1 Reproduction in Plants

Let's Begin

Like animals, plants also reproduce to make their own kind but the mode of their reproduction differs from the animals. Let's study the ways of reproduction in plants in detail.

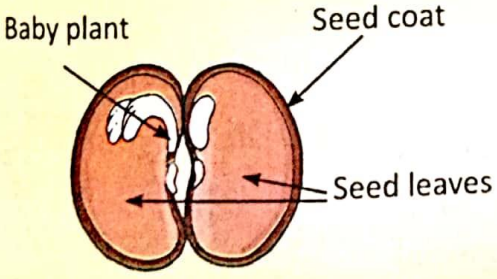
Ways of Reproduction in Plants

Living organisms produce their own kind through a process called **reproduction**. Plants also increase in number through the process of reproduction.

Different plants reproduce in different ways. Most of the flowering plants produce seeds. Some plants also reproduce through their stems, leaves and roots.

Reproduction through seeds

When a seed gets the right amount of air, water, soil and sunlight, it grows into a plant. Fruits have seeds inside them. When a fruit dries up, the seeds inside it can be used to grow new plants of the same kind.

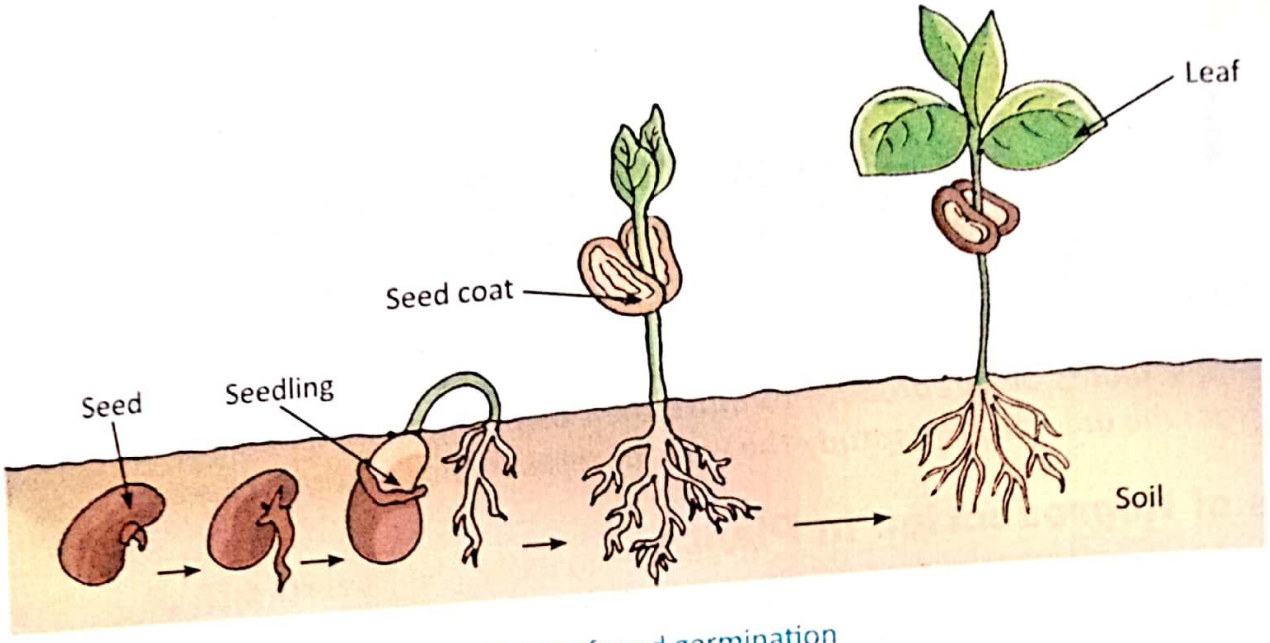


*Take one bean seed. Soak it in water for few hours. Remove the outer covering or the **seed coat**, which protects the baby plant. Break open the seed into two equal parts called **cotyledons** or **seed leaves**. These store food for the baby plant. Between the two cotyledons lies the **embryo** or the **baby plant**.*

Germination

The process by which a seed grows into a seedling or a baby plant is called **germination**.

A germinating seed needs air to breathe. It absorbs water through a minute hole that softens the seed coat. Water mixes with the stored food in the seed leaves to make food available to the baby plant. Sunlight gives the much needed warmth to help the seed grow into a new plant. So, a plant needs air, water and sunlight for germination. Many seeds do not get enough sunlight, water and air to grow. Some seeds are also eaten by birds, insects and other animals. Plants, therefore, produce many seeds so that at least a few of them survive and germinate into new plants.



Stages of seed germination

Fact!

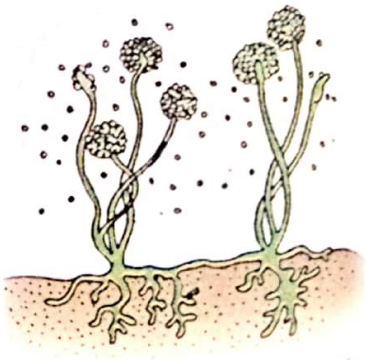
Some seeds like gram have two cotyledons and are called ***dicot seeds.*** *Whereas rice seeds have only one cotyledon. They are called* ***monocot seeds.***

Gram seeds

Rice seeds

Reproduction through spores

Non-flowering plants like ferns and mosses do not reproduce from seeds. They make spores. Each spore can grow into a new plant. Spores look like tiny dark-coloured dots. These plants have special structures which bear spores. When the spores burst, they scatter and germinate. Fungi such as bread moulds and mushrooms reproduce through spores.

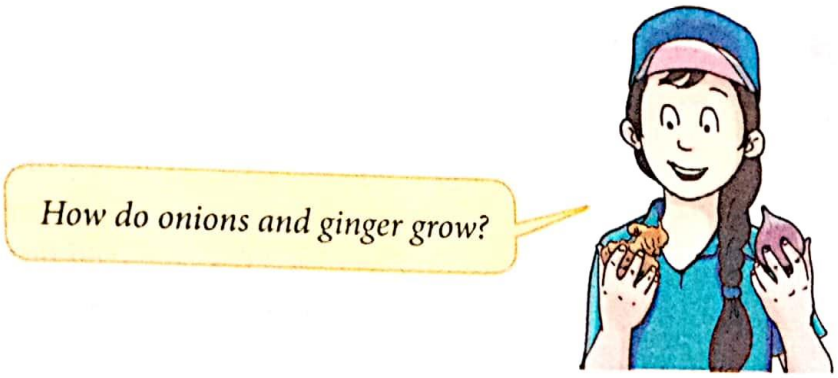


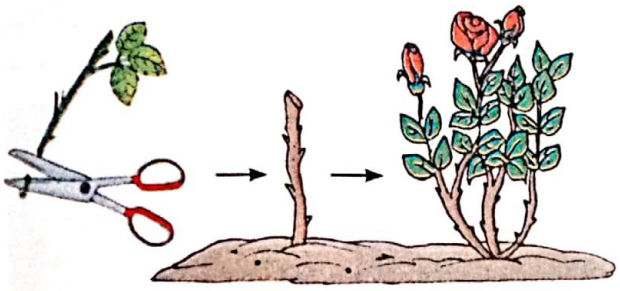
Spores of a bread mould

Sweet potato

Reproduction by body parts

Roots: Sweet potato, radish and carrot grow into new plants when replanted.





Rose plant grows by stem cutting

Stems: Some plants like potato are actually stems. They have buds called eyes that grow into new plants.

Rose, sugarcane and hibiscus also grow from stem cuttings. A length of stem is planted in the soil which grows into a new plant.

Leaves: Some leaves grow new plants from their edges. The new plants have their own leaves and roots. Plants like bryophyllum bear small seedlings on their leaves. These can be removed from the leaf and planted in the soil to get a new plant.

Leaf of bryophyllum

Dispersal of Seeds

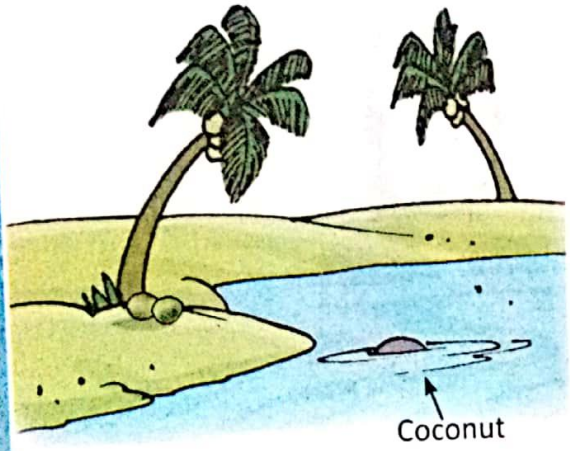
The process by which seeds and fruits are scattered away from the parent plant is called **dispersal of seeds**. Plants cannot move from one place to another. But if too many seeds are planted at the same place they would not be able to germinate or grow properly. Therefore, dispersal of seeds is necessary for the healthy growth and survival of plants.

Agents of dispersal

Seeds are scattered by different natural agents. These agents are mainly wind, water, animals and explosion of fruit. The special structures of certain seeds and fruits help to carry these to new and far away places.

Dispersal by wind: Light seeds are easily carried away by the wind only to be dropped down at some other distant place where they germinate. Seeds of cotton, hiptage, dandelion and madar have fine hair or wings that help them to get carried away by the wind.

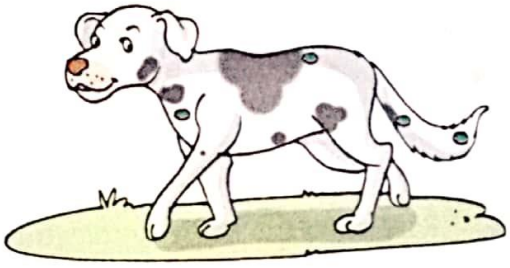
Seed dispersal by wind



Seed dispersal by water

Dispersal by water: The seeds of plants that grow in or near water bodies are generally dispersed by water. Water transports such seeds from one place to another. Lotus fruit is spongy and the coconut has a fibrous outer covering to make these easily float on water. These are taken to far off places by waves.

Dispersal by animals: Human beings, animals and birds eat fruits and throw away the seeds on the ground where they germinate. Some seeds like xanthium have hooks or spikes that stick to the hairy skin of animals and our clothes. They are carried away to different places. Some fruits like tomatoes, guavas and berries have small and edible seeds. These seeds remain undigested after being eaten and come out of the body. Such seeds also get dispersed to distant places.



Seed dispersal by animal

Seed dispersal by explosion of fruit

Dispersal by explosion of fruit: The fruits of some plants like peas, geranium, poppy, gorse pod and balsam burst when ripe. The force of the explosion helps to scatter the seeds in all directions.

Cultivation of Crops

Plants that are grown in a large area to provide food and other substances are called **crops**. The process of growing crops is called **cultivation**.

In India, we have two crop seasons – the summer crops are called **kharif crop** and the winter crops are called **rabi crops**.

Cultivation of crops

Fact!

Crops are of different types–food crops (like wheat), fibre crops (like cotton) and oil producing crops (like mustard).

Rice, jowar, bajra, jute, peanuts, maize and pulses are **kharif crops**. Some vegetables and fruits like onion, pumpkin, tomato, gourd, mango, litchi, melon and plum are also grown during summers.


Bajra


Maize


Tomato


Mango

Wheat, barley, gram, peas and mustard are **rabi crops**. Some fruits and vegetables like apple, banana, orange, spinach, radish, peas and cauliflower are also grown during winters.


Mustard

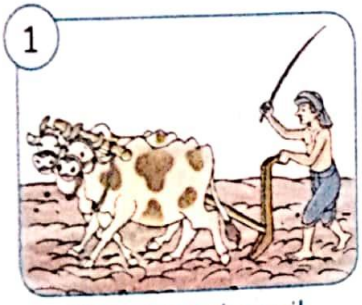

Gram


Banana


Cauliflower

There are different stages for cultivating crops. These are:

1


Ploughing the soil

2


Adding fertiliser and manure

3


Sowing the seeds

4


Proper irrigation

5


Spraying pesticides and insecticides

6


Removing weeds

7


Harvesting the crops

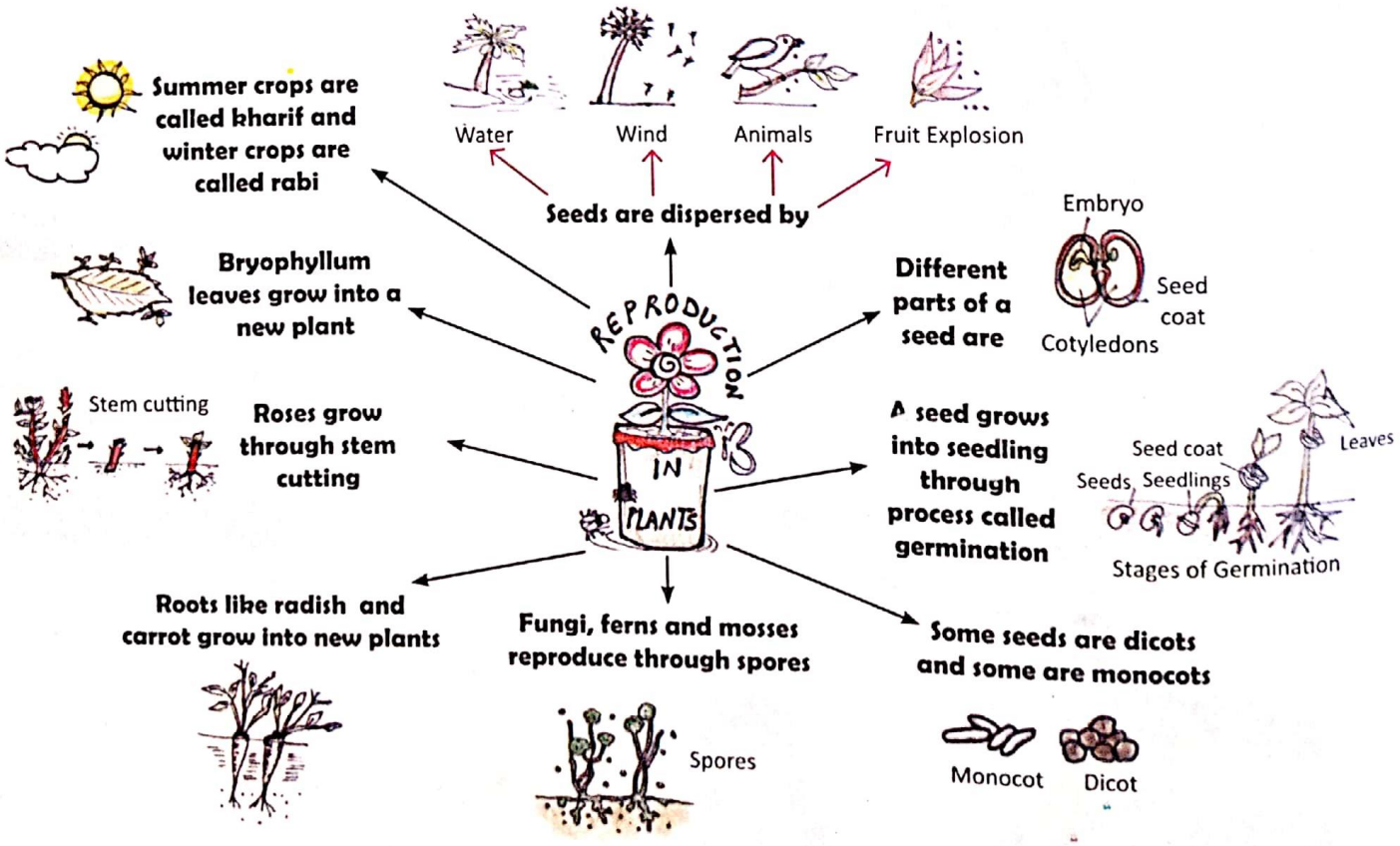
Healthy yield

Crops produce a better yield if they get proper care and attention. Here are some important ways to take care of crops and to enhance their quality:

1. The crops should be selected according to the particular type of soil in an area. For example, rice cannot grow in sandy soil as it needs a wet clayey soil.
2. Sufficient quantities of manure and the right type of fertilisers should be added regularly to the soil to keep it fertile.
3. Good quality seeds should be selected for sowing.
4. Proper irrigation facilities should be available in the field.
5. Crops should be protected from birds, insects and pests by spraying insecticides and pesticides.
6. Unwanted plants or weeds must be removed regularly.
7. Grains should be stored in air tight containers after harvesting. This will prevent them from getting spoiled due to moisture, and from rodents and birds as well.

Now We Know

(Mind Map)



KEYWORDS

reproduction	germination	cotyledon	seed coat	embryo	spores
growth	survival	dispersal	yield	irrigation	manure
fertiliser	insecticide	pesticide	fertile	cultivation	

EXERCISES

I. Tick (✓) against the correct option. (Multiple Choice Questions)

1. Air, water and sunlight help in the _____ of seeds.
   (a) irrigation ☐ (b) germination ☐ (c) sowing ☐
2. The process of growing crops is called:
   (a) germination ☐ (b) dispersal ☐ (c) cultivation ☐
3. _____ seeds have only one cotyledon.
   (a) Rice ☐ (b) Wheat ☐ (c) Gram ☐
4. The outer covering of a seed is called:
   (a) seed coat ☐ (b) cotyledons ☐ (c) embryo ☐
5. The baby plant is protected by:
   (a) seed leaves ☐ (b) seed coat ☐ (c) seedling ☐

II. Write 'T' for True and 'F' for False statements.

1. Rice is a rabi crop. _____
2. Good quality seeds should be selected for sowing. _____
3. Coconut seeds are dispersed by wind. _____
4. Bryophyllum leaves bear seedlings _____
5. Rose plant grows from stem cuttings. _____

III. Fill in the blanks using the words from the box.

1. Mushrooms reproduce through _____.
2. _____ and _____ are non-flowering plants.
3. _____ is a dicot seed.
4. The unwanted plants are called _____.
5. Seeds of _____ have wings for dispersal.

Ferns, dandelion, mosses, spores, Gram seed, weeds

IV. Circle the correct option.

1. (Bread moulds/Potatoes) grow from spores.
2. The fruits of (sugarcane/pea) plants burst open when ripe.
3. (Fern/Rose) is a non-flowering plant.
4. (Mustard/Mango) is an oil producing crop.
5. Xanthium seeds are dispersed by (water/animals).

V. Short answer questions.

1. Define germination.
2. What are the different ways by which plants reproduce?
3. What are spores? Name two plants that reproduce through spores.
4. Differentiate between monocot seeds and dicot seeds.
5. Name three things that a seed requires to germinate.
6. What are crops? Name the two kinds of crop.

VI. Long answer questions.

1. What do you understand by disperal of seeds? Describe the different ways of seed dispersal.
2. Explain the process of germination with the help of a diagram.
3. Differentiate between rabi crops and kharif crops.
4. Describe the structure of a bean seed with the help of a diagram.
5. How do plants reproduce through stems and leaves?

VII. Think and Answer.

What would happen and why?

- If fertilisers and manure is not added to the soil during cultivation.
- If proper irrigation is not provided.
- If weeds are not removed.

Let's Do More

Experiment

Perform the following experiment with the help of the given steps:

1. Take some kidney beans (*rajma*) seeds, cotton wool, four transparent bowls and some water.

2. Put some cotton and kidney beans in each bowl.
3. Pour some water in the first bowl and keep it in the sunlight. Keep the second bowl with some water in a dark room, the third one without water in the sunlight and the fourth one without water in a dark room or a cupboard.
4. Observe the bowls for 2-3 days.

Draw the pictures of the four bowls and write your observations.

1.

2.

3.

4.

Group Discussion

In a group of four, discuss how the food you eat reaches to your home from the farm. Create a thank you card, thanking each and every person involved in this process from farmers to shopkeepers.

LIFE SKILLS

Some seeds are a good source of nutrients. With the help of your elders, sprout moong dal. Add sliced tomatoes, onions and cucumbers in it along with some lemon juice and salt. It is very good for health.

2 Life of Animals

Let's Begin

Different animals have different body features to carry out their life process. Their distinct body features help them survive even in drastic environmental conditions. Let's study the life of animals in detail.

Habitat

Animals live at different places on the earth. The place where they live, feed and reproduce is known as their natural **habitat**. Different animals have different kinds of habitats like the sea, pond, forest, mountain, desert, polar region and the plains.

Animals are classified as **terrestrial** (living on land), **aquatic** (living in the water), **amphibian** (living both on land and water), **arboreal** (living on trees) and **aerial** (flying in the air) on the basis of their natural habitats.

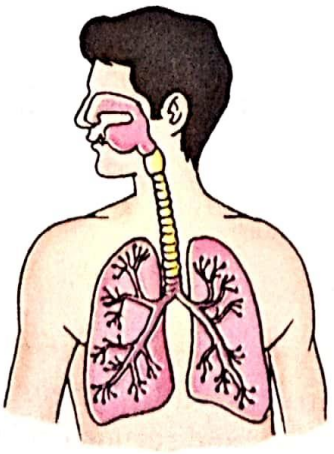
Body Features

For surviving in special environmental conditions, animals have different body features.

Breathing Methods

All animals breathe in oxygen but they take it differently.

Lungs: Human beings take in oxygen through their nose to the windpipe and then into the lungs. The lungs are abundantly supplied with blood vessels. When the air reaches the lungs, exchange of gases takes place. The oxygen in the air passes into the blood and the used carbon dioxide passes out through the nose. Birds, reptiles and mammals have lungs to breathe.

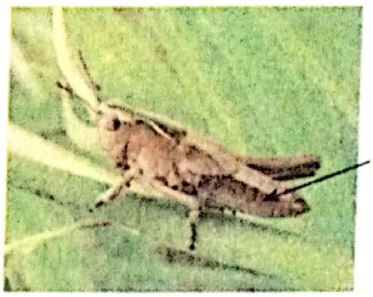


Human respiratory system

Fact!

A special substance called haemoglobin helps to carry fresh oxygen through the blood to all body parts.

Spiracles: Insects like grasshoppers breathe through air holes on their body called spiracles. The spiracles lead to air tubes which form a fine network that reaches every tissue of the body. Air enters the body through this network of air tubes.



Grasshopper

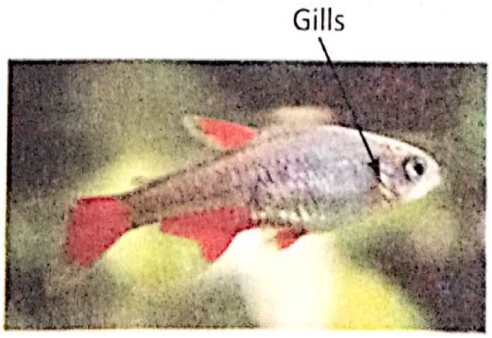
Fact!

Frogs breathe through their skin when in water. On land, they breathe through their lungs. Tadpoles breathe through their gills.

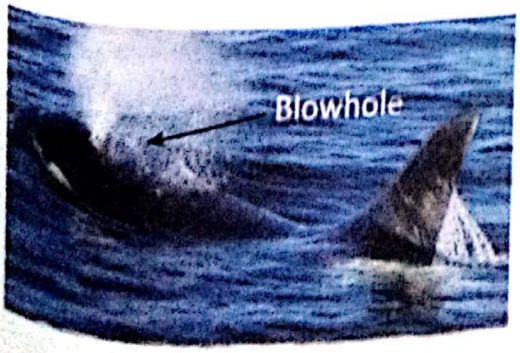

Earthworm

Skin: Some animals like the earthworms, breathe through their skin.

Gills: Water animals breathe through their gills. Gills are thin and flat organs richly supplied with blood vessels. When water flows over the gills, exchange of gases takes place. The gills absorb oxygen from the water and release carbon dioxide from blood.



Fish



Whale

Although dolphins and whales are also aquatic animals, they breathe through their lungs. They come up to the surface of the water for breathing. The blowholes on their bodies help them in the exchange of gases.

Movement

Animals need to move from one place to another in search of food, shelter and also to protect themselves from predators.

Most **terrestrial animals** have four limbs. The front limbs are called forelimbs and the back limbs are called hindlimbs.

Humans use their hindlimbs to walk and forelimbs to hold objects.

Animals like horses, tigers, dogs as well as most of the other animals use all the four limbs to move. Kangaroos make use of their hindlimbs to hop.

Kangaroo

Snake

Lizards and crocodiles are **reptiles**. They have four short legs to crawl on ground. Snakes are also reptiles. Instead of legs, they have scales on their bodies. These are attached to their ribs. Snakes move because of their strong muscles and ribs.

Bats are flying **mammals**. The skin from their body stretches to join forelimbs, forming wings.

Bat

Turtle

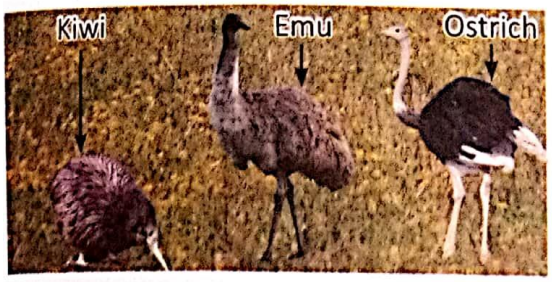
Aquatic animals like fish use their fins to move forward. Turtles have four paddle-like limbs to push water and move forward. Penguins use the two flippers to push the water and move. Ducks have webbed feet to swim in water.

Insects have six legs to crawl and jump. Ants and cockroaches crawl on their legs. Grasshoppers use their long hind limbs to hop. Some insects like butterflies have wings which help them to fly.

Butterfly

Birds have wings to fly. The forelimbs of birds are in the form of wings which help them to fly. The hindlimbs are used for walking, hopping and running as well as for clinging to something. The wings are attached to the breastbone of their body with the help of strong muscles. These muscles help the birds to flap their wings and fly. Birds have hollow bones which makes their body light for flying.

Bird



Flightless birds

Though all birds have wings, some cannot fly as their wings are too weak for flying. Emu, ostrich, kiwi and penguin are flightless birds. An ostrich has very strong legs and can run very fast.

Ways of protection

Some animals have special ways of protecting themselves.

- A chameleon changes its colour to merge with the colour of its surroundings.

Chameleon

Polar bear

- The white fur of the polar bear helps it to merge with the snow surrounding it.

Fact!

Many animals disguise themselves to hide. This ability is called ***camouflage.***

Stick insect

- Some insects like the stick insect, disguise themselves as thorn, leave or stick to save itself in times of danger.
- Insects and fish produce millions of eggs. So that atleast some of them survive and reach adulthood.

- Many animals like the elephant and fish live together in groups and protect their young ones.

Herd of elephants

School of fish

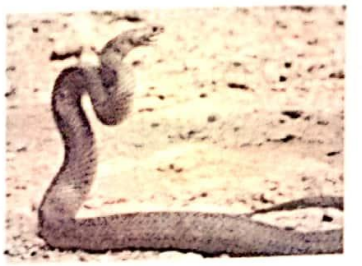
Puffing toad

- A puffing toad puffs itself up to look bigger and frightful. The enemy is put off by its size and awful look.

- A rhinoceros has sharp pointed horns for its protection.
- A porcupine uses its needle-like spines called quills to protect itself from its enemies.
- Snakes have poisonous bites to protect themselves from their enemies.

Rhinoceros

Porcupine



Snake

- Tortoise and snail have a protective and hard outer covering called a shell to keep themselves safe from their enemies.

Tortoise

Snail

Fact!

The Arctic tern travels between the Arctic and Antarctic twice a year. Some terns fly nearly 15,000 km, yet many go even further.

Migration

Some animals move from one place to another in large groups at certain times of the year. This mass seasonal movement is called migration. Animals migrate to escape from the harsh weather conditions that prevail in a place. They also migrate in search of food and a place for breeding.

The Siberian crane is the most common migratory bird. It comes to India to breed during the not so cold Indian winter months because it is much warmer here compared to the harsh Siberian winter season.

Siberian crane

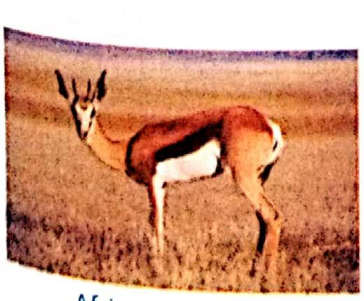
Olive Ridley turtle

Many Olive Ridley turtles migrate to the coast of Odisha to lay eggs.

What is hibernation? Can you name some animals which hibernate?

Monarch butterflies migrate from Canada to Mexico during the winter season.

Monarch butterfly

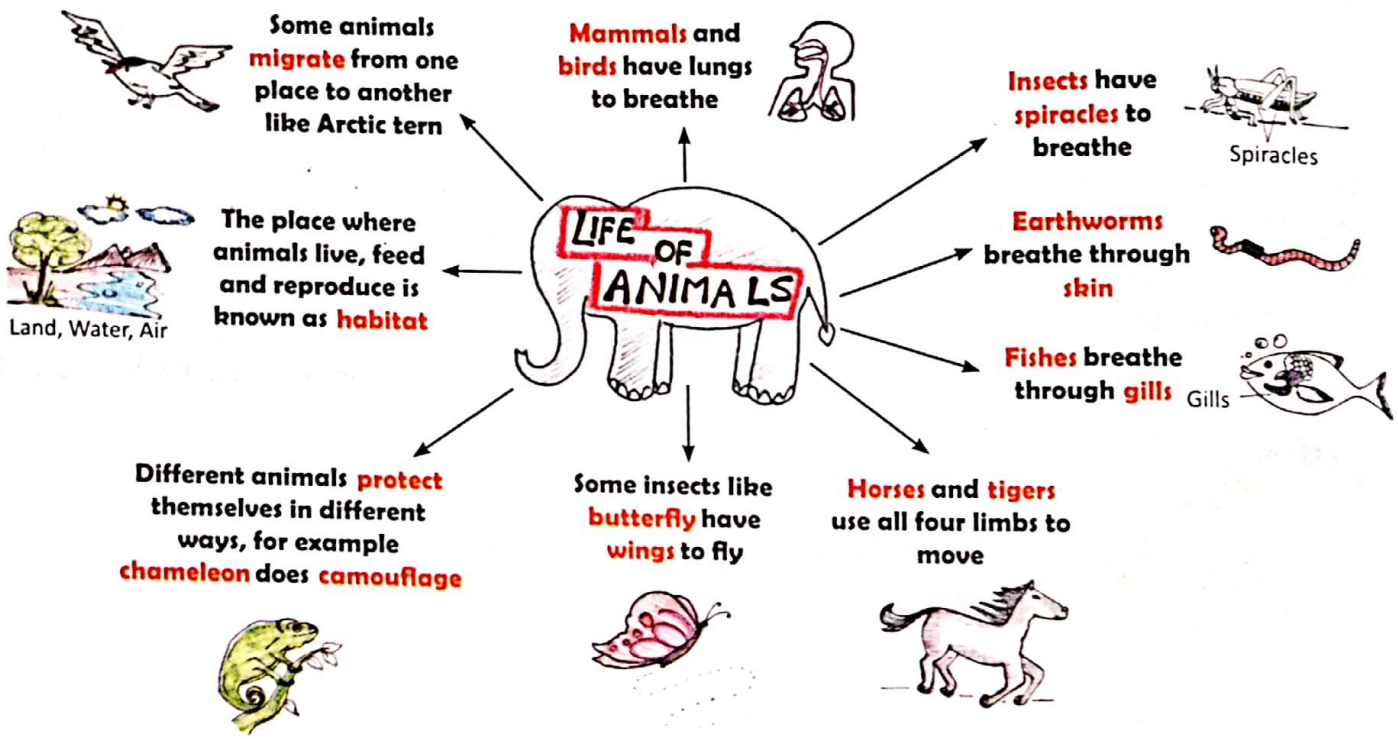


African antilope

African antelopes migrate in large groups to keep themselves safe during the summer season.

NOW WE KNOW

(Mind Map)



KEYWORDS

habitat	survive	haemoglobin	spiracle	limbs	camouflage
quills	lungs	gills	migration		

EXERCISES

I. Tick (✓) against the correct option. (Multiple Choice Questions)

1. A _____ puffs itself to look bigger.

   (a) toad ☐ (b) snake ☐ (c) whale ☐

2. An earthworm breathes through:

   (a) gills ☐ (b) skin ☐ (c) lungs ☐

3. _____ do not have legs.

   (a) Tigers ☐ (b) Grasshoppers ☐ (c) Snakes ☐

4. _____ migrate from Canada to Mexico during winter season.

   (a) Orangutans ☐ (b) Monarch butterflies ☐ (c) Rhinoceros ☐

5. In our body, haemoglobin helps to carry:
   (a) oxygen ☐ (b) nitrogen ☐ (c) carbon dioxide ☐

II. Write 'T' for True and 'F' for False statements.

1. A grasshopper breathes through its spiracles. _____
2. Stick insects can disguise themselves and be safe from enemies. _____
3. Emu, kiwi and ostrich are flightless birds. _____
4. Olive Ridley turtles migrate to lay eggs. _____
5. We take in carbon dioxide through our nose. _____

III. Fill in the blanks using the words from the box.

Haemoglobin, nose, gills, chameleon, Siberian crane

1. Humans breathe through the _____.
2. Tadpoles breathe through _____.
3. _____ helps to carry oxygen in the blood.
4. _____ is the most common migratory bird in India.
5. A _____ changes its colour to merge with the colour of its surroundings.

IV. Short answer questions.

1. What is a habitat?
2. Name a few reptiles. How do they move?
3. How do gills work?
4. Define migration.
5. What do you mean by the term camouflage?
6. Name any three breathing organs in animals.

V. Long answer questions.

1. Describe the different body coverings of animals with examples.
2. Explain how animals are adapted to move in different ways.
3. Explain why do the following animals migrate?
   (a) Siberian crane (b) Olive Ridley turtle (c) Monarch butterfly
4. Discuss the special features present in birds that help them to fly.

VI. Think and Answer.

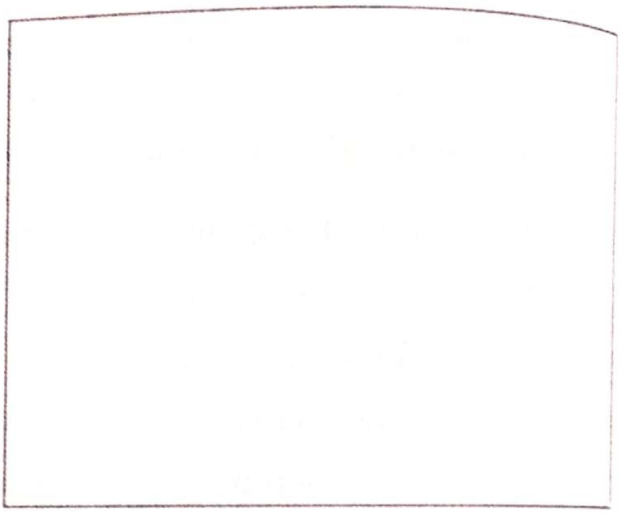
List five things we humans do to protect ourselves in different ways.

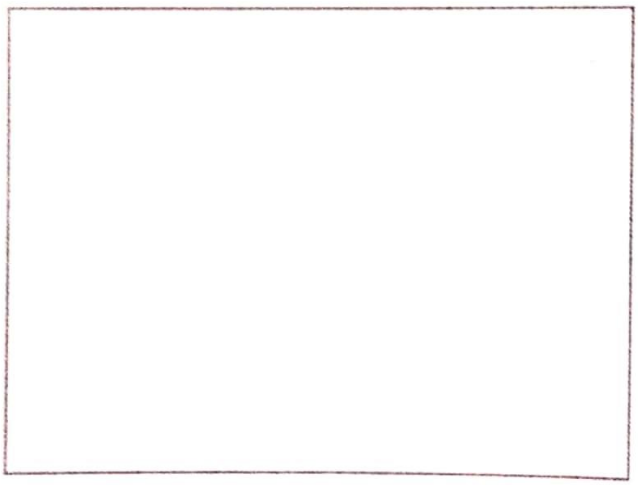
LET'S DO MORE

Puzzle

Identify these animals and paste or draw their picture in the given space.

I breathe through my lungs when I am on land and through the skin in water.
I am a _____.



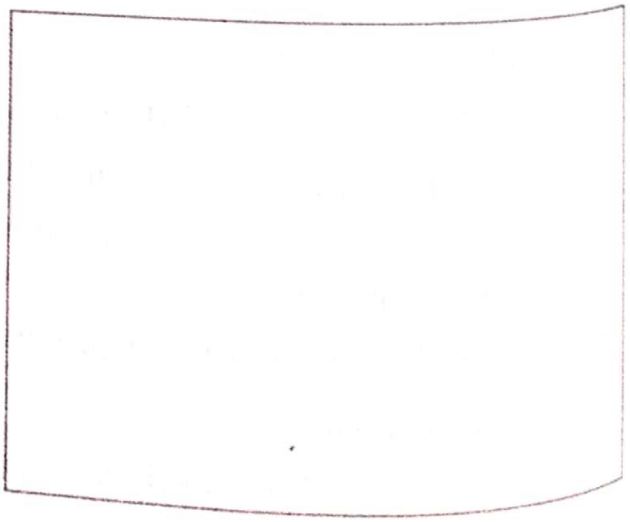


I am bright green in colour and have long hindlimbs to hop.

I am a _____.

I am a bird with wings and have long and strong legs to run.

I am an _____.



Explore

Identify these animals and fill the given table.

Animal	Breathing method	Habitat
		
		
		
		
		
		

LIFE SKILLS

Water pollution, especially at sea coasts and in rivers is harmful for aquatic animals. Many of these die due to polluted water. Spread awareness along with your friends to save the habitat of aquatic animals.