	LPG	kerosene	electricity	biogas	

2. Prepare and present a skit focussing on the importance of reducing the use of non-renewable energy sources.



7

MAGIC OF SENSES

I can recognise even the lowest of the sounds.



I can see the prey even from a great distance.



I can recognise tastes using my legs.



I can recognise even the faintest of smells.



Even if my body is hard like a rock, I will know wherever touched.

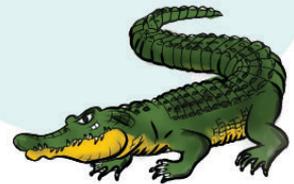


Illustration 7.1

You have read what each creature has said, haven't you?

What are the special abilities of these creatures to recognise their surroundings?

Examine the illustration and complete the table below

Creature	Organ	Special ability
Eagle	Eyes	Far sight
Butterfly		
Crocodile		
Dog		
Bear		

Table 7.1

These organs help the creatures to understand their surroundings through sight, touch, hearing, smell and taste.

Similarly, which are the organs that help us to understand our surroundings?

- Eyes - Sight
-
-
-
-
-

Sense Organs

Creatures have different types of organs that help them to understand the surroundings. These organs are called sense organs. Eyes, ears, nose, tongue and skin are the sense organs of human beings.



Who will Win?

Shall we conduct a contest?



Picture 7.1

Keep a lock and some keys on the table as shown in the picture. Blindfold those children who are ready to participate in the contest. The winner is the one who opens the lock within 30 seconds.

Did everyone who was blindfolded win to open the lock?

Is it easy to recognise objects without the help of the eyes?

Draw the picture of eyes and colour it.



Picture 7.2

When the Position Changes

Are the eyes of other creatures similar to our own eyes? Look at the position of the eyes of the creatures in the picture.



Picture 7.2

How does the position of the eyes help these creatures?

Classify creatures into groups on the basis of the position of their eyes.



Those with eyes in front of the head	Those with eyes on the sides of the head

Table 7.2

Animals with eyes on the front of their heads are able to precisely understand the position and distance of the objects. This peculiarity of animals like tigers and lions helps them to catch their prey. Animals with eyes on the sides of their heads are able to see both the sides. This feature helps animals like deer and rabbits to escape from their predators.



Cat

The pupil of a cat's eye appears to constrict in the daylight and dilate to the maximum at night. This helps the cat to see even in low light. A cat's eye has a layer of specialised cells. That is the reason for the shining of their eyes at night. The eyes of many animals that hunt for prey at night have this feature.



Owl

The owl has large eyes directly at the front of its head. The owl is also able to see sights behind it by rotating its neck to the back.



Chamaeleon

The chamaeleon can simultaneously move its eyes in different directions and see around it.



Eye Diseases

Conjunctivitis spreading

Many people in the state are seeking treatment for conjunctivitis. This disease spreads fast among children. Care should be taken not to touch the objects used by the patient, as this is a communicable disease.

*Medical Officer
Primary Health Centre*

Have you seen the notice issued by the health department?

What are the symptoms of conjunctivitis?

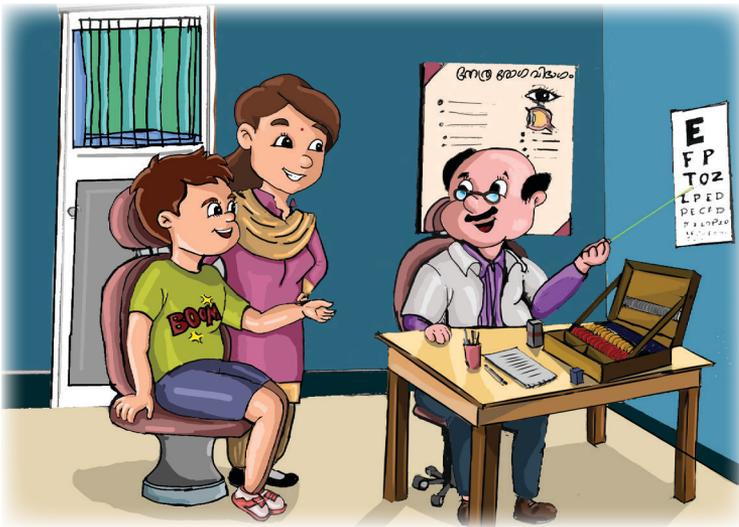
- Pain in the eye.

-
-

What other eye diseases do you know?

-
-

Look at the picture



Picture 7.4



Have you seen the charts used for vision tests?
Collect more information about them.



Snellen Chart

100	E	100	1
75	F P	75	2
60	T O Z	60	3
45	L P E D	45	4
36	P E C F D	36	5
30	E D F C Z P	30	6
24	F E L O P Z D	24	7
18	D E F P O T E C	18	8

Picture 7.5

There are letters of different sizes in the chart commonly used for testing eyesight. The letters are arranged in such a way that the size decreases from top to bottom. This was developed by Dutch Ophthalmologist Herman Snellen in 1862.

The Visually Challenged

How do visually challenged individuals understand their surroundings?

Examine the different currency notes.

In what ways do they differ?

Which features help the visually challenged individuals to recognise the currency note? Prepare a short note.

Look at the pictures.



Picture 7.6

Seat number in a train



Picture 7.7

The tile on the footpath

What are the special features you observed?



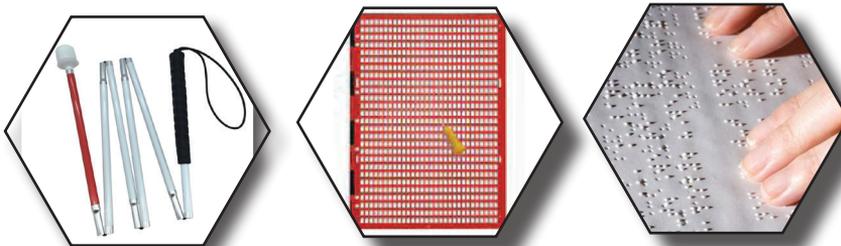
How do they benefit visually challenged individuals?

Which features of the devices like mobile phones, watches, computers, etc. help them?



Picture 7.8

What are the other systems to help them?



Picture 7.9

The smart cane and the digital Braille slate are examples for the changes in these systems due to the developments in technology. Collect more information about the features of these devices.



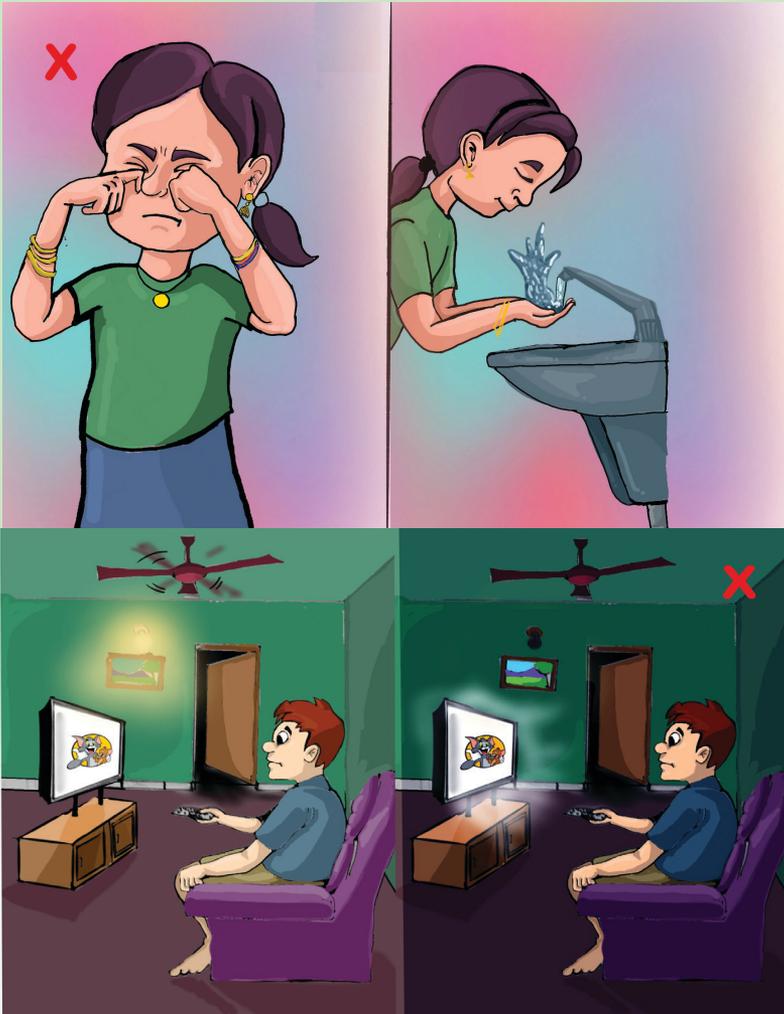
Smart Cane

- To find the way : It helps to find the way more easily
- To locate obstacles: Ultrasonic/infrared sensors can be used to locate obstacles in real time.
- Connectivity : Smart canes can be connected through bluetooth to smartphones or other devices.
- To identify falls : It passes information to the concerned if there is a fall and the individual is unable to get up.
- Customisation : Adjustable height, different handle grips, different sensory feedback arrangements
- Data collection : They can collect information about distance travelled, walking speed, obstacles faced, etc.



See pictures and instructions in the Health Department's brochure.

Just take care; see for a long time



- Do not rub the eyes.
- Do not touch inside the eye.
- Do not watch television in dimlight.
- Do not use mobile phones, computers, televisions, etc. for a long period of time.
- Do not use the handkerchiefs used by others.
- Read in a well lit place.
- Get the eyes tested periodically.
- Include fruits, leafy and other vegetables in the diet.



Do you follow these instructions?

What health habits should you follow for the health of the eyes?

Write in your Science Diary.

Hear and Understand



Picture 7.10

How does the blindfolded child in the picture understand the positions of her friends? We are able to understand our surroundings clearly, when hearing combines with sight.

Do we give enough care to protect the ear, the organ that helps us to hear?

What should we do in these situations?



Picture 7.11

Is the grandfather's advice correct?



What should we do in such situations?

Don't follow treatment methods without scientific basis, when we can access the service of healthcare professionals directly or over phone. Use medicines in the ear only according to the instructions of the healthcare professionals. Self treatment is dangerous. This can even lead to loss of hearing. Did you know that water getting inside the ear can cause injury or infection to the ear? This may lead to ear ache and even loss of hearing.

What should we be careful about to avoid such problems?

- Don't put any objects such as pencil, pen, matchstick, safety pin, etc. into the ear.
-
-
-



Picture 7.12

Hearing Aids

Loss of hearing occurs due to many reasons.

Hearing aids are devices to solve this problem.

A wide variety of hearing aids are available now with special features to increase sound volume and clarity.



Cochlear Implant Surgery

Cochlear implant surgery is a surgery to correct congenital hearing loss. This is a surgery to transplant the cochlea inside the ear.



Recognising the Smell

Look at the picture.



Picture 7.13

What is the reason for loss of smell when you have a cold?

We always feel a moist inside our nose, don't we? The reason for this is the secretion in the nose. The function of this secretion is to remove the dust particles and pathogens getting inside the nose. The cold is a condition when this secretion is produced in excess, when there is a virus infection.

When secretion is produced in excess, the odour particles will not reach the cells that help to recognise the smell. That is why we don't recognise smells.

Does smell also help in understanding the surroundings like sight and hearing? Write your opinion in your Science Diary.



Food	Taste
Lime pickle	Sour
Ripe mango	Sweet
Bitter gourd curry	

Table 7.3

Does the tongue help only in tasting?

What are the other functions of the tongue?

- Talking

-

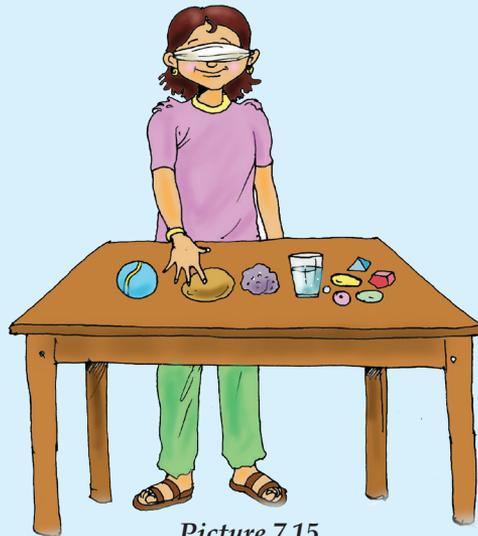
What should be taken care of, for the health of the tongue?

- Don't eat extremely hot or cold food.
- Don't forcefully clean the tongue with a tongue cleaner.

Touch and Understand

Look at the picture.

The objects like a ball, beads of different shapes, a glass of cold water, a smooth stone and a rough stone are kept on the table. A child attempts to identify each object blindfolded. Do this activity in your class.



Picture 7.15



Could you recognise all the objects?

How were they recognised?

What all features can be recognised through touch?

Which organ helped you in this?

The skin is the organ that helps us to recognise objects by touch. It also helps us to feel sensations like hot and cold. It covers and protects our body. The skin is the largest organ in the body. It prevents pathogens from entering the body. The skin has a role in controlling the temperature of the body and eliminating wastes through sweat.

Protecting the Skin

What should we be careful of in protecting the skin?

- We should keep the skin clean.
- We should drink sufficient water.
- We should include leafy vegetables and fruits in our diet that help in the health of the skin.

Add more instructions and write them in your Science Diary.

Let us conduct an interview with a healthcare professional to know more about the functioning and protection of sense organs. Prepare a questionnaire by including all your doubts.

What should be included in the questionnaire?

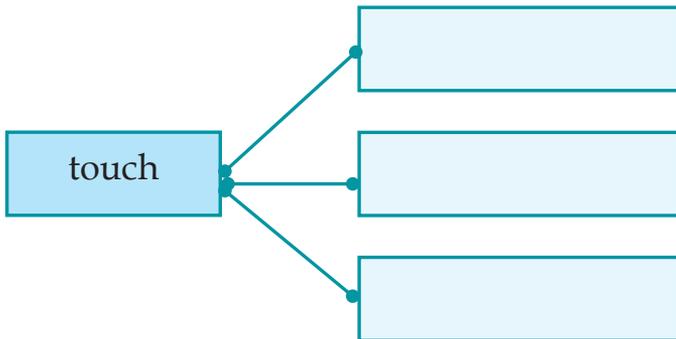
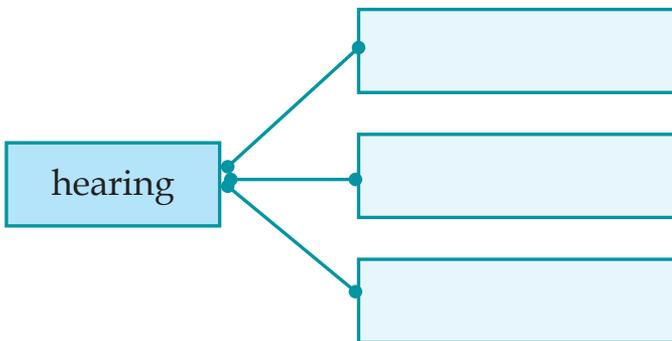
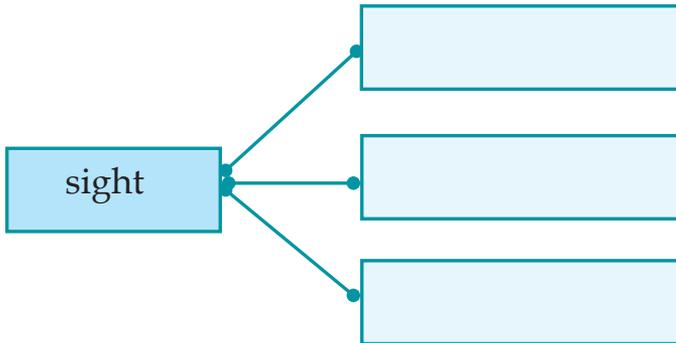
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Summarise the information that you received through the interview and write in your Science Diary. Write the protective measures

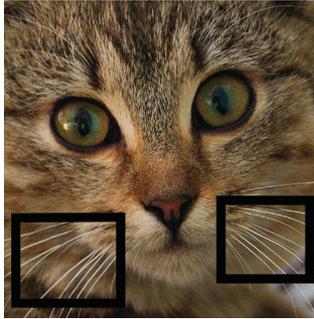


Draw the five sense organs on a chart and exhibit in your class.
Let's assess.....

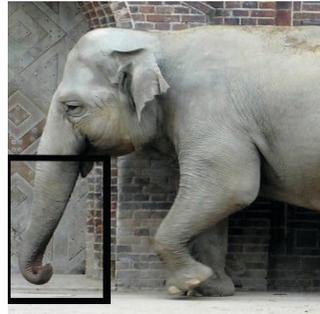
1. There are restrictions in working hours during extreme summer. What may be the reason?
2. What features of an object can be understood through sight,



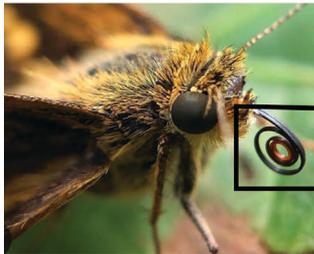
3. The special organs of creatures are marked in the pictures. Find out and write down how each of them helps the creatures.



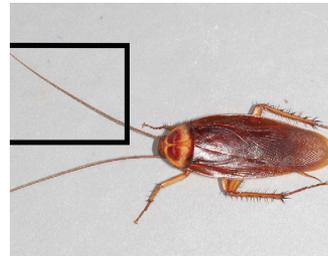
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hearing, and touch? Complete the list below.

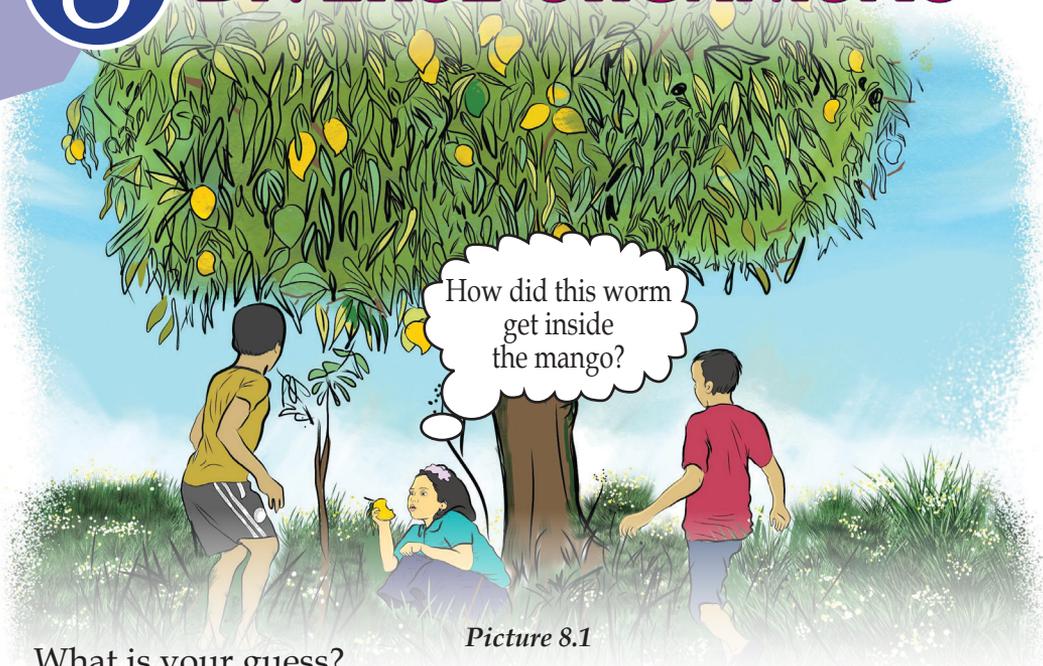
Extended activities.....

1. There is a variety in the sense organs of different creatures. Prepare an album including the pictures of these creatures.
2. Design a new device that can be effectively used by visually and aurally challenged persons. Prepare a sketch and describe the making procedure in your Science Diary.



8

DIVERSE ORGANISMS



Picture 8.1

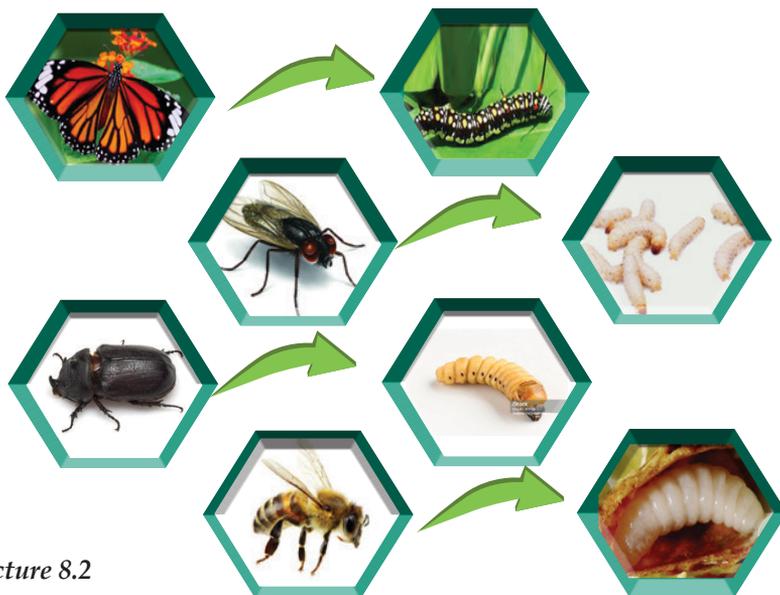
What is your guess?

Discuss with your friends and write the findings in your Science Diary.

Are worms found only inside fruits?

Haven't you seen different kinds of worms in your surroundings? From where do they come?

Worms are formed from the eggs of certain insects. Observe the picture and record the findings.

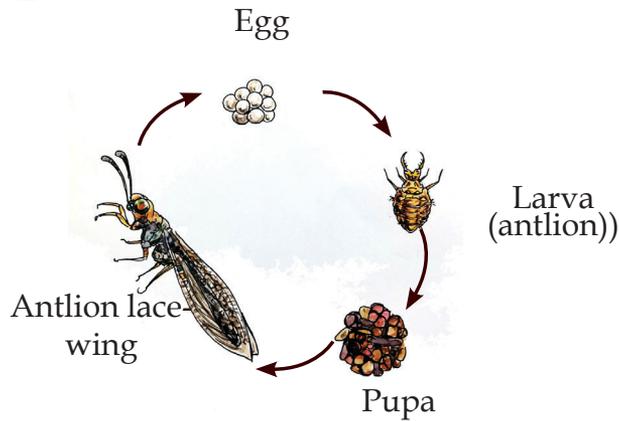


Picture 8.2



Find out and write down more examples of creatures that hatch into worms.

Observe the picture.



Picture 8.3

Does the antlion hatched from the egg, look like its parent creature? What are the further changes that happen to the antlion?



Antlion

Antlion(doodlebug) is the larva of a kind of winged insect called antlion lacewing. They make funnel-shaped pits in sand and eat small insects like ants. They are called antlions because they capture ants.



Its larva makes a cocoon using sand grains and thin silk fibres secreted by itself and becomes a pupa. This pupa undergoes changes to become the insect.

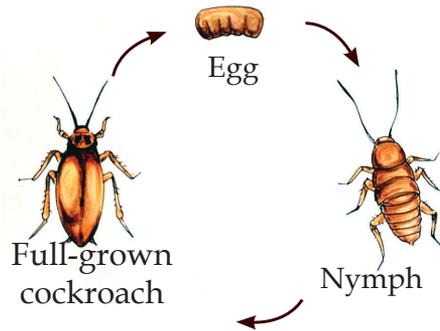
Metamorphosis

In some creatures, the larvae do not resemble to the parent. The larva formed from the egg goes through different stages of growth and becomes a creature resembling the parent. This change is called metamorphosis.

What other creatures do you know that go through such stages of growth.



Observe the life cycle of the cockroach.



Picture 8.4

Does the offspring of a cockroach look like a cockroach itself?

What are the differences?

They are called nymphs. Nymph goes through different stages of growth and becomes a fully grown cockroach. During these stages, the nymph sheds its outer shell many times.

The worms hatched from the eggs of the insects eat leaves and other plant parts. Thus many such worms adversely affect farming. Farmers adopt many measures to keep such worms and pests away.



Illustration 8.1

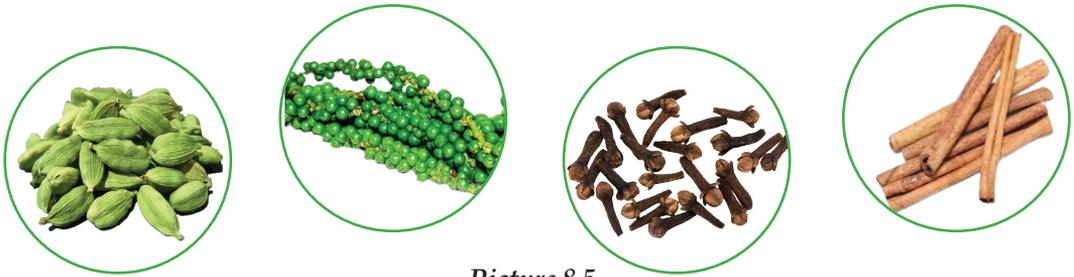
The chemicals produced by the Marigold keep certain kinds of pests away.



Similarly, what are the other methods you know? Discuss.
Find out and write examples for pests that harm the crops.

- ◆ Yellow stem borer larva.
- ◆

Look at the pictures of some spices that we use.



Picture 8.5

Cardamom

Pepper

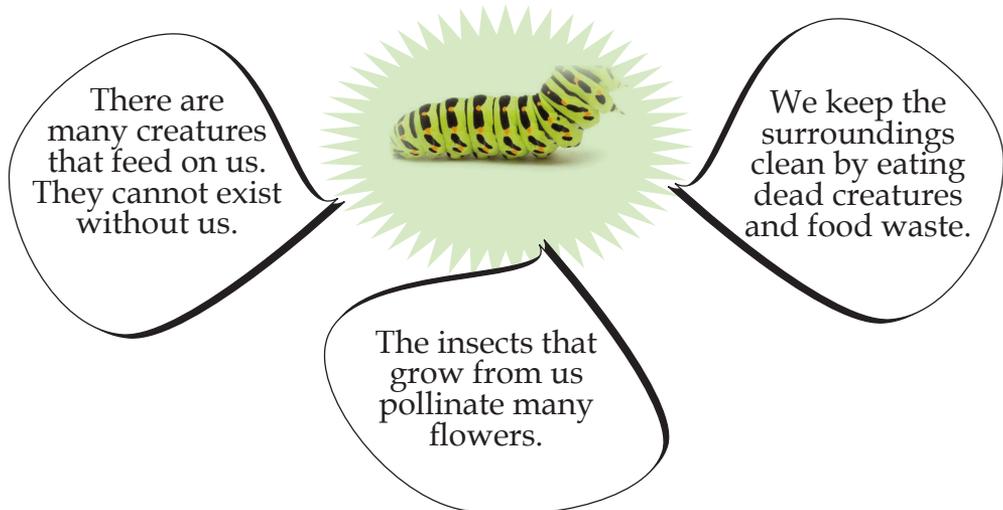
Clove

Cinnamon

We often keep some spices, along with grains when they are stored. Why?

The chemicals produced by the plants to protect themselves from pests make them aromatic spices.

Do worms cause harm only? Listen to what they are saying.



Picture 8.6

Prepare a short note focussing the importance of insects for the balance of the ecosystem.





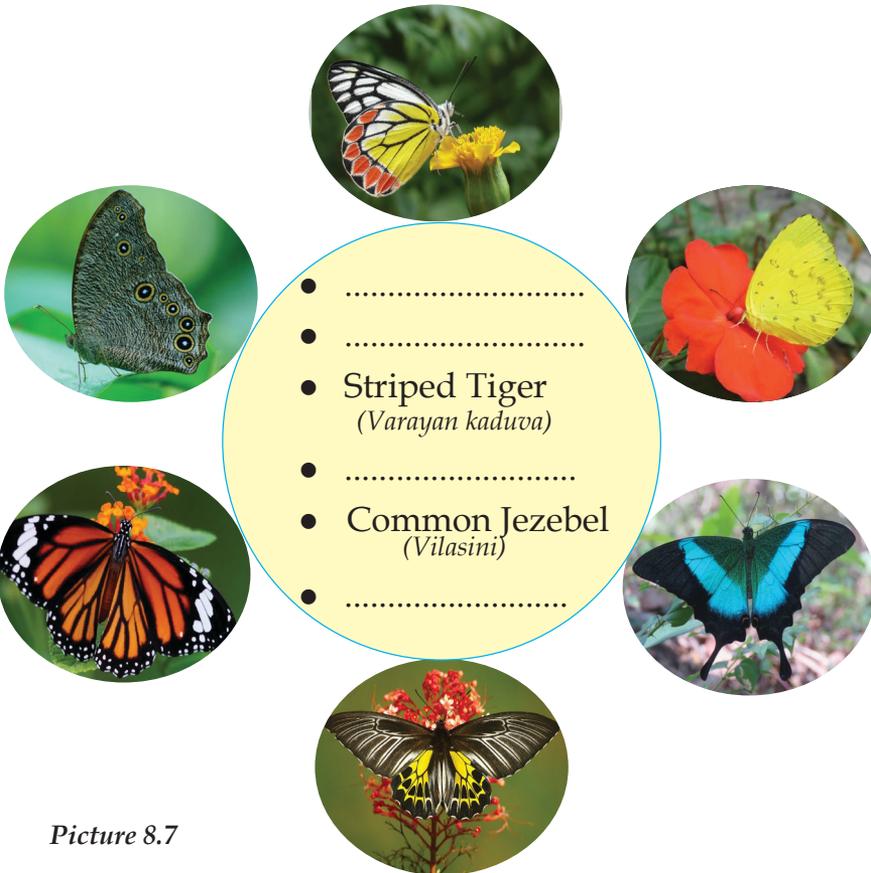
Small Insects as Food

People in many parts of the world use insects like grasshoppers, worms, beetles, scorpions and ants for food. Small insects are a good source of proteins and vitamins. They are also kept for food in some areas because of the availability of low cost protein.

Colourful Insects

Butterflies are a group of the insect family. How many names of butterflies found in our area are known to you?

Observe the pictures and identify the butterflies.



Picture 8.7

Collect more pictures of butterflies and make an album. Write down their characteristics.



Some butterflies lay eggs on particular plants. The parts of these plants are the food of the butterfly larvae.

Look at the names of some of the butterflies found in our area.

Naraka Salabham (Lime butterfly), *Arali Salabham* (Common crow),
Vellila Thozhi (The Commander), *Erukku Thappi* (Plain Tiger).

Why are these butterflies named so? Discuss.

Find more examples and write in your Science Diary.

For the survival of butterflies both nectar plants and host plants are necessary. Butterflies get nectar from the nectar plants. The larvae feed on the host plants. A butterfly garden is a garden with both these kinds of plants.

Grow a butterfly garden in your school.

Moths



Picture 8.8

During which time do we see butterflies? Do we see them at night? What are their features?

They are Moths. Unlike butterflies, most of them are not colourful. Some moths have feather-like antennae. Silk is produced from the cocoon made by the larva of a kind of moth.



Blue Tiger Moth (*Venkana Neeli*)

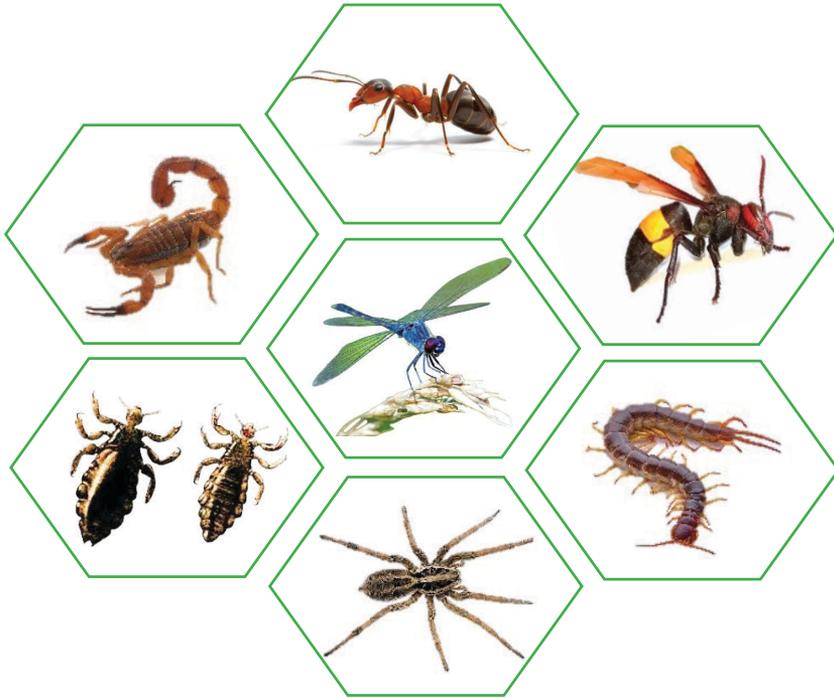


Blue tiger moth is a kind of blue coloured moth found during day time. They are mistaken for butterflies because of their blue colour. They are called Venkana Neeli because they lay eggs on the Carallia tree (Venkana tree). They satisfy all the features of moth except that they are seen during day time and have blue colour. So they are included in the moth family.

The World of Small Creatures

How many of the small creatures are familiar to you?

Write the names of the creatures given in the picture in your Science Diary.



Picture 8.9

Ants are small creatures mostly found everywhere in our surroundings. Are all ants of the same kind?

How many types of ants do you know? Write down their names.

- ◆ Yellow crazy ant (*chonan urumb*)

◆

◆

Division of Labour

Ants are small creatures living as a community. Different types of ants can be found in a colony of ants, performing the tasks of laying eggs, collecting food and protecting from enemies.



Winged Ants



Illustration 8.2

Have you seen winged ants? When do the wings grow?

Male and female ants that perform the reproductive function come out of their colonies with wings. They mate with male and female ants from another colony and form new colonies.

Let's Observe Ants

Shall we observe ants in our surroundings? What can be observed?

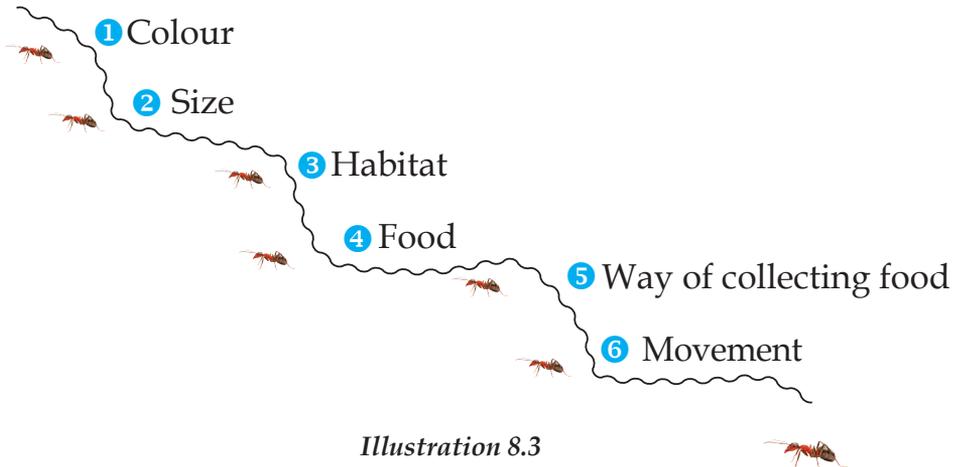


Illustration 8.3

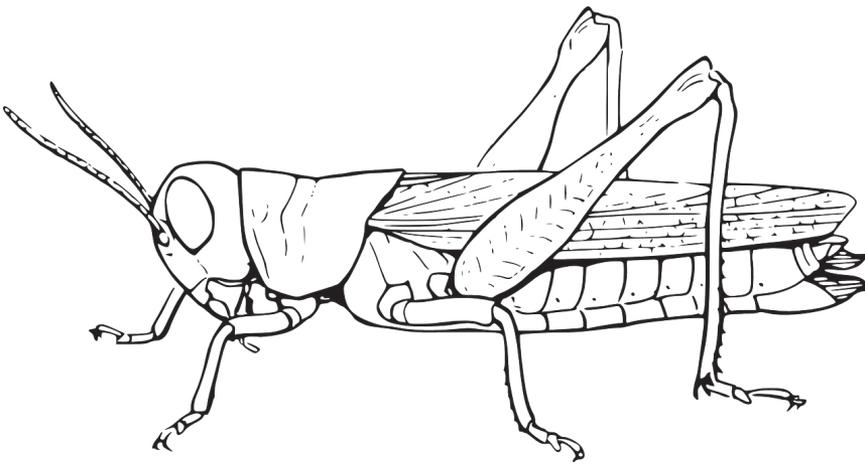
Prepare a booklet with your findings.

How many other small creatures do you know that live as a community?

- ◆ Termites
- ◆
- ◆
- ◆

The Body of Insects

Observe the body parts such as antennae, legs, wings and eyes of the insects.



Picture 8.10

What are the characteristics of these body parts?

Do other insects also have these characteristics?

Present your findings as a seminar.

Fishes

You have learned the adaptations of fish for aquatic life, haven't you? What are they?

Offsprings of fish are hatched from eggs.

In which months do fish lay eggs in our area?

Why is there a ban on trolling on the Keralam coast in June and July? Discuss with your friends and present the conclusions in the class.





Floodplain breeding run (Oothakayattam)

The migration of the fishes in large numbers to water bodies such as streams, fields, small lakes and backwaters for breeding during the monsoon in the month of June is known as floodplain breeding run. Catching fish during this period will reduce the stock of fishes. Fishing during this period is illegal.

Some fishes hatch their eggs inside their body.

Find out and write examples for such fishes.

- ◆ Shark
- ◆
- ◆

The fishes in the picture are familiar to you, aren't they? Compare their habitats and prepare a note.



Mushi



Sardine

Picture 8.11

Amphibians

Look, there are many fish in our water lily pond.

They are not fish, they are tadpoles.



Illustration 8.4

Observe the life cycle of a frog.

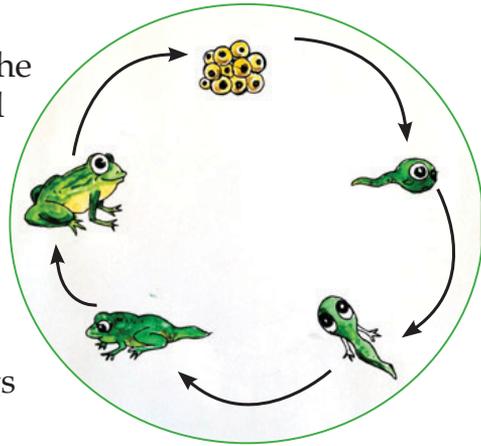
You can see many changes that the tadpole undergoes to attain full growth and become a frog.

What are the adaptations that the tadpoles have for living in water?

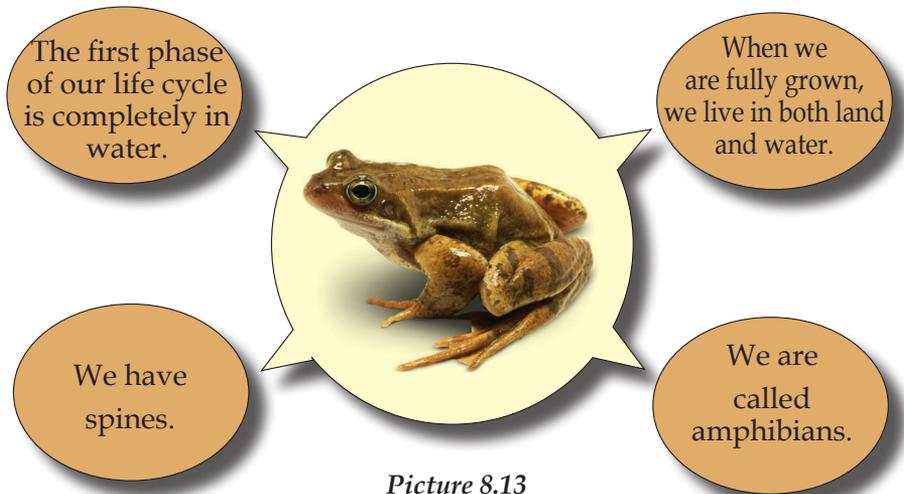
How do they breathe?

Discuss and record your findings in your Science Diary.

Listen to what the frog says.



Picture 8.12



Picture 8.13

Attempt to define amphibians.

Caecilians

Caecilians are another type of amphibians found in Keralam. They are also known as Blind Snakes (*Kurudi*). Their eyes are covered with transparent skin. They are often mistaken for snakes.



Picture 8.14



Reptiles



Picture 8.15

Look at the pictures of some of the creatures found in our area. Try to identify them.

What are the common characteristics of these creatures?

- ◆ Produce offspring from eggs.
- ◆

Snakes

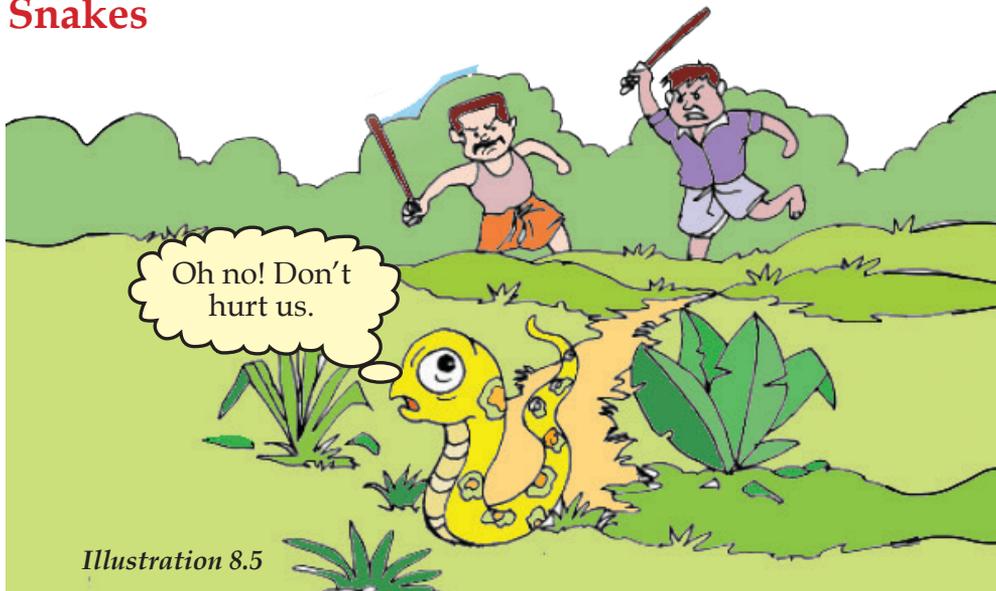


Illustration 8.5

Snakes belong to the reptile family. Do you know the names of snakes found in your area. Write their names.

- ◆ Viper
- ◆
- ◆

Are all the snakes venomous? Which are the non-venomous ones?

- Rat snake
- ◆

Venomous Snakes

Check out the indicators to identify common venomous snakes found in Keralam.



Cobra

- Expandable hood.
- Two interconnected rings at the back of the hood.
- Two wide bands across and below the neck.

Picture 8.16

King Cobra

- ^ mark visible on the hood.
- Length up to 5 metres.
- Bands in front of the body.
- Dark black colour of the tail.



Picture 8.17



Common krait

Visible white bands across the body.
Deep black colour

Picture 8.18

Russell's Viper

- Large triangle shaped head.
- Chain like ovals on the body.



Picture 8.19



Beaked Seasnake

- The tail is broad and shaped like an oar.
- Dark rings on the body.

Picture 8.20



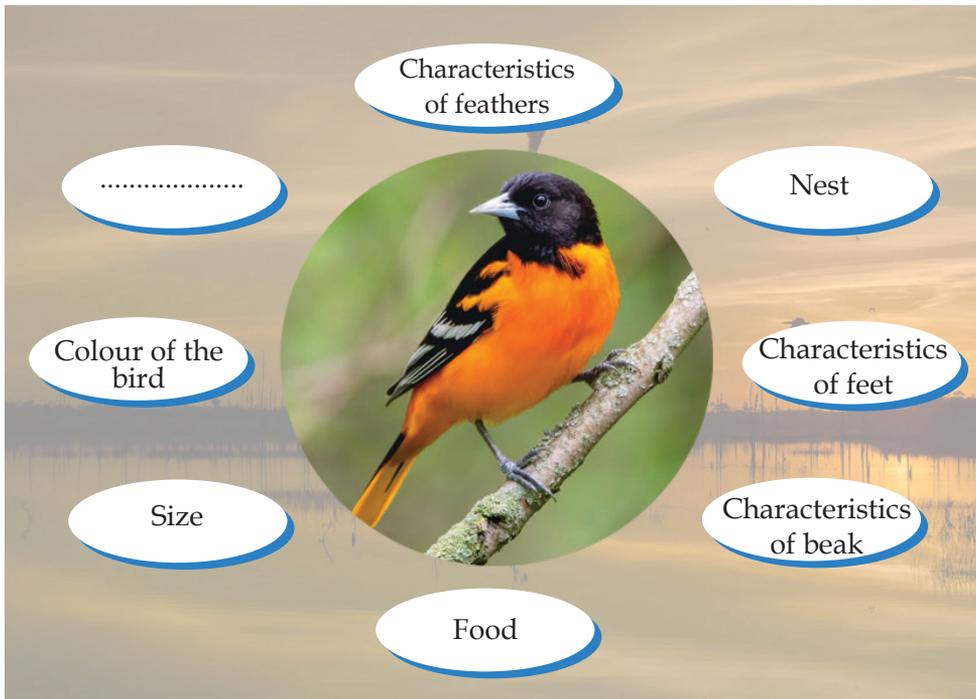
*Most of the snakes are non-venomous.
Only five species of snakes found in Keralam
are venomous.*

In Case of Snake Bite

- Do not injure the bite site or try to suck out the venom.
 - Don't panic the bitten person. Console and help them stay calm.
 - The bitten person should be taken to hospital immediately.
- Discuss the ecological importance of snakes and prepare a note.

Feathered Friends

Haven't you learned about the characteristics of birds? How many birds can you identify? Try to list them. Observe any five birds in your neighbourhood and write about them in your Science Diary. What are the things to observe?



Picture 8.21

Mammals

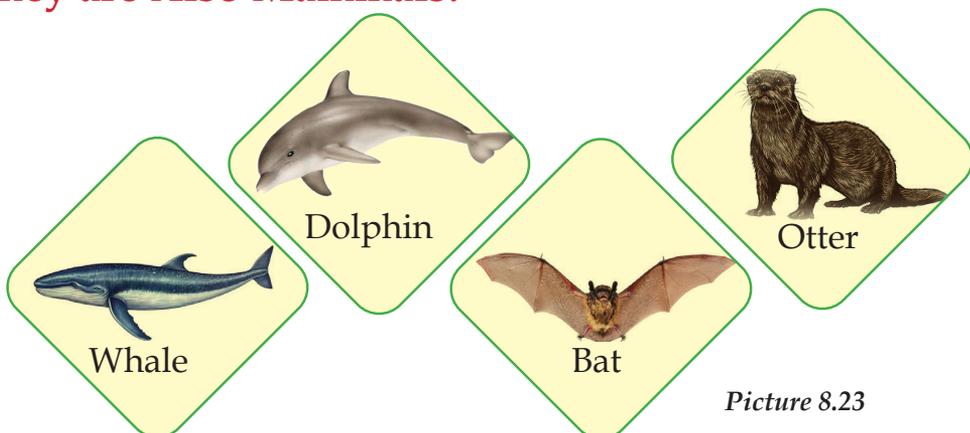


Picture 8.22

- ◆ Have pinna
- ◆
- ◆

Mammals are creatures that give birth and feed milk to their offspring.

They are Also Mammals!



Picture 8.23

Discuss their characteristics and prepare a note.



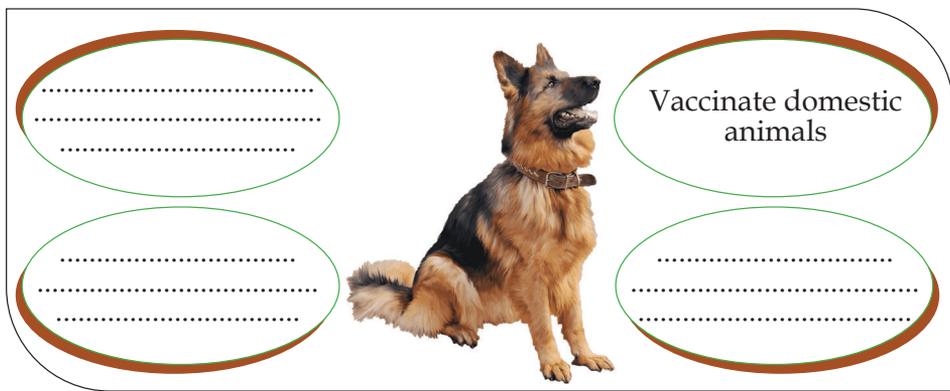
Some mammals are domestic animals. For what purposes do we keep them?

- ◆ For meat
- ◆
- ◆

Even though domestic animals are helpful to us, sometimes humans get diseases from them. Find out and list such diseases.

- ◆ Rabies
- ◆
- ◆

What precautions should we take while interacting with domestic animals?



Picture 8.24

Fishes, amphibians, reptiles, birds and mammals have spines.

Extinct Creatures

Many creatures that existed once on Earth have become extinct due to various reasons. The causes of their extinction such as extreme cold, drought, meteorite fall, epidemics and volcanic eruption are not under human control. However by destroying their habitats humans also play a major role in the extinction of creatures.



What are the human activities that destroy the living conditions of creatures? Are these activities happening around you? Discuss. Restoration of habitats is our responsibility. What could be done for this? Present your suggestions.

Get familiar with some of the endangered creatures of Kerala. Find more examples.



Tiger spider



Fungoid frog



Indian pangolin

Picture 8.25

Creatures and Superstitions

Look at the creatures in the picture.



Barn owl



Western blind snake



Indian star tortoise



Serpent

Picture 8.26

There are many misconceptions about these creatures. What problems do such misconceptions create?

- Financial exploitation
- Extinction of creatures
-

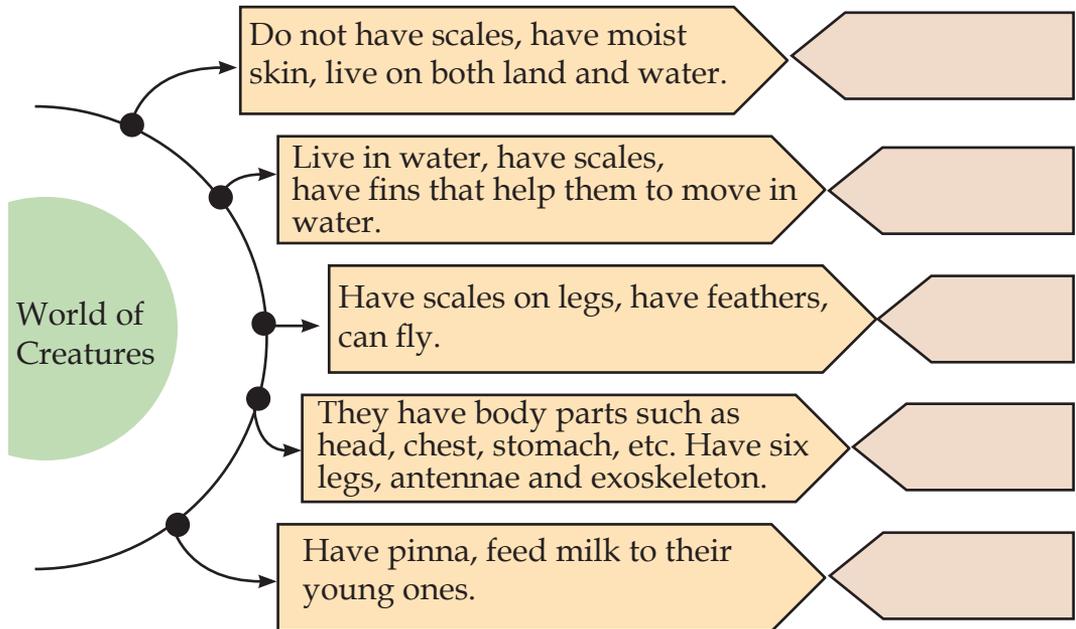
Organise a seminar on this topic in the class.





Let's assess.....

1. Which all creatures that have the following characteristics are found around you?



2. You have studied the characteristics of fishes, amphibians and reptiles. Compare these creatures based on the following characteristics.

Creature	Characteristics			
	Skin	Breathing	Habitat	Eggs and offspring
Fish				
Amphibian				
Reptile				



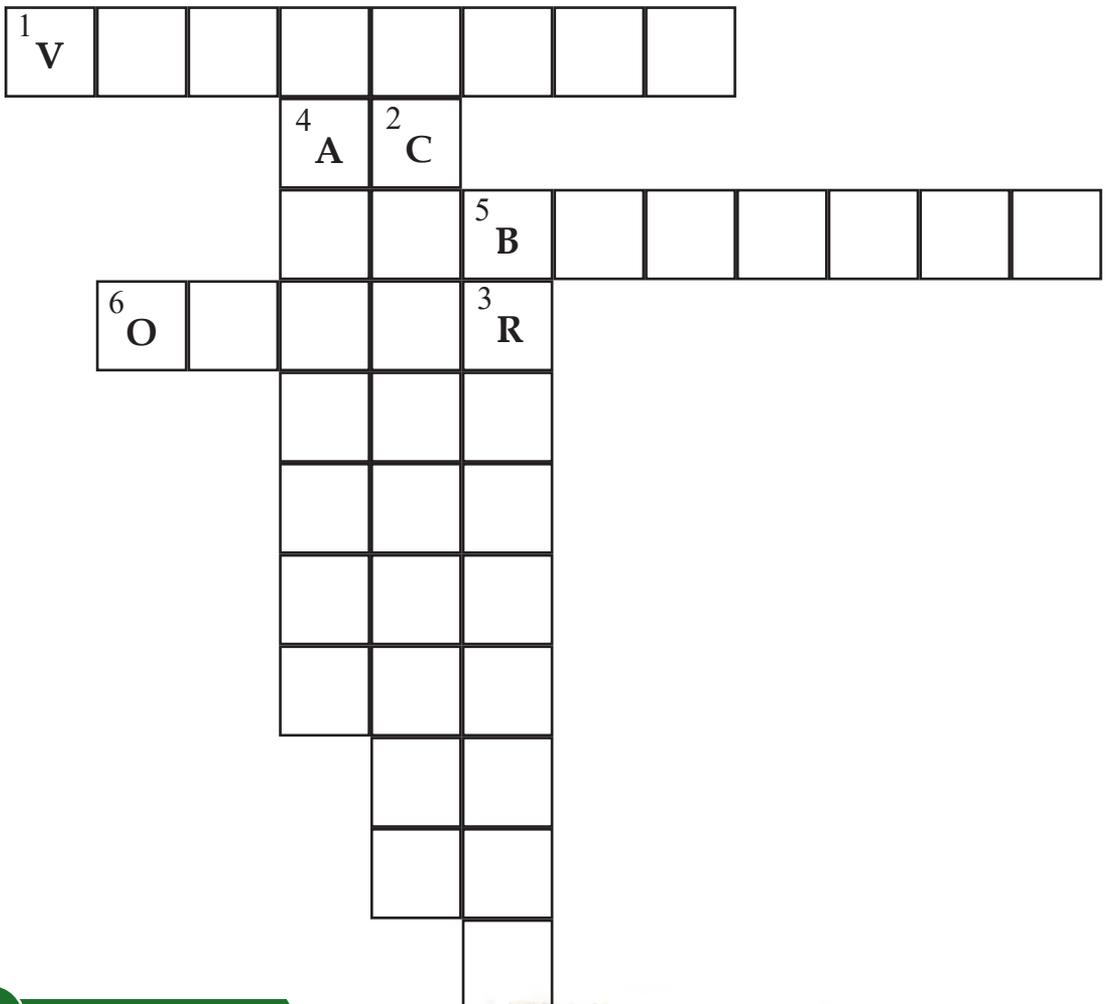
3. Complete the crossword puzzle.

To the right

1. A Butterfly found in our area.
5. A nocturnal bird.
6. A freshwater mammal.

Downward

2. An amphibian that looks like an earthworm or a snake.
3. The category of creatures which lizards, snakes and tortoises belong to.
4. The larva of an insect.





Extended activities

1. Some birds come to our area from distant lands. Collect and record the following information about these types of birds.

Name of the bird	The months they are found in Keralam	Place where they come from	Reason for the migration

2. Prepare a digital presentation for a seminar on 'Butterfly diversity in my area' including details and pictures.



Notes

A series of horizontal dotted lines for writing notes.

CONSTITUTION OF INDIA

Part IV A

FUNDAMENTAL DUTIES OF CITIZENS

ARTICLE 51 A

Fundamental Duties- It shall be the duty of every citizen of India:

- (a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
- (b) to cherish and follow the noble ideals which inspired our national struggle for freedom;
- (c) to uphold and protect the sovereignty, unity and integrity of India;
- (d) to defend the country and render national service when called upon to do so;
- (e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;
- (f) to value and preserve the rich heritage of our composite culture;
- (g) to protect and improve the natural environment including forests, lakes, rivers, wild life and to have compassion for living creatures;
- (h) to develop the scientific temper, humanism and the spirit of inquiry and reform;
- (i) to safeguard public property and to abjure violence;
- (j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievements;
- (k) who is a parent or guardian to provide opportunities for education to his child or, as the case may be, ward between age of six and fourteen years.

CHILDREN'S RIGHTS

Dear Children,

Wouldn't you like to know about your rights? Awareness about your rights will inspire and motivate you to ensure your protection and participation, thereby making social justice a reality. You may know that a commission for child rights is functioning in our state called the **Kerala State Commission for Protection of Child Rights**.

Let's see what your rights are:

- Right to freedom of speech and expression.
- Right to life and liberty.
- Right to maximum survival and development.
- Right to be respected and accepted regardless of caste, creed and colour.
- Right to protection and care against physical, mental and sexual abuse.
- Right to participation.
- Protection from child labour and hazardous work.
- Protection against child marriage.
- Right to know one's culture and live accordingly.
- Protection against neglect.
- Right to free and compulsory education.
- Right to learn, rest and leisure.
- Right to parental and societal care, and protection.

Major Responsibilities

- Protect school and public facilities.
- Observe punctuality in learning and activities of the school.
- Accept and respect school authorities, teachers, parents and fellow students.
- Readiness to accept and respect others regardless of caste, creed or colour.



Contact Address:

Kerala State Commission for Protection of Child Rights

'Sree Ganesh', T. C. 14/2036, Vanross Junction

Kerala University P. O., Thiruvananthapuram - 34, Phone : 0471 - 2326603

Email: childrights.cpcr@kerala.gov.in, rte.cpcr@kerala.gov.in

Website : www.kescpcr.kerala.gov.in

Child Helpline - 1098, Crime Stopper - 1090, Nirbhaya - 1800 425 1400

Kerala Police Helpline - 0471 - 3243000/44000/45000

Online R. T. E Monitoring : www.nireekshana.org.in