Archana Shukla

This is my book

I am ................................................
I am in class ...................................

Hands-on Learning in Science
Wow! Science, the series, attempts to present Science through comprehensive and wide ranging content and related activities that provide a joyful learning experience to our young learners. The series follows the recommendations of the National Curriculum Framework (NCF) 2005.

Learning of science is based on themes that students can relate to in their everyday experiences, and to the commonly observed phenomena in nature. These themes encompass a core body of concepts across both, the life sciences and physical sciences.

The focus of each theme is given below.

**DIVERSITY**
There are many living and non-living things in the world. Man seeks to organise these living and non-living things for better understanding of the world he lives in. There are connections among all living things and integrating factors in the variety of non-living things, that help us classify them. This theme elaborates the importance of diversity.

**CYCLES**
Nature is full of repeated patterns of changes. We call these patterns ‘cycles’. For example, the life cycles of living things, the water cycle, etc. We can predict events and processes once we understand these cycles. This understanding also helps us to appreciate the Earth as a self-sustaining system.

**SYSTEMS**
Various parts that work together to perform a function(s) makes a system. There are man-made systems as well as natural systems. The digestive and respiratory systems are examples of natural systems, while an electrical systems are man-made systems. Understanding systems means understanding how they work and how their various parts interact with one another to perform a particular function.

**Inquiry-based Warm-up**
Encourages active student participation and creates opportunity for interaction and discussion.

**Interactive approach**
Helps to engage learners and help them connect to scientific ideas.

**In This Lesson**
List of major topics covered in the chapter.

**Think Science**
Helps learners to understand the topic practically, through logical and critical thinking activities.

**Explore**
Inquiry-based activities to gain a deeper understanding of the concepts learnt.

**Science Talk**
Discussion pointers related to the respective topics, to be initiated by the teacher.

**Info Bit**
Interesting facts that excite students and broaden their scientific knowledge.

**Learning Link**
Shows the connection between themes and grades to help students connect and appreciate key scientific ideas.
INTERACTIONS

Various systems interact within themselves and with each other. This understanding helps to enhance our knowledge of the environment and the role of humans in it. Organisms interact in three ways: within an organism, among various organisms, and between organisms, and the environment. The interaction of humans with the environment has led to the development of Science and Technology. Also, the way humans interact with the environment is influenced by Science and Technology. By understanding the interactions between humans and their environment, students can become aware of the consequences of their actions as they learn to take responsibility for these actions.

ENERGY

Changes and movements in everyday life are made possible due to energy. Humans use various forms of energy for various activities. Not just humans, but all living things need energy to carry out life processes. This theme will allow students to appreciate the importance and uses of energy and the need to conserve it. Appropriate links are included across the five themes to help learners connect their learning with the experiences about the world around them that they would gradually acquire.

I Have Learnt
Concept maps that summarise and link all the concepts learnt in a chapter

Assess
In-text exercise for assessment.

Building Block
Observing, analysing, interpreting and making models to build the understanding of the concepts learnt

I Wonder
Hands-on activities involving experiments, making observations collecting data, model making, and project work

Worksheet
A useful worksheet at the end of each chapter for additional formative evaluation

Connecting Science
Interdisciplinary activities based on linkages with other subjects within the curriculum.
### Understanding the book

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• Describe external features of various plants which help them to survive in the places where they live  
• Discover how terrestrial plants differ from one another  
• Compare the places where aquatic and terrestrial plants grow in  
• Explore the reason why some plants eat insects | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Chapter 2 Animal Classification | • Explain that different animals live in different environment  
• Describe external features of various animals which help them to survive in the places where they live  
• Discover how amphibians survive both in water and on land  
• Explore the food habits of animals | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Chapter 3 Exploring Materials | • List various types of materials used in everyday life and classify them  
• Relate the properties of materials to their uses  
• Compare the materials based on their physical properties | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Unit 2 - Cycles** |
| Chapter 4 Life Cycle of Animals | • Different animals have different life cycles  
• Explain and compare the life cycles of different egg-laying animals | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Chapter 5 Life Cycle of a Plant | • Different plants have different life cycles  
• Describe the life cycle of a flowering plant  
• Summarise the importance of flowers and seeds  
• Explain the structure of a flower | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Chapter 6 States of Matter | • Differentiate between solids, liquids and gases based on their characteristics  
• Understand the molecular arrangements of solids, liquids and gases  
• Explain water cycle by demonstrating the interconversion of states of matter  
• Reversible and irreversible changes | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
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</table>
Every plant grows in unique conditions. The place and conditions required by the plant to grow and survive is known as its habitat.

**Habitat**

The surroundings in which plants grow and are commonly found in are called **natural habitats**. An organism finds food, water, and shelter to live in its habitats.

There is a vast variety of plants that grow on the Earth. Most of the plants grow on the land but some plants grow in water, as well.

The plants that grow on the land are known as **terrestrial plants** and plants that grow in water are known as **aquatic plants**.
70% of our Earth’s surface is covered with water and so it has only 30% land on which terrestrial plants grow. But land areas of different regions differ due to the climatic conditions. Our Earth has hills, mountains, deserts, plains and forests. Some regions which have a very cold climate experience snowfall, while in some areas heavy rainfall takes place.

Therefore, the plants grown in different land regions also differ from each other due to change in climatic conditions.

**Classification of Terrestrial Plants**

- **Palm Trees**
  (plants on the sea coasts)

- **Mango Tree**
  (plants in the heavy rainfall areas)

- **Teak Tree**
  (plants in the plains)

- **Cactus**
  (plants in the deserts)

- **Pines**
  (plants on the hills and mountains)

- **Mangrove Tree**
  (plants in the marshy or swampy areas)
Plants that Grow on Hills and Mountains

Hilly areas and mountains have snowfall and get lesser sunlight. The plants that grow here are generally tall and thin so they can easily trap the sunlight. They have sloping branches so that snow can easily slide off.

They are also called **conifers or coniferous plants** due to their cone-shaped appearance and their fruits which are called cones.

They have **needle like leaves with waxy coating** which help the trees to survive in the extreme cold weather and snow that falls on to them.

![Image of a pine tree and cone-bearing seeds]

**EXPLORE**

How do wax coated needle like leaves help the pine trees to survive in the extreme weather conditions?

Plants that Grow in the Plains

In the hilly areas and mountains, do only tall and thin trees grow?

**No, besides the tall trees, small flowerless plants like fern, mosses and lichens also grow on the hills and mountains.**

How do these plants differ from the plants that grow in the plains?
Plants that Grow in the Plains

The trees which grow in the plains have lots of leaves, solid stem and several branches. Leaves of these trees are thin and flat which help them in transpiration. They transpire more than the leaves of the plants that grow on the hills and mountains.

These trees can bear heat and give shade during summer. But, they shed their leaves in autumn and new leaves grow again in spring.

Plants that Grow in Deserts

In the deserts, there is a scarcity of water, so the plants that grow in these areas have spines or thorns. This is an adaptation to reduce water loss through the process of transpiration. The leaves of the plants are modified into spines or thorns.

These plants have green fleshy stem to store water to, survive in deserts. They also have very long roots to get underground water. The green fleshy stem carries out photosynthesis for the cactus plant.

Learning Link - Systems

Transpiration is a continuous process caused by the evaporation of water from the leaves of the plants. It helps the plant to absorb water from soil.
You will learn more in UNIT 3-Systems.

Do you know that the plants which grow in the deserts either do not transpire or transpire the least?

Now I understand, why cacti have thorns not leaves, just like a pine tree.

Barrel cactus
Succulent
Prickly Pear cactus

Thin and flat leaf of peepal tree

Neem tree

Science Talk

Desert plants do not have leaves, so how do they carry out photosynthesis?
Photosynthesis in desert plants (like cacti) is carried out by the green stems of the plants. These plants have chlorophyll in their stem which helps to carry out the photosynthesis process.
Plants in Heavy Rainfall Areas

Plants which grow in the heavy rainfall areas have broad leaves. Their leaves remain green all the year round and are known as **evergreen** trees. They do not shed all their leaves at the same time. These plants and trees form **rainforests**. Small plants, such as cotton, sugarcane and rice also grow in the areas that receive heavy rainfall.

**Info Bit**

The most important raw material in your pencil eraser is rubber. Natural rubber is obtained from the latex of rubber tree.

Plants that Grow on the Sea Coast

Coconut and other palm trees grow on sea coasts because they need salty water to grow and survive. They grow on a sandy soil. They grow well in the areas of abundant sunlight and regular rainfall. They also need high humidity for optimum growth.
Plants in Swampy (marshy) Areas

Oh! These trees have their roots above the ground. Why is it so?

The land areas which have sticky and clayey soil are called swampy or marshy areas. Plants and trees which grow in these areas have their roots above the ground. It is because air cannot reach the roots as the soil is sticky and clayey. These roots are called breathing roots which help them to breathe.

Aquatic Plants

Plants which live in water, for their needs of food and shelter, are called aquatic plants. There are three kinds of aquatic plants: floating plants, fixed plants and underwater plants.

Aquatic Plants

- **SUBMERGED PLANTS**
  - These plants grow underwater. They also have roots fixed in the muddy soil. They have narrow thin leaves without stomata and have delicate and flexible stems. Examples are Hydrilla, Tape Grass and Pondweeds.

- **FLOATING PLANTS**
  - They float on the water surface as they have spongy bodies with lots of empty space filled with air.
  - Examples are Duckweed, Water Lettuce and Water Hyacinth.

- **FIXED PLANTS**
  - They have roots fixed to the bottom of the pond.
  - These plants have thin, long and hollow stems, and broad and flat leaves with waxy coating.
  - Examples are Lotus and Water Lily.

The hollow stem of lotus is known as Kamal Kakri which we eat as vegetable.
Plants or trees usually grow in their natural habitat, but they can be grown in the places which have different climatic condition from their natural habitat.

When you observe your surroundings, you may find different kinds of plants. Do you find some trees or plants which cannot be grown in the area? Make a list of these plants or trees and mention the climatic conditions of their natural habitat. Where would you find them?

**Insectivorous Plants**

Some plants eat insects and are called **insectivorous** plants. These plants grow in the soil that is poor in nitrogen. They eat insects only to fulfil the shortage of nitrogen.

Examples are pitcher plant and Venus flytrap.

Leaves of Venus flytrap have sensitive leaf surface and hair like structures. When an insect sits on the leaf, it closes shut and dissolves the insects.

An insect gets attracted towards pitcher plant because of its attractive colour. The insect is, then, trapped by the plant. The plant closes its lid and does not allow the insect to come out.

**Teacher’s note**

Show a video of Venus flytrap and pitcher plants trapping insects. It will help the students to understand how sensitive these plants are.
Just like other green plants, they prepare their food by photosynthesis. Insectivorous plants have chlorophyll and other coloured pigments to carry out photosynthesis. These plants have coloured and attractive parts.

Non-green Plants

Some plants are not green because they lack chlorophyll. They are called non-green plants.

Chlorophyll does not only give green colour to the plants, it is also essential to carry out photosynthesis. Yet these non-green plants can make food from sunlight with the amount of chlorophyll that they have. The leaves of non-green plants live on saprophytic nutrition. Examples of such plants are: Blue Colorado Spruce and Japanese Red Maple.

Uses of Plants

We cannot imagine our life without plants. Plants give us oxygen to breathe, food to eat, clothes to wear, shelter to live in and much more. Thus, plants are very useful to us.

1. Which type of plant is *Hydrilla*?
2. Give two examples of floating plant.
3. Which plants have leaves with waxy coating?
4. Where do insectivorous plants grow?

Info Bit

Saprophytic nutrition is a mode of nutrition, in which an organism gets its food from dead or decaying organic matter.

One common example of a non-green plant is *Monotropa uniflora*, or Indian Pipe. It is completely white in colour because it has no chlorophyll in any of its parts.
I Have Learnt

- Plants grow in different places known as Natural Habitat.
- Types of plants

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<th>Terrestrial (grow on land)</th>
<th>Aquatic (grow in water)</th>
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<td>are classified as plants that grow</td>
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- Plants that eat insects are called insectivorous. Examples: pitcher plant, Venus flytrap.
- Plants that have less or no chlorophyll are called non-green plants.

Science Words
- Habitat • Terrestrial plants • Aquatic plants • Climate • Marshy • Swamplike
- Conifers • Cones • Transpiration • Photosynthesis • Evergreen • Rainforests
- Submerged • Insectivorous • Chlorophyll • Pigments

Evaluate

A. Objective type questions

Tick (√) the correct options.

1. Plants which grow underwater are called—
   a. terrestrial plants  b. submerged plants
   c. desert plants d. insectivorous plants

2. Insectivorous plants eat insects because they—
   a. Do not carry out photosynthesis
   b. Do not grow in sunlight
   c. Do not get nitrogen from the soil where do they grow
   d. Do not get water from the soil where do they grow

3. Cactus and other desert plants store water in their—
   a. leaves  b. flowers  c. roots  d. stem
4. The plants and trees that grow in areas of heavy rainfall are called—
   a. evergreen trees
   b. conifers
   c. aquatic
   d. swampy
5. Fir trees are used as Christmas trees. They grow—
   a. in the plains
   b. on the hills and mountains
   c. in the deserts
   d. in water

B. Short answer questions
   1. Trees that grow in areas with heavy rainfall generally have broad leaves. In what ways can these leaves be useful for the plant?
   2. Some plants eat insects. What are they called? Why do they eat insects?
   3. Plants that grow on the hills and mountains are also known as conifers. Why?
   4. Write any two differences between terrestrial and aquatic plants.
   5. What are evergreen trees? Give example.

C. Long answer questions
   1. Riya saw various kinds of aquatic plants in a pond when she was walking around a park. Observe the given plants and help her to write differences between these two plants.
   2. Give reason for the following—
      a. Coconut tree is an evergreen tree but it grows on the sea coasts.
      b. Plants that grow in the desert have spines as modified leaves and their stems are fleshy.
      c. Mangrove trees have breathing roots.
   3. Compare the characteristic features of the given plants and write similarities and differences between them.

D. HOTS
   Raman had gone on his school trip to desert areas of Rajasthan. He observed many cacti in desert. His teacher had told them about this kind of plants. But Raman was surprised to see the plant for it has no leaves. Why do you think, these plants do not have leaves?
Investigate

I will: Investigate and learn how leaves breathe in water.

I need: A plastic bowl, lukewarm water and a leaf.

I do:
1. I fill the bowl with lukewarm water.
2. I pluck a large-sized leaf from a tree.
3. Place the leaf in the bowl of water and put a small stone or pebble on top of it, so it is fully submerged under the water.
4. Wait for 2-3 hours.

I observe: Many................................. form around the leaf and the edges of the bowl.

I conclude: Leaves................................. inside water through..................................

Suggested Activity

Grow an aquatic plant in a pot filled with porous soil. Observe it every day and note down the changes you observe. Will this plant survive? Find out the reason.

Project Work

Visit a garden or a park. Identify the plants that grow in the plains and name any five of them. Choose the one which you like the most. Now draw the picture of the selected plant or tree and write its features that you have observed. You can collect the leaves of the plant and make some patterns or designs in your file.
Answer the following questions.

1. Complete the classification table of the plants, based on their habitat.

   Plants
   \[\begin{array}{c}
   \text{Evergreen, } \text{Succulent, } \text{Conifers} \\
   \text{Aquatic: } \text{Floating, } \text{Submerged}
   \end{array}\]

2. Look at the given plants.

   How do they differ from each other?
   Plant ‘A’ is 
   Plant ‘B’ is 

Animal Habitat

The natural home of an animal is called its habitat. Here, they find the food, water, and shelter they need to live. Animals can be classified according to their habitat.

Some animals live on the land, some in the water and some have adapted the body structure to survive in the air or on the trees. They show adaptations to the environment.

In This Lesson

- Explain that different animals live in different environments
- Describe external features of various animals which help them to survive in the places where they live
- Discover how amphibians survive both in water and on land
- Explore the food habits of animals
**Terrestrial Animals**

Animals that live on the land are called **terrestrial animals**. Example—horse, elephant, deer, cow and buffalo.

These animals have special features to survive. Most of the terrestrial animals have strong legs to move around. Some of them like snakes don’t have legs. Snakes have bodies that are covered with scales which help them to move around.

Terrestrial animals have lungs to breathe air.

Terrestrial animals differ from one another as they live in different climatic conditions. Animals, like polar bear, live in the arctic region which is very cold, so they have fur on their bodies to keep them warm. Similarly, animals like camels, which live in deserts, have thick skin but less hair, it protects them from the heat of the Sun.

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**Learning LINK**

Some animals, such as **chameleon**, have adapted special features to survive. You will learn about **Adaptation in animals** in Unit 4 Interactions/ Ch- Our Environment.

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**Science Talk**

Some animals, like frogs, snakes, turtles and bears, become inactive during very cold winters because it becomes difficult for these animals to find food. So they go for a deep sleep that helps them to save energy and survive the winter without eating. It is known as **hibernation**.

Some animals, like frogs and salamanders, in deserts also go for a long sleep during hot summer months to save water; it is known as **aestivation**.
Aquatic Animals

Animals that live in water are called **aquatic animals**. They have gills to breathe and fins to swim. Some aquatic animals, such as whales and dolphins, have lungs to breathe. Penguins have flippers to swim in water. Ducks have webbed feet that help them to swim.

Amphibians

There are some animals that can live, both, on the land and in water. Are they aquatic or terrestrial animals?

Some animals, such as frogs and toads, live on the land as well as in water. These are known as **amphibians**. These animals have specific features that help them to survive, both, on the land and in water. They have webbed feet that help them to swim in water. They have stronger hind legs than the front legs which help them to jump on the land, easily. They have lungs to breathe but they can also breathe in water through their skin.

**Info Bit**

All frogs start life as aquatic tadpoles, breathing underwater through internal gills and their skin. Later most develop into land animals with lungs for breathing air. Frogs lose their gills when they grow.

Fish have streamlined body which helps them to swim faster.

Think Science

Human beings can also swim under water. Can they be called aquatic animals or not? Give reasons for your answer.

Arboreal Animals

Look at the monkey on the tree. Monkeys live on the trees. Which category do they belong to?

I think, they are also terrestrial animals.

They mostly live on the trees. So, they are arboreal animals.
Some land animals, like monkeys and koala bear, that live mostly on trees are called **arboreal animals**. They have sharp claws that helps them to climb up and down the branches. They usually have a strong tail and limbs for holding onto the branches.

### Aerial Animals

Birds also live on trees. Are they also arboreal animals?

No, birds are not arboreal animals. Birds not only live on trees but can also fly in the air.

Animals, such as birds and insects, that can fly and spend most of their time in air are called **aerial animals**. Some birds, such as emu and ostrich, don’t fly. They are also categorised in this group. Bats also belong to this category. Birds have hollow bones that make their body light. This helps them to fly in the sky. They have one set of limbs modified as wings to fly.

### Food Habits of Animals

Why do animals move from place to place?

Animals move from place to place in search of food. Some eat grass, while others hunt for their food.

We are humans. We do not have wings. If we get wings, would it be possible for us to fly like birds? Give reasons for your answer.
Animals eat different types of food. Some animals eat grass while others eat flesh. Based on their food habits animals are categorised into five main groups.

**Herbivores**

Animals, such as rabbits, deer, cows and horses, that eat only plants or plant products, are called **herbivores**. These animals have sharp cutting and strong grinding teeth.

**Carnivores**

Some animals, like lions, lizards, tigers and snakes eat other animals or flesh of other animals. They are called as **carnivores**. They usually have sharp tearing teeth that help them to hunt and tear the flesh of their prey.

**Omnivores**

Animals that eat plants or plant products as well as flesh of the animals are called **omnivores**. Examples are crows, bears and cockroaches. Humans also belong to the same category.
Scavengers

Some animals that eat flesh of dead animals are called as **scavengers**. Vultures, hawks and hyenas are some scavengers.

Parasites

Some animals, such as lice and ticks, live on the body of other animals for their nutrition. They are called **parasites**. The body on which the parasites live is known as their **host**. Some parasites live inside the body of other animals, for example tapeworms, roundworms and hookworms; they suck the blood of host.

I Have Learnt

**Animals**

- can be classified on the basis of

**Habitat**
- Terrestrial live on land (mountains and polar regions, plains, deserts).
- Aquatic live in water.
- Ambhibians can live on land and in water.
- Arboreal live mostly on trees.
- Aerial can fly and spend most of their time in air.

**Food Habitat**
- Herbivores eat plants and plant products.
- Carnivores eat flesh of other animals.
- Omnivores eat both plant products and flesh of other animals.
- Scavengers eat flesh of dead organisms.
- Parasites survive on the body of their host.

**Science Words**
- Adaptation
- Habitat
- Terrestrial Animals
- Aquatic Animals
- Streamlined
- Amphibians
- Aerial Animals
- Herbivores
- Carnivores
- Hibernation
- Tadpoles
- Omnivores
- Aestivation
- Arboreal Animals
- Scavengers
- Parasites
**Evaluate**

**A. Objective type questions**

**Tick (✔) the correct options.**

1. Monkeys can live on land but do not belong among the terrestrial animals because –
   a. They cannot move on the land.  ❑
   b. They mostly live on the trees.    ❑
   c. They have gills to breathe.  ❑
   d. They have lungs to breathe.  ❑

2. Tapeworms and roundworms are –
   a. parasites  ❑
   b. scavengers    ❑
   c. carnivores  ❑
   d. omnivores    ❑

3. Humans have lungs to breathe and legs to move. Which category of animals do they fall in?
   a. herbivores  ❑
   b. aquatic    ❑
   c. arboreal  ❑
   d. terrestrial    ❑

4. Salamanders are –
   a. terrestrial animals  ❑
   b. amphibians    ❑
   c. aquatic animals  ❑
   d. aerial animals    ❑

5. Aerial animals can fly in the sky because they have –
   a. hollow bones  ❑
   b. wings    ❑
   c. both a and b  ❑
   d. none of these    ❑

**B. Short answer type questions**

1. a. Aanya visited a National Park and prepared a list of animals that she liked the most. Help her to classify these animals based on their habitat.

   ![Diagram of animals]

   b. Can you classify these animals based on their food habits?

2. What are amphibians? Give two examples.

3. What are parasites? Name any two parasites which live on human body.

4. Carnivores eat flesh of the other animals. What special features do they have which help them to eat the flesh of other organisms?
5. Look at these animals. Identify them and write one similarity and one difference between them.

C. Long answer questions
1. ‘Polar bears have fur on their body while camels do not.’ Explain the reason.
2. Give one difference between the following and give two examples of each.
   a. scavengers and parasites
   b. arboreal and aerial animals
3. Draw a Venn diagram to compare the characteristic features of aquatic animals and terrestrial animals.

D. HOTS
Can human beings live like amphibians? What conditions will we need to live under water?
**I wonder**

**Investigate**

I will: Investigate how the beaks of the birds help them to adapt to their feeding habits.

I need: Pegs, tweezers of various sizes, grains, pasta, vermicelli.

I do:
1. Use pegs and tweezers of different sizes to pick up the food items.
2. Compare the shapes of the pegs and tweezers with the beaks of different birds.

I observe:
1. The birds which have conical beaks, use it to crack seeds, just like tweezers.
2. Insect eaters have thin and .................................................. (flat/pointed) beaks, similar to chopstick.
3. Some birds have beaks like straw to ........................................... (suck/eat) the nectar from flower.

I conclude:
The .................................................. of the birds are shaped according to their feeding habits.

**Suggested Activity**

Explore how arctic animals stay warm in icy water.

Step 1—Take an ice bucket filled with ice cubes.

Step 2—Put your fingers into the ice bucket.

Step 3—Now wear rubber gloves on your hands and then put fingers in ice cubes.

Step 4—Now wear biker’s gloves and repeat the activity.

Write how do you feel in each case. In which case do you not feel the cold, easily?

**Project Work**

Collect amazing facts about animals from the internet or library and make a questionnaire on ‘Animal habitat’. Thereafter, organise a Science Quiz in your class.
Answer the following questions.

1. Complete the given classification table based on the food habits of animals—

   - **Animals**
     - Eat
       - **Plants**
       - are
       - **Carnivores**
       - **Both plants and animals**
       - are
       - **Flesh of dead organisms**
       - are
       - **Rabbit**
       - **Vultures**

2. In what ways are the given animals similar?

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

   How do they differ from each other?

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

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

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

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

   ........................................................................................................................................................................
Materials We Use in Our Daily Life

Materials are used to make many non-living things that we use in our daily life. All the non-living things are made of materials. Some materials, such as rubber, leather and wood, come from living things. And some materials, such as metals, rocks and bricks, come from non-living things.

Think Science

What helped the pucca house to survive the storm?
Do you think the materials used to build these houses helped them?
Some Common Types of Materials

All these objects are made of some common types of materials, such as wood, plastics, metals and fabrics.

Wood

There are many objects made from wood. Wood comes from tree. Trees are chopped for wood. Furniture, toys, some musical instruments and even paper are made from wood.

Science Talk

Besides providing us wood, trees are very important for us as they give us food to eat, oxygen to breathe in and many more things to survive. Trees are responsible for climatic changes, as well. So, we must plant trees and make others aware of the need of saving trees. We celebrate World Environment Day on 5th June every year.
Rubber

Rubber is made of a thick white liquid substance (sap) obtained from the rubber trees. This white liquid is treated with many chemicals to make rubber.

Rubber is used to make many objects that we use in our daily life, such as toys, balloons, slippers, erasers and tyres.

Fabrics

The clothes that we wear are made of fabrics. Different clothes are made of different fabrics.

Wool

Woollen clothes are made of wool, a fabric that is obtained from the fleece of animal, such as sheep, yak and camels.

Silk

Silk clothes are made of silk fabric that is obtained from cocoons that silkworms spin.

Cotton

Cotton clothes are made of cotton fabric that is obtained from flowers of cotton plant.

Look at these clothes; they are different. Are they also made of some fabric?
Glass

Glass is a material used to make many kinds of things, such as spectacles, window panes, bottles, drinking glasses, decorative items and television screens. Objects made from glass are usually see-through (transparent).

Plastic

Plastics is a man-made material. Many objects in our surroundings are made of plastic.

There are different types of plastic. Different types of plastic are used to make objects that look and feel like wooden, glass and metal objects.

**Panorama**

Look around you; find some objects made of plastic that look like wooden, glass or metal objects. Name them.
Metal

Metal is dug out from the ground. A hole or tunnel is dug into the earth to obtain metal, and is called a **mine**. There are different kinds of metals, such as iron, aluminium, copper, gold and silver. Gold and silver are valuable metals.

**Ceramic**

Oh no! My pencil stand is broken, but why? Is it not made from wood?

It looks like a wooden pencil stand. But it is made of ceramic, which is made of clay.

Ceramic is made by baking or treating clay with chemicals. Clay is obtained from rocks or soil. Clay is moulded into different shapes to make objects.

Floor tiles and bricks are also made from ceramics.

---

**Info Bit**

Gold mines in India are found in Karnataka, Andhra Pradesh and Jharkhand states.

**Science Talk**

Plastic is a non-biodegradable material and causes pollution. The materials that are not degraded by microorganisms are called non-biodegradable materials. Fruits and vegetables wastes are biodegradable as they can be decomposed by microorganisms.
Properties of Materials

Chinmaya was carrying two drinking tumblers. He stumbled and the tumblers fell off. Let's read what amazed Chinmaya!

Blue coloured tumbler was made of glass while red coloured tumbler was made of plastic. Plastic does not break easily. It is the property of plastic. On the other hand, glass breaks easily as it is brittle.

Every material has its own properties. These include **strength**, **hardness**, **flexibility** and **ability to float** or **sink** in water.

A material can have more than one property. A material can be hard or soft, strong or weak, flexible or stiff; it can float or sink in water. A soft material can be flexible and can float on the surface.

A material is described by its properties and hence can be classified as well.

Choosing a Suitable Material

How do we get to know that which material is suitable for making a particular object? We choose the materials for making an object according to the properties of the material and the purpose of the object.

Usually a single material does not have all the properties that the object needs. So, to choose the material or materials to make an object, we must know the use of the object.

Generally, an object is made from more than one material.
This rod is made of metal which is hard and strong.

This raincoat is made of light and flexible plastic. It is waterproof so does not absorb water and so, keep you dry in the rain.

Bricks and tiles (ceramics) are used to make the walls because they are hard and strong. They cannot be broken easily.

Wood is used to make door because it is strong. So it does not break easily and no one can see through it.

Glass is used to make window panes because it is hard and strong. It also allows us to see through it.

The tyres of the bicycle and the hose are made of rubber which is flexible. Flexible rubber of the tyre can easily roll over the ground and it makes hose so flexible that is bends easily.

Info Bit

A Boeing 747 aeroplane has more than 6 million different parts.
I Have Learnt

- Non-living things are made of materials such as wood, rubber, fabric, plastic, metal, ceramic.
- Materials are chosen to make objects based on their properties such as hardness (soft and hard), strength (strong and weak), flexibility (flexible and stiff), ability to float or sink (float and sink).

Science Words
- Materials • Wood • Rubber • Fabrics • Cotton • Wool • Silk • Blend • Glass
- Plastics • Metal • Ceramic • Strength • Hardness • Stiff • Flexible • Float • Sink

Evaluate

A. Objective type questions

Tick (√) the correct choices.

1. The materials that we obtain from plants are –
   a. wood ☐ b. fabric ☐ c. rubber ☐ d. all of these ☐
2. The magnifying lens is made from glass because –
   a. Glass can break easily. ☐ b. We can see through glass. ☐
   c. Glass cannot break easily. ☐ d. None of these ☐
3. We should avoid using plastics because –
   a. It is very hard and stiff. ☐
   b. We cannot see through it. ☐
   c. It is non-biodegradable and causes pollution. ☐
   d. It is flexible. ☐
4. What should we know to choose right material, to make an object?
   a. Properties of material and use of the object ☐
   b. Colour of the material ☐
   c. Both a and b ☐
   d. None of these ☐
5. Which object will float on the surface of water?
   a. ceramic spoon ☐ b. metal spoon ☐
   c. plastic bowl ☐ d. chalk piece ☐
B. Short answer questions

1. Chinu’s mother had asked him to arrange his wardrobe. When Chinu opened the wardrobe, he found the following dresses.

Now answer the following questions.

a. Name the dress/dresses made of natural material.

b. Do these materials come from plants or animals? Name the plant or animal from which the materials are obtained.

c. Which material is waterproof?

b. Which dress is most suitable for use in summers and why?

2. Find four objects made of each material listed below. Find four objects in your surrounding made of each material listed below.

   wood  ceramic  metal  plastic  fabric  glass and rubber

3. Some materials come from animals. Which material do we get from the animals given below and give an example of what the material is used for?

   silkworm  yak

4. What are mixed fabrics? Give two examples.

5. How is ceramic made? Name two objects; made from ceramic, used at your home.

6. What are the main properties of materials?

7. Ansh was given a task to hit the given objects hard, with a hammer. What would happen to each object after being hit by a hammer?

<table>
<thead>
<tr>
<th>Objects</th>
<th>Result after hitting object with a hammer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold drink cans made of aluminium</td>
<td></td>
</tr>
<tr>
<td>Ceramic mug</td>
<td></td>
</tr>
<tr>
<td>Glass bowl</td>
<td></td>
</tr>
<tr>
<td>Buttons</td>
<td></td>
</tr>
</tbody>
</table>
8. In a toy shop, there were toys made of the materials shown in the given pie chart. Answer the questions asked with the help of pie chart.
   a. Which material is used to make most of the toys in the toy shop?
   b. What could be the reason of using this material to make most of the toys?

C. Long answer questions

1. Rocks and soils are not the only types of materials used to build houses. In some parts of the world, people build houses using ice blocks; such houses are called igloos. Why is ice not a suitable material for building houses in the region of North India? Explain.

2. a. Glass can break easily, yet it is used to make light bulbs. Why?
   b. You can easily tear the pages of your notebook but it is difficult to tear or break your ball. Why?
   c. What would you use to carry wet groceries—paper bags or cloth bags? Why?
   d. What do you bring to school—a glass water bottle or a plastic water bottle? Why?

D. HOTS

Imagine your team has been given a project to construct a helicopter to carry sick people to the closest hospital. What material would you use to make them? Would glass be suitable for this purpose? Why?
Investigate

I will: Test and observe whether an object floats or sink in water.
I need: A tub of water and 5 different objects of my choice.
I do:
1. Predict whether the object will sink or float in water by writing ‘Yes’ in the appropriate box.

<table>
<thead>
<tr>
<th>Objects Tested</th>
<th>My Prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Float</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Drop each item into a tub and observe whether it floats or sink. Match your predictions with your observations.

I observe: Some objects float on the water surface while some sink into the water.
I Conclude:
1. Objects which were light in weight .................. while the others ...................... .
2. How many of your predictions were correct? What do you notice about the materials they are made of? ................................................................. .

Suggested Activity

Make ‘fabric designs’ using ‘Tie and Dye’ technique. Prepare dye with teacher support. Place rubber bands on the garment according to the design you wish to achieve. Place it in the dye for 15-20 minutes. Remove from the dye and rinse. Remove rubber bands to reveal your design.

Project Work

Hair bands are mostly made of rubber.
• Can you list different variety of materials used to make different types of hair bands?
• Is it necessary that they be made of more than one material?
• Would the object be still useful if they were made of only one material?
Repeat the above process for wrist bands, knee bands and ankle bands, used for athletic and medicinal purposes.
Answer the following questions.
1. Complete the classification table about different types of materials.

```
<table>
<thead>
<tr>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>From living things</td>
</tr>
<tr>
<td>From plants</td>
</tr>
<tr>
<td>P</td>
</tr>
<tr>
<td>From animals</td>
</tr>
<tr>
<td>Q</td>
</tr>
<tr>
<td>From non-living things</td>
</tr>
<tr>
<td>R</td>
</tr>
</tbody>
</table>
```

a. What can be P, Q and R? ..............................................................................................................
b. What is the similarity between P and Q? ........................................................................................
c. What is the difference between P and R? ........................................................................................

2. Look at the electric bulb.

```
X
Y
```

a. Name the most suitable material that can be used to make part ‘X’ and part ‘Y’.
..........................................................................................................................................................
b. Give reasons for the same.
..........................................................................................................................................................
Plants and animals adapt to their environment with some special features to survive. Adaptation in animals helps them to obtain food, keep safe, withstand weather, etc. Similar to animals, plants also adapt in different ways. Both terrestrial and aquatic plants adapt with some features which help them to survive.

**Terrestrial plants are generally tall and have a strong stem to make them stand straight.**

**Aquatic plants are adapted with floating leaves and generally spongy stem.**

**Some terrestrial plants have spiny leaves to reduce the rate of transpiration.**

### Science

1. How do aquatic plants adapt?
2. Give two examples of adaptation in animals.

### Maths

Observe the given picture, as well as the nature in your surroundings. Can you find ‘symmetry’ anywhere in the nature? Mention two objects which have at least one line of symmetry.

### Social Science

Observe the Christmas tree. Find out the kinds of adaptation in it and the region where these plants grow.

### English

Write the word meaning of the given words and make two sentences using each word.

- a. Transpiration
- b. Adaptation
- c. Terrestrial
Life Cycle

All the living things, including animals, go through a cycle called life cycle. A cycle is a pattern that repeats itself continuously.

Like all other living things, animals also reproduce and have their young ones while they are alive. They reproduce so that their kind will always be around on the earth. For this purpose, the young ones go through a similar life cycle as the parents.
All the stages of an animal’s life—from birth to growing and changing, and producing young ones—make up its life cycle. The length of the life cycle differs in living things. Some animals have short life span while other have very long life span.

Example—Fruit flies have a life span of only few weeks, some plants, like wheat plant, have a life span of a few months while dogs have a life span of 12-13 years.

Life Cycles of Some Egg Laying Animals
Let us look at some of these egg laying animals.

Life cycle of a chicken

1. The life cycle of chicken starts with an egg. The egg has a hard shell as its outer covering which keeps the egg from drying and protects the new baby chick growing inside.

2. The chick hatches from the egg. It grows into an adult chicken (hen).

3. The fully grown chicken (hen) produces eggs and a new life cycle starts.

Some animals reproduce by laying eggs while others give birth to their young ones.

Science Talk

The female hens sit on their eggs. This is called incubation. Hen sits on the eggs to give warmth that results in hatching of eggs.

Info Bit

The length of time that an animal lives is its life span. The animal with the longest life span is giant tortoise. It can live up to 170 years. The animal with shortest life span is gastrotrich, a microscopic freshwater animal. It lives for only 3 days.
Life Cycle of a Frog

Frogs lay their eggs in water in large clusters known as **spawns**. The frogs’ eggs have a jelly-like covering that protects them and helps them breathe under water.

A young frog looks very different from an adult frog. It looks like a fish and is known as a **tadpole**. A tadpole has a tail and breathes through its gills. A tadpole goes through various stages of development and the process is called **metamorphosis**.

Tadpole grows into an adult frog which has neither a tail nor the gills. A frog breathes with its lungs and moist skin instead.

Life cycle of a frog is different from that of a hen.

As the tadpole grows, it becomes bigger in size; first, its hind limbs appear. Then its forelimbs grow; its tail becomes shorter and finally disappears, and lungs begin to form.

**Building Block**

Visit a pond with your teacher or parents. Try to find frog eggs around the edges, if you can. Observe them carefully and draw in your notebook.

Why do you think observing frog eggs in their natural home is better than collecting them and taking them home?
Life Cycle of Insects

The life cycle of some insects pass through stages where they do not look like their parents. They change from one form to another as they grow.

1. The butterfly lays its eggs on the leaves or stem of the plant. Eggs hatch on their own, into a larva.

2. The caterpillar is a larva that eats a lot and grows very fast. It sheds its old skin and grows a new one. This is called as **moult**ing.

3. The larva changes into a pupa and stops feeding. It looks inactive from outside but many changes take place inside. Pupa is covered with a hard covering called **cocoon**.

4. The covering of pupa finally breaks and an adult butterfly comes out of it. Butterfly spreads its wings to dry before taking off on its flight.

I wonder, how does this pupa change into a butterfly?

Life Cycle of a Butterfly

Life cycle of butterfly is similar to that of frog. It also shows metamorphosis.

Pupa Changing into a Butterfly
Life Cycle of a Cockroach

The life cycle of a cockroach go through three stages—eggs, nymph and adult. A cockroach may live several months to over a year.

1. A female cockroach lays eggs in an egg case. Each egg case may have 16 to 50 eggs. Eggs hatches into nymph on their own.

2. The small young cockroach that hatches from an egg is known as Nymph. It is similar to an adult but does not have wings. Nymph eats a lot and moults several times before becoming an adult cockroach. Moulting is shedding of the upper skin.

3. An adult cockroach has wings and when it reproduces, a new life cycle begins.

Science Talk

Cockroaches and Diseases: There are more than 3000 types of cockroaches in the world. They can cause disease like food poisoning and allergies. They may play a supplementary role in the spread of some diseases, like diarrhoea, dysentery, cholera, leprosy, plague, typhoid fever, and viral diseases like polio. Cockroaches carry eggs of parasitic worms and may cause allergic reactions including dermatitis, itching, swelling of eyelids and some respiratory problems.
Do you know that grasshoppers have a life cycle similar to cockroaches?

Animals that Give Birth to Young Ones

Some animals, such as cats, dogs, horses and giraffes, do not lay eggs. They give birth to young ones. Human beings also give birth to young ones. The animals that give birth to young ones are called mammals.
I Have Learnt

Life cycle of some animals

3-stage life cycle

- Egg
- Adult
- Nymph (young)

Examples: Frog, Hen, Grasshopper, Cockroach

4-stage life cycle

- Egg
- Adult
- Larva
- Pupa

Examples: Butterfly, Housefly, Mosquitoes

Science Words

- Life cycle
- Reproduce
- Incubation
- Spawn
- Tadpole
- Larva
- Moulting
- Metamorphosis
- Pupa
- Nymph
- Mammals

Evaluate

A. Objective type questions

Tick (√) the correct options.

1. A frog is similar to a butterfly as—
   a. They are both insects. □
   b. They both can fly. □
   c. Their young ones do not look like the adults. □
   d. They live in water. □

2. In the life cycle of a butterfly, at which stage is it harmful to plants?
   a. larva □ b. pupa □ c. eggs □ d. adult □

3. How is the life cycle of a cockroach similar to that of a grasshopper?
   a. They both have 3-stage life cycle. □
   b. Their young ones look like their adults. □
   c. Their young ones are called nymph. □
   d. All of these □
4. Caterpillar of butterfly and nymph of cockroach are similar because, they both –
   a. look different from their adults  
   b. moult several times  
   c. eat leaves  
   d. none of these  
5. Which of the following animals lay their eggs in water?
   a. frogs  
   b. butterfly  
   c. hens  
   d. grasshoppers  

B. Short answer questions
1. What is a life cycle?  
2. Name the three stages of the life cycle of a cockroach.  
3. A tadpole differs from an adult frog in some ways. Consider the given points and write the differences between them.
   a. breathing method  
   b. habitat  
   c. food  
4. The given diagram represents the four-stage life cycle of a common and beautiful insect. Its young ones eat leaves. Answer the questions that follow.
   a. The life cycle of which animal is shown here?  
   b. Draw the life cycle in your notebook and label it.  
   c. Where does the insect generally lay its eggs?  
   d. During which stage of its life cycle, does the insect not eat anything?  

5. In a life cycle of a butterfly, its larva sheds its old skin and gets a new one. It happens several times. What is the process called? Define it.  
6. Define the following terms–
   a. incubation  
   b. metamorphosis  

C. Long answer questions
1. Give reason for the following–
   a. Eggs of chicken have a hard shell as their covering.  
   b. Frog’s eggs have jelly like covering.
2. Look at pictures A and B and answer the questions given below.
   a. What are they called at these stages?
   b. What are they called at the adult stage?
   c. In which stage of their life cycle are they, now?
   d. What do they eat at these stages?

D. HOTS

Observe the given life cycle of a mosquito. Which other animals have a similar life cycle as the mosquito?

Raft of eggs (laid on water’s surface) → Larva (just under water’s surface) → Pupa (just under water’s surface) → Adult

E. Values and life skills

Dengue fever is a disease spread by a mosquito called ‘Aedes’. We are advised to clean the stagnant water in our surroundings, and even to spread kerosene oil on water surface.

Why do you think that it will be helpful to prevent the spread of diseases caused by mosquitoes?
Will it affect the life cycle of mosquitoes anyway?
I Wonder

Investigate

I will: List the diseases spread by insects.
I need: Internet connection/books.
I do:
1. Collect the information from my elders, teachers, parents, family doctor and so on, about these diseases.
2. Make a list of diseases.
3. Sort out the diseases, for which the insects are responsible.
I observe:
The diseases spread by insects are

I conclude:
There are some insects in our surroundings that cause or spread many ............................................
........................................... . We interact with them in our daily life activities.

Fill the details in given table.

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<thead>
<tr>
<th>Diseases</th>
<th>Spread by</th>
<th>Can be prevented by</th>
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Suggested Activity

Arrange the pictures of life cycle of butterfly and at least two other animals.

Project Work

Hens lay eggs whereas a dog gives birth to its young one. Find out which other animals lays eggs and which ones give birth to young ones. Make a list of these. Also find out, what else is similar or different about their life cycle.
Answer the following questions.

1. Study the given flow chart carefully. What could ‘X’ and ‘Y’ represent?

   - Spends part of its life cycle in water? Yes — Hatches from an egg? Yes — Resembles the parent at first? No — ‘X’
   - Yes — Hatches from an egg? Yes — Three-stage life cycle? Yes — ‘Y’

2. Complete the flow chart and draw it in your notebook.

   - Animals lay eggs
     - Three-stage life cycle
       - The young doesn’t look like the parent.
         - The young looks like the parent.
           - Chicken
     - Have wings
     - Have wings

3. Study the pictures given below. They show the different stages of the life cycles of four animals. Use them to draw the life cycles of these four animals. Identify each stage and name the animals. (One is done for you.)

   - Hen
   - Chick
   - Egg