Chapter 1

Growing Plants

Just like animals, plants also grow and multiply in number. You must be aware that seeds are required to grow a new plant. But did you know that new plants can also grow from other parts like roots, stems and leaves? Let us study the various methods of growing new plants, one by one.

KNOW MORE

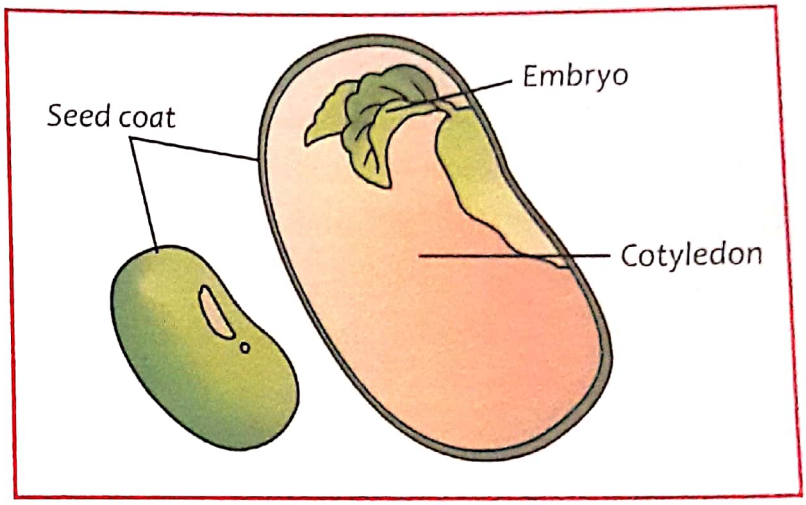
There are also some seeds which essentially require darkness to germinate.

Plant Growth From Seeds

Seeds, in plants, are generally found inside fruits.

Seed Structure

A bean seed is a typical example of seed. It has three mains parts: embryo, cotyledons and seed coat.



Structure of a seed

Embryo

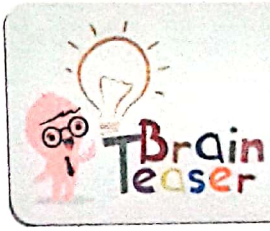
Embryo is the baby plant which grows into a seedling in the presence of favourable conditions.

Cotyledons

Cotyledons are the fleshy part of the seed that provide nourishment to the young plant until it is capable of manufacturing its own food. They are also known as **seed leaves**.

Seed Coat

Seed coat is a protective covering around the seed. It bursts open on absorbing water and allows the seed to germinate.



List the names of five plants that have edible seeds.

ACTIVE PAGE

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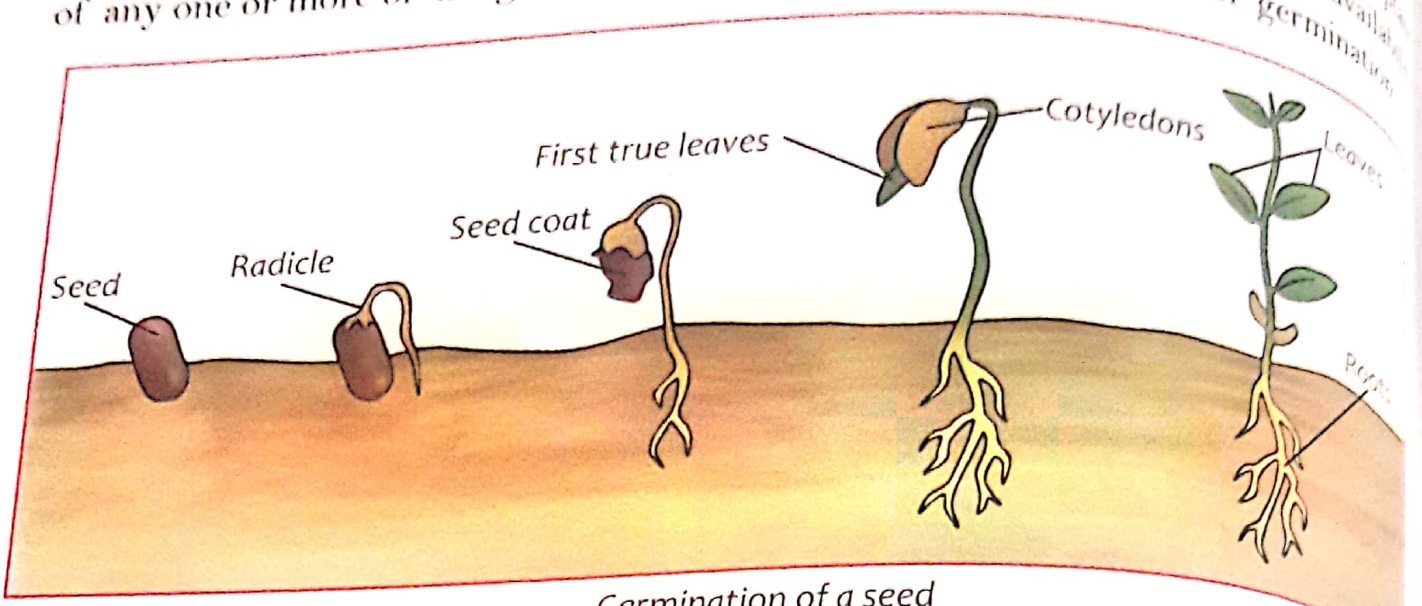
Seed Germination

Germination is the process by which a seed sprouts and develops into a new pl... Presence of air, water and sunlight is indispensable for a seed to germinate. Unavailab... of any one or more of the given conditions would lead to the failure of germinatio...



Germination of a seed

A seed in soil, when receives adequate amount of moisture, bursts open to release the embryo. It obtains nourishment from the cotyledons for as long as it does not develop into a young plant. It receives air and sunlight from the atmosphere.

Radicle is the first structure to emerge from the seed. It grows downwards and develops into the root system of the plant. The embryonic shoot system is called **plumule**. It grows upwards and forms stem, branches and leaves. The leaves grow above the ground. They make food for the plant in the presence of sunlight.

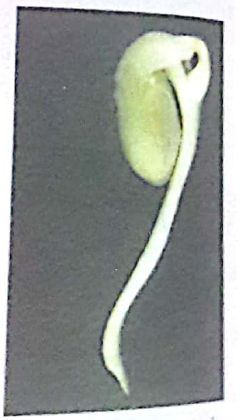
Of all the seeds produced by the plants, only some of them successfully germinate and form young plants. To increase the viability of their seeds, plants have adopted certain features to help in seed dispersal by various mediums.

Activity

Aim : To grow a plant from a seed

Need : A flower pot, pea seed, water, soil

Method : Prepare the flower pot by putting soil in it. Sow a pea seed in the pot and water it. Place the setup in sunlight and observe the seed germinate within the next 2-3 days. Water the young plant regularly. After a few days you can see that it grows and bears flowers.



Pea seed germination

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Seed Dispersal

The transportation of seeds away from their parent plant is called **dispersal**. There are various mediums for the dispersal of seeds.

Amazing Fact

The seeds of maple trees have developed a special mechanism, called helicopter mechanism, for their dispersal.

Wind

Seed dispersal by wind occurs in plants like dandelion and cottonweed. The seeds in such plants have wing-like structures or hair on them. They are also extremely light weight.

Water

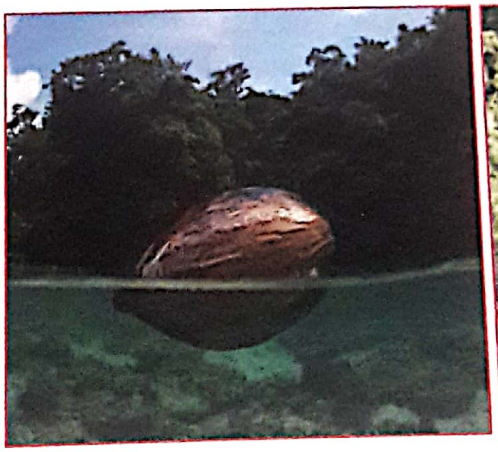
Water acts as a medium of seed dispersal in plants like coconut and lotus. The seeds of these plants have fibrous or spongy structure to provide buoyancy for floating. It also prevents them from harsh environmental conditions.

Animals

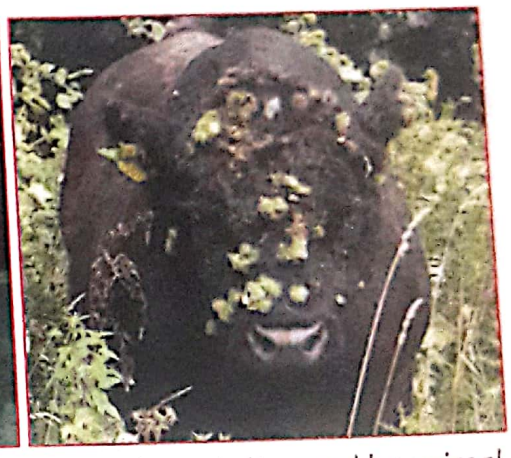
Seeds are also dispersed by the action of humans and animals. They eat fruits and throw away the seeds at random places. The seeds which find suitable conditions, germinate. Birds and squirrels also consume fruits and pass out seeds as undigested waste material in their droppings. This also helps in their dispersal.

Seeds of some plants like burdock and cocklebur have surface modifications like hooks, barbs, sticky hair or bristles to help them in sticking to the fur on the body of animals. The animals, in turn, disperse them to far off places.

Wind dispersal in dandelion



Water dispersal in coconut



Burdock seed dispersal by animal

Explosion

In some plants like pea and gorse, seeds are dispersed by explosion. When the seeds mature, their pod dries up and bursts open . It discharges the seeds in all directions with force.

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E. Answer the following questions in short.

1. What are the necessary conditions for a seed to germinate?
2. What is function of roots in a plant?
3. Give one example of vegetative propagation by –

   i. Roots ii. Stem iii. Leaves
4. How are seeds dispersed by explosion?
5. What is a farm?
6. Why are weeds and pests harmful for the crops?
7. What is terrace farming?

F. Answer the following questions in detail.

1. Explain the structure of seed with the help of a diagram.
2. How does the germination of seed take place? Draw a diagram in support of you answer.
3. Explain the steps of agriculture in detail.
4. What modifications do seeds have for dispersal by means of –

   i. Wind

   ii. Water

   iii. Animals
5. Write a short note on the two main farming seasons in India.

Do & Learn

llect a gram seed (soaked) and a corn seed. Remove their seed coat and observe the cotyledons they have.

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Quora Watch

A. Write 'T' for true and 'F' for false statements.

1. Seed coat is also known as seed leaves. _____
2. Germination of seed requires only water and sunlight. _____
3. Radicle grows into the root system of the young plant. _____
4. Water disperses the seeds of dandelion. _____
5. Pea seeds are dispersed by explosion of pea pod. _____
6. 'Eyes' of potato help in vegetative propagation. _____
7. The piece of land on which crops are grown is known as track. _____

B. Fill in the blanks.

1. Seed coat bursts open on absorbing _____.
2. A seed in soil receives air and sunlight from the _____.
3. _____ of carrot can germinate into a new plant.
4. Seeds dispersed by _____ are extremely light weight.
5. The person who practices agriculture as profession is called a _____.
6. Seeds that are sown should be _____ and _____ to ensure a good produce.

C. Match the following.

1. Embryo	a. Fibrous
2. Coconut seed	b. Leaf
3. Bryophyllum	c. Farm
4. Crops	d. Canals and tube wells
5. Irrigation	e. Seedling

D. Define the following terms.

1. Vegetative propagation
2. Germination
3. Seed dispersal
4. Agriculture

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Chapter 2

Animal Habitats and Adaptations

Habitat

Over 6.5 million species of animals are inhabitants of earth. All of them survive in a varied set of conditions. They can be found anywhere among land, air and water. The geographical area where an organism lives is called its habitat. It determines the living habits and physical features of animals. Forests, deserts, polar regions are the land habitats while oceans and freshwater bodies like lakes, ponds and rivers are the aquatic habitats.

Forests

Forests are the vast stretches of natural vegetation which provide home to a number of animals. Big animals like elephants, lions, tigers, deers, giraffes, etc., live on the forest floor. The trees give shelter to animals like monkeys, apes, koala, bats and also to the most varieties of birds. Animals like rabbits, snakes and hares live in burrows. Apart from these, millions of insects are also native to the forest habitat.

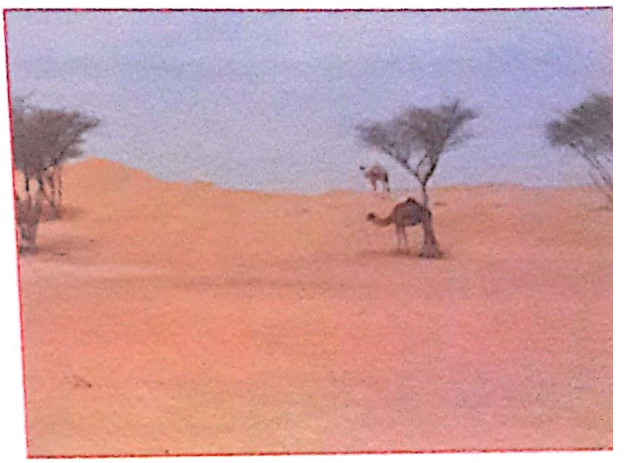
Forest habitat

KNOWMORE

Orangutan is the largest tree dwelling animal in the forest. It is often called the king of the trees.

Deserts

Deserts are the driest places on earth. Only a limited variety of animals can survive in such harsh climatic conditions. Camels, coyotes, scorpions, hedgehogs and rattle snakes are some of the animals which live in desert habitat. Due to extreme heat during the daytime, most animals prey at night. Camels have the ability to store food and can also survive without water for long



Desert habitat

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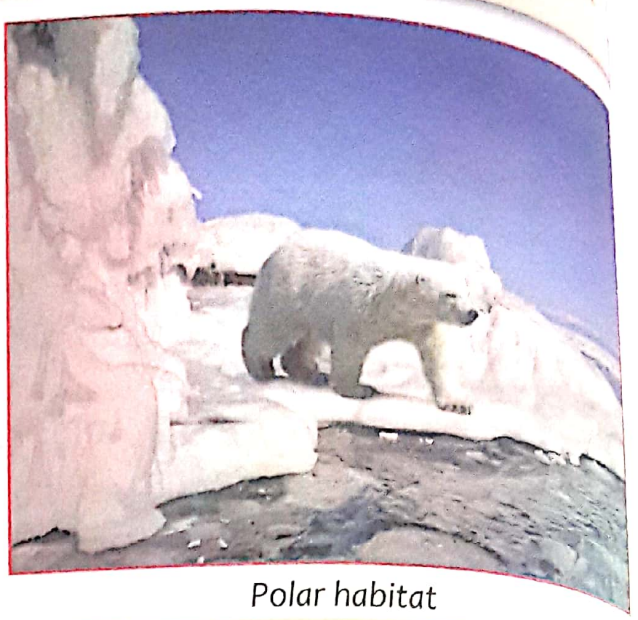
periods of time. They can even eat cactus as food. Animals living in deserts have thick skin to protect from heat.

KNOWMORE

Desert animals generally have a light sandy colour to reflect the sunlight and minimise heat absorption.

Polar Regions

Poles of the earth show another extreme of climate and are also challenging to survive in. They are permanently covered in ice and have very low temperatures throughout the year. Animal life is found on snow covered land and also in the sea. They live in groups and have fur on their bodies. They also have a thick layer of fat under the skin to protect from cold. Penguins, polar bears, walrus, arctic fox, etc., are found in the polar regions of the earth. Mountain animals like yak also show similar adaptations.



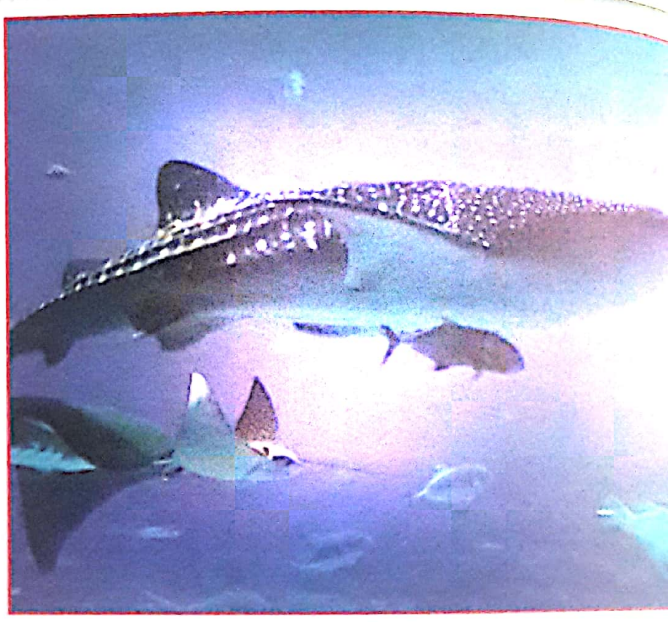
Polar habitat

KNOWMORE

The fur of the Arctic fox changes colour with the seasons. It is brown-grey in summers and changes to white during winters when it snows.

Oceans

Oceans are the vast water bodies of saline water covering over 71% of the earth's surface. They provide home to the widest range of organisms. Large animals like whales, sharks, dolphins and octopus co-exist with small animals like starfish, sea horse and sea turtles. Marine fauna is well adapted to breathe and survive under water.



Ocean habitat

KNOWMORE

Jellyfish are one of the oldest aquatic animals, they have been in existence from even before the time of dinosaurs.

Amazing Fact

Ocean water is salty because it has ions and minerals washed from the rocks on land.

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Freshwater Bodies

Rivers, lakes, ponds and streams are the freshwater bodies. They have minimal amount of dissolved salts in them. Freshwater organisms include fish, frogs, alligators, ducks, salamanders, turtles, etc. Some of them can also live on land. They are called reptiles.

Freshwater habitat

Adaptations in Animals

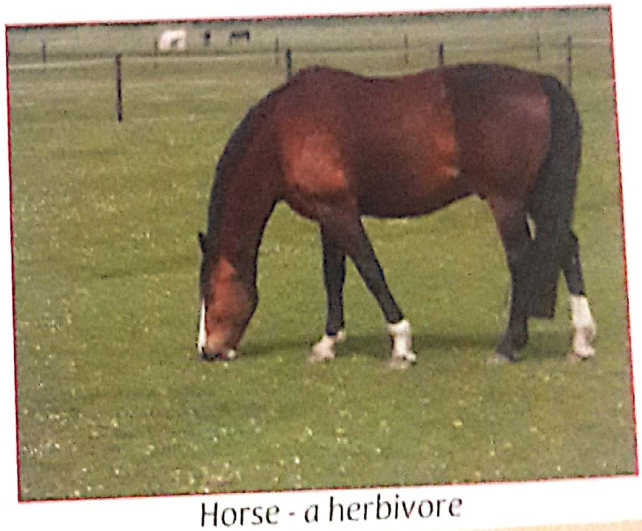
The animals living in a particular habitat have their bodies modified to make themselves compatible with their surroundings. This is called **adaptation**. Adaptations can be based on several features like feeding habits, breathing organs, body covering and movement.

Feeding Habits

Different animals live on different kinds of food. Some eat grass and plants while others eat flesh. Animals can be herbivorous, carnivorous, or omnivorous, based on their feeding habits.

Herbivores

Herbivores are the animals which eat only plants as their food. They have broad and flat molars and premolars to crush and grind plant matter. Their incisors are sharp to aid in grazing. Cattle animals can move their jaws sideways for better chewing. Their canines are reduced or non-existent because of their nil utility. Goat, cow, horse, rabbit and giraffe are some of the herbivores.



Horse - a herbivore

KNOWMORE

Ruminants are the herbivores that can bring semi-digested food from stomach back into their mouth and chew it again.

Carnivores

Carnivores are the flesh eating animals. They usually prey on smaller animals so their mouth is designed to have a very strong grip on the food. The canines of carnivores are

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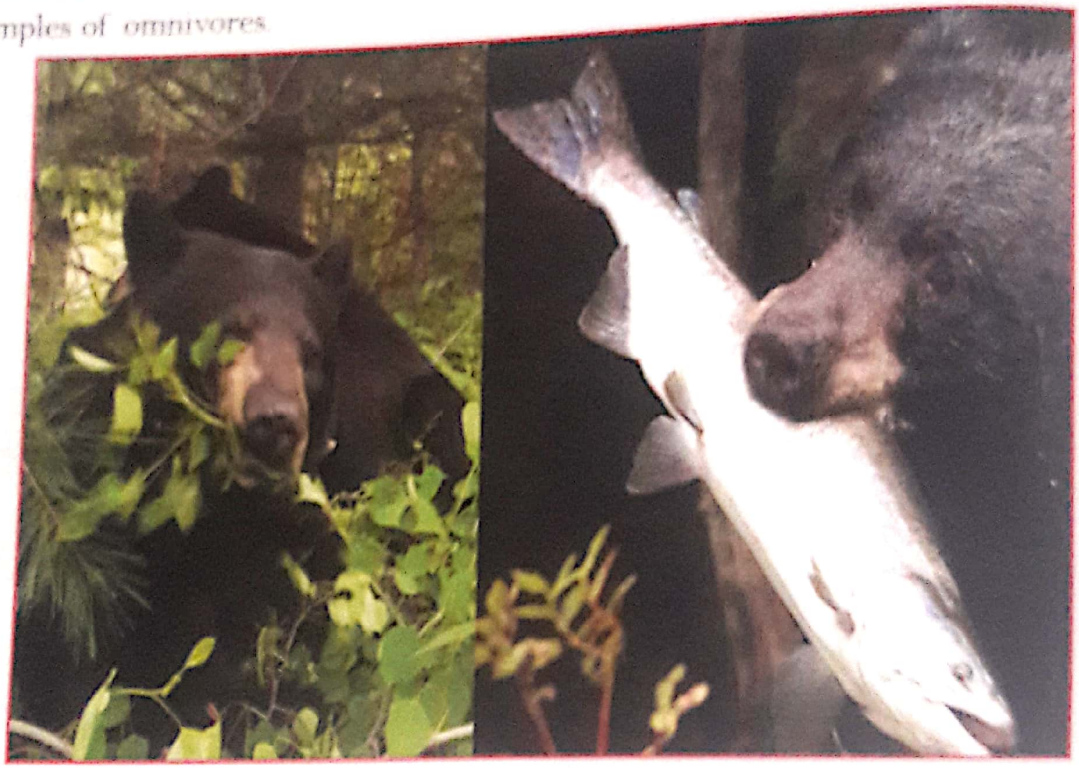
curved, long and pointed to help in killing the prey animal at once. Along with sharp incisors, they help in tearing and pulling apart the flesh. The molars are few as they are not of much use. Examples of carnivores are lion, alligator, wolf, tiger, etc. Some birds like vulture and eagle are also carnivores. They have strong and curved beaks to kill and eat small animals.

Tiger - a carnivore

Omnivores

Omnivores are the animals which feed on both, plants and other animals. Human beings also fall in this category. The jaws of omnivores have well developed molars for chewing of plant food material while canines help in eating meat. Bears and crows are some other examples of omnivores.



Bear - an omnivore

Birds are the animals that do not have jaws or teeth. They have beaks to catch and eat their food. They can also be herbivorous or carnivorous depending upon their eating habits.

Breathing Organs

Breathing is indispensable for the survival of all living beings. Some animals breathe on land while others breathe under water. Their breathing organs also vary accordingly.

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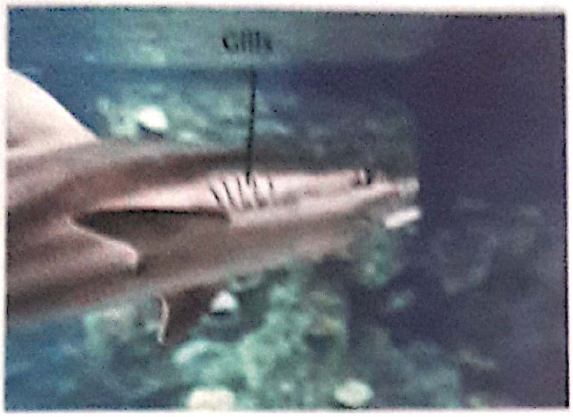
Lungs

Lungs are the breathing organs of all terrestrial animals. Mammals, birds and reptiles breathe through their lungs.

KNOW MORE

When filled with air, lungs are the only organs in the human body that can float on water.

Lungs



Gills

Gills are used by aquatic life forms for respiration. These organs are specialised in extracting dissolved oxygen from water. Fish, prawns, tadpoles and crabs have gills.

Spiracles

Insects have spiracles as breathing organs. They are small openings on their body surface which serve as pathways for gaseous exchange.

Moist skin of frog

Skin

Skin also acts as respiratory organs in some animals like frogs and earthworms. Their skin is moist through which gaseous exchange occurs. Frogs breathe through skin in water and through lungs on land.

What is the difference between a turtle and a tortoise?

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Body Coverings

Variations in body covering of animals is due to their different needs. Body covering some animals helps them to live in extreme temperatures while it helps in escaping predators in case of others. Some of the types of body coverings are mentioned be

Shell

Shell is an extremely hard covering made up of calcium compounds. It is protective in function. It is mostly found as an exoskeleton in animals with soft bodies. Turtle, tortoise and snail are the animals bearing shells.

Shell on tortoise

Fur on yak

Fur

Fur is a thick layer of hair on the skin certain animals. It provides insulation allows survival in extremely cold conditio Polar bear, sheep and yak are the animals have fur.

Scales on fish

Scales

Fishes and reptiles have scales. The purpose of scales is to retain moisture, protect from predators and help in movement.

Feathers on bird

Feathers

Feathers are present on birds. They help them in flying and also in maintaining their bod temperature.

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Spines

Spines, on the body surface of animals, are protective in function. They are made up of a special protein and have pointed ends to keep the predators away. Porcupine and hedgehog are the examples of animals having spines.

Spines on porcupine

Apart from these, there is another special defence mechanism found in certain animals which allows them to blend with their surroundings and hide from the enemies. This is called **camouflage**. A chameleon is a reptile that can change its skin colour to conceal within its surroundings.

Camouflage in chameleon

KNOW MORE

Peregrine Falcon is the fastest flying bird in the world at the speed 322 kmph. Cheetah is the fastest running animal at 113 kmph.

Movement

All animals have the ability of movement and locomotion. They move from one place to another for various reasons like:

- Search for food and shelter
- Escaping from predators
- Mating
- Migration

Terrestrial Animals

Land animals have two pairs of limbs; forelimbs in the front and hindlimbs at the back. Tiger, bear, jackal, elephant, etc., are terrestrial animals.

Jackal - a terrestrial animal

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Reptiles

Crocodiles and alligators have small feet to walk on land. Snakes, on the other hand, are limbless reptiles. They have scaly skin which helps them in moving from one place to another.

Snake - a reptile

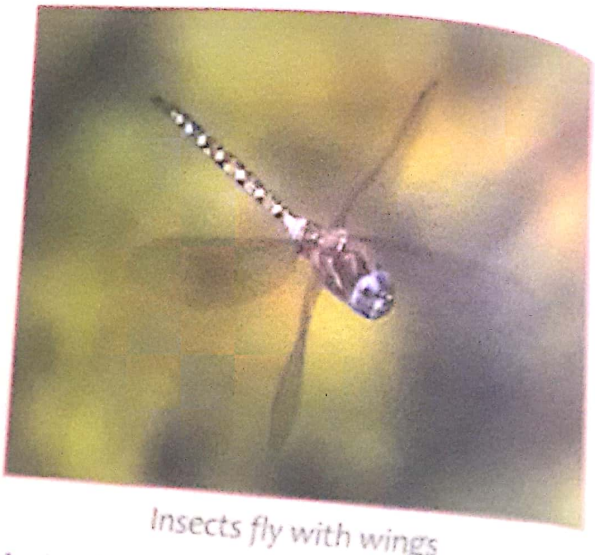
Birds fly with wings

Birds

Wings are the locomotory organs of birds. They are the modified forelimbs and are covered with feathers. Birds walk on land using their hind limbs. Flightless birds have strong legs for running.

Insects

Insects have upto two pairs of wings for flight. Most of them also have three pairs of legs for walking. Insects can also crawl, hop or swim using their legs.



Insects fly with wings

Frogs swim with webbed feet

Aquatic Animals

Fishes swim using their fins. Ducks and frogs have webbed feet. Turtles swim their with limbs.

KNOW MORE

Arctic terns are one the longest migrators on the earth. They can travel upto a maximum of 81,600 km in a year. They spend their summers in the Arctic circle and winters in the Antarctic circle.

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Activity

Observe any 5 types of animals around you and classify them on following basis.

S.No.	Animal	Locomotory organ	Feeding habits	Body covering
E.g.	Dog	Legs	Omnivore	Fur
1.				
2.				
3.				
4.				
5.				

Migration

Migration is the seasonal mass movement of animals over relatively large distances due to various reasons like climatic changes, mating, food needs, etc. It is shown by animals of various classes like birds, insects and fish. Arctic tern, herring fish and dragonflies are some migratory organisms. India provides winter homes to migratory birds like Siberian cranes and Greater flamingo.

Siberian crane migration

Life Skills

- We should protect animals and their habitats.
- We should not go near beehives.

Keywords

Habitat	:	Dwelling place of an organism on earth
Adaptation	:	Modifications in the bodies of animals to make them compatible with their surroundings
Herbivores	:	Animals which eat only plants
Carnivores	:	Animals which eat only flesh
Omnivores	:	Animals which eat both plants and animals
Spiracles	:	Respiratory organs of insects
Camouflage	:	Property of animals to blend with their surroundings
Migration	:	Seasonal mass movement of animals over long distances

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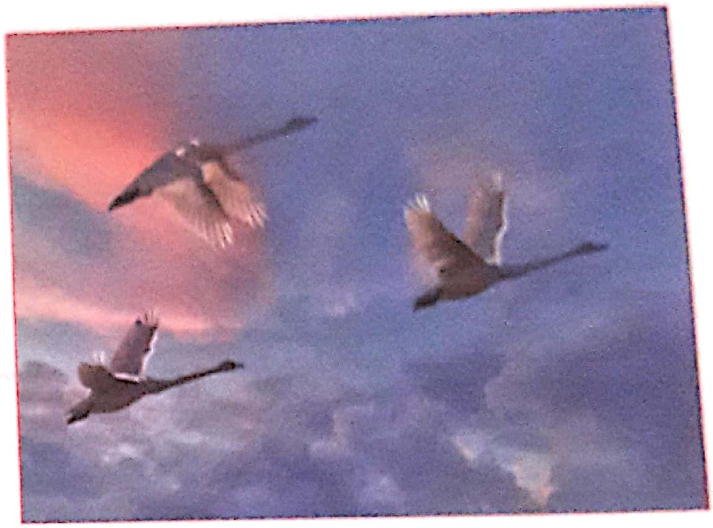

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Let's Revise

- The habitat of an organism determines its living habits and physical features.
- Forests give home to a large variety of animals.
- Animals living in Polar Regions have thick layer of fat to protect from cold.
- Marine life forms are well adapted to breathe and survive underwater.
- Adaptations in animals can be based on feeding habits, breathing organs, body covering and movement.
- Carnivores have highly developed canines for killing and tearing the flesh of prey and
- Birds can be herbivorous or carnivorous depending upon their feeding habits.
- Terrestrial animals breathe with the help of lungs.
- Shell of tortoise is protective in function.
- Snakes move with the help of scales on their skin.
- Ducks have webbed feet for swimming in water.

Quora Watch

A. Write 'T' for true and 'F' for false statements.

1. Polar Regions are aquatic habitat.
2. Animals like rabbits and hares live in burrows.
3. Desert animals live in groups and have fur on their bodies.
4. Cattle animals can move their jaws sideways.
5. Gills help in extracting dissolved oxygen from water.
6. Birds have jaws and teeth to catch and eat their food.
7. Animals move from one place to another in search of food.

B. Fill in the blanks.

1. Desert animals mostly prey at _____.
2. Freshwater bodies have _____ amount of salts dissolved in them.
3. _____ is a carnivorous bird.
4. Insects have _____ as breathing organs.

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5. _____ of birds are modified forelimbs which have feathers.

6. Frogs breathe through _____ in water and through _____ on land.

C. Match the following.

1.	Spines	a.	Webbed feet
2.	Movement	b.	India
3.	Duck	c.	Porcupine
4.	Siberian crane	d.	Mating

D. Define the following terms.

1. Adaptation
2. Migration
3. Camouflage
4. Spiracles

E. Answer the following questions in short.

1. Name the different types of habitats.
2. How does a camel survive in desert?
3. What adaptations do polar bears have to live in the polar regions?
4. Name some of the marine water animals.
5. What is the shell of tortoise made up of?
6. What is the need for movement in animals?

F. Answer the following questions in detail.

1. How are animals classified on the basis of their breathing organs?
2. Differentiate among herbivores, carnivores and omnivores.
3. Explain the purpose of following body coverings on animals.

   i. Fur

   ii. Scales

   iii. Feathers

   iv. Spines

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