### Unit 4: Plant and Animal Adaptations

**Key Idea:**

4.1: Describe how all living things grow, take in nutrients, breathe, reproduce and eliminate waste.

4.2: Describe how plants must adapt to their environment in order to survive.

4.3: Describe how animals must be adapted to their environment in order to survive

* Structures and their functions (e.g. wings, legs, fins, scales, feathers, fur, etc)
* understand that animals respond to change in the environment (e.g. heart rate, eye, blinking, shivering)
* Animals change as seasons change

- Hibernation
- Migration (i.e. moving from place to place to meet needs) including humans

4.4: Recognize that traits of living things are both

* Inherited (color of flowers, eye color)
* learned/acquired (being able to swim, having scars).

### Unit Overview

All living things have the same basic needs. They are food, water, air and shelter. Living things meet their needs in a variety of ways. Meeting basic needs isn’t always easy, but living things must do it to survive.

Plants and animals have adaptations that help them meet their needs. An adaptation is a body part or a behavior that a living thing gets from its parents, and that helps it to survive.

When living things reproduce, the offspring will carry the parent’s traits. Most traits develop through a combination of heredity and nurture. Nurture is everything.

In your life– where you live, the people you know, and the activities you do. Nurture influences many traits.
### Essential Question:
How are plants and animals well-suited to live in their environments?

### Key Idea 4.1:
Describe how all living things grow, take in nutrients, breathe, reproduce and eliminate waste.

### Scientific Terms:

### Content:
- **Characteristics of living things:**
  - They grow during their lives,
  - They need nutrients. (Nutrients are substances a living thing needs for energy and growth.)
  - They can make more of their own kind through reproduction (producing young, or more of its own kind).
  - They die at the end of their life cycles.
- **Nonliving things:** They are not alive, so they do not need nutrients. They cannot reproduce.
- **How do living things grow?**

Plants and animals need food in order to grow and to live. Food supplies the energy and the materials that are necessary for plants and animals to grow.

Plants grow by turning the sun’s energy into sugar and starches which they use to make leaves, flowers, and fruits. Plants change some sugars and store them as starches. The sugars and starches that plants use to live and grow might be stored in their roots, stems, leaves, fruits and seeds.

**Life-Cycle**
- **Plants from seeds:** Seeds stay in the ground until conditions are right.

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**Unit 4: Plant and Animal Adaptations**

<table>
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<tr>
<th>ISNUIT 8:  উদ্ধিতি ৪: উদ্ভিদ ও প্রাণীর অভিলোহণ</th>
<th>Content:</th>
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<tr>
<td><strong>প্রাণীরনীয় প্রশ্ন:</strong> কিভাবে উদ্ধিতি ও প্রাণীর তাদের কসবাদের পরিবেশের সাথে খাঁচা করা হয়?</td>
<td>• <strong>জীবনী বেষ্টনির বৈশিষ্ট্যোক্তি:</strong></td>
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<tr>
<td><strong>মুল ধারণা ৪.১: কিভাবে কিভাবে সকল জীবনী বসন্ত বৃদ্ধি হয়, ছানা গৃহস্বামী করে, দিবসাব সরাসরি করে এবং কার পদার্থ বৃদ্ধি করে।</strong></td>
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<td><strong>বৈজ্ঞানিক শব্দাবলী:</strong></td>
<td>• <strong>প্রাণীরনীয় প্রশ্ন:</strong> কিভাবে উদ্ধিতি ও প্রাণীর তাদের কসবাদের পরিবেশের সাথে খাঁচা করা হয়?</td>
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<td>1) উদ্ধিতির উপরি কাঠামো, 2) উদ্ধিতি ৪) উদ্ধিতি ৫) উদ্ধিতি ৬) উদ্ধিতি ৭) উদ্ধিতি ৮) উদ্ধিতি ৯) উদ্ধিতি ১০) জীবনীনাথ শিল্পীর ১১) জীবনীনাথ শিল্পীর</td>
<td>• <strong>প্রাণীরনীয় প্রশ্ন:</strong> কিভাবে উদ্ধিতি ও প্রাণীর তাদের কসবাদের পরিবেশের সাথে খাঁচা করা হয়?</td>
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for germination. Then they grow into seedlings. A flower provides nectar for bees. The bees carry pollen to another flower. Sperm cells in the pollen join with egg cells. Flowers turn into fruit with seeds inside. Animals eat the fruit and deposit the seeds in a new area.

Plants from spores (for example, fern):

Clusters of spores grow on the fern fronds. Spores are released from the clusters. Spores land on damp ground. They grow into heart-shaped plants. This is the gametophyte generation.

The gametophytes produce sperm and eggs. The sperm fertilize the eggs. The fertilized eggs develop into fiddleheads. The fiddleheads uncurl and grow into fern fronds. This is the sporophyte generation.

Animals get the energy they need from the food they eat. They cannot make their own food. They must eat.

When animals eat carrots, which are roots, or tomatoes, which are fruits, or asparagus, which are stems, they are eating the sugars and starches that the plant stored.

Animals grow and develop in different ways. Animals with internal skeletons, such as chickens and horses: The bones inside their bodies grow and they do not change form. They just grow bigger.

Animals with exoskeletons, such as spiders and crayfish: These animals shed their hard outer covering when they grow. Because the exoskeletons do not grow as they grow, the animals must shed, or molt, their exoskeletons. Each time the animal molts, it grows a little bigger. Then it grows a new and larger shell.

Other animals, such as butterflies and moths, go through a process called metamorphoses. This means that their bodies change form. First they hatch from the egg as a larva or caterpillar. The
larva or caterpillar then eats, grows and forms a chrysalis or cocoon. Inside the cocoon or chrysalis, the caterpillar is called a pupa. The pupa then changes form and an adult butterfly or moth will emerge.

Animals grow at different rates. A fruit fly grows to be an adult in about 10 days. A dog develops about seven times faster than a human.

**Breathe:**

When a fish opens its mouth water comes in and washes over the gills. They absorb oxygen from the water and pass it into the fish’s body. Waste water goes out through the slits.

**Eliminate waste:**

Animals release waste products. They also release waste products when they breathe. They release carbon dioxide as a waste product.

Plants release oxygen as a waste product.

**Reproduction**

Plants: Flowers of the plants produce fruit, and the fruit contains seeds. The seeds grow into new plants.

Animals: Almost all animals come from fertilized eggs. Fertilized eggs are eggs that have joined with sperm cells. Mammals, such as kittens and humans, begin life inside a mother. Marsupials are mammals that don’t develop fully inside the mother’s bodies. They need to stay in the mother’s pouch until they get bigger. The kangaroo is an example of a marsupial. Many birds lay eggs in nests. The eggs have shells that protect the growing embryos inside. When many young birds hatch, they have no feathers. They need to be fed and kept warm.
Most reptiles also lay eggs. But when reptiles hatch, they are ready to survive on their own. Fish and amphibians lay their eggs in water. When fish hatch, they look just like their parents. They are ready to survive on their own.

<table>
<thead>
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<td>1. What do plants and animals need in order to grow?</td>
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<td>2. How do animals with exoskeletons grow?</td>
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<td>3. What animals have internal skeletons?</td>
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<td>4. What animals go through metamorphoses?</td>
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<td>5. What is plants’ waste product?</td>
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<td>6. What animals can survive on their own when hatch?</td>
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<tr>
<td>1) প্রাণী ও উদ্ভিদের বৃদ্ধির জন্য কি কি প্রয়োজন?</td>
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<tr>
<td>2) জীবদের উপরিকাঠামো সংযুক্ত প্রাণীরা কিভাবে বৃদ্ধিগ্রস্থ হয়?</td>
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<td>3) কোন কোন প্রাণীর অংশসংক্রান্ত কমল রয়েছে?</td>
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<td>4) কোন প্রাণী জীবচক্রে মেটামরফোসিস পথায় অতিক্রম করে?</td>
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<td>5) প্রাণীরা কি কি অংশন্তায় বল উৎপাদন করে?</td>
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<td>6) জন্মের পর থেকে কোন কোন প্রাণী বেঁচে থাকার সংগ্রামে প্রস্তুত থাকে?</td>
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Scientific Terms:
1. evaporate

Content:
In order to survive in their environment, plants must adapt to that environment. Plants in different environments have different leaves, flowers, stems, and roots. These structures may be different in size, shape, thickness, color, and scent.

Structures of living things are different to fit their environment and the needs of the species. For example, plants of the desert, such as cactus, store water in their leaves and trunks. They have small needle-like leaves so water doesn’t easily evaporate. Many desert plants store the sun’s energy but don’t make food during the hot daytime, so that they do not lose water.

Seeds need space, light, nutrients and water in order to grow. So parent plants need to spread their seeds far away from themselves. Species of plants have also adapted ways to spread their seeds. Plants that depend on wind to carry seeds have seeds that are tiny and light or have wing-like structures. Plants that live near moving water may have seeds or fruit that float. Some plants depend on animals to spread their seeds. These plants must make tasty, colorful fruit to attract animals.

When environmental conditions change, living things respond or also change. For example, the leaves of some green plants...
change position as the direction of light changes. Parts of some plants change with the seasons. Fruit and seeds leave the plants; leaves may change color and drop. Later new leaves and flowers grow.

In nature, organisms of a species compete fiercely for food, space, light, water and mates. Individual differences give some members of a species a better chance of surviving and reproducing. For example, a tall tree gets more sun than the smaller trees that live in its shade.

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<tbody>
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<td>1. How is a cactus adapted to its environment?</td>
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<tr>
<td>2. How do plants respond to changes in the environment?</td>
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<tr>
<td>(১) প্রাকৃতিক পরিবেশে কাছাটে উদ্ভিদ কিভাবে অভিবাসন করে।</td>
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<tr>
<td>(২) পরিবেশের পরিবর্তনের সাথে উদ্ভিদে কিভাবে সাজে দেয়া।</td>
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paribarthoner pelo on akok udhironder bibidh danesh. fokunon o bijnadon der mul udhiron der poudhok hoye poerdha. paro palon lorkho paribarthon korar. porer nataon pata o fulo jaknaya.

prakrititobe bishnuprojighitar kastomobha kudna, jayagha, aulon, pani o snder jona durnatati sagnati hoy. kichhu kichhu projighitar danasa chikte thaka o bang he bishomera korte belo sushibha paay. jeman jarha borkha, furo borkha tulanaya abikoter suryaalok poere thakar.

parbalochna:
(1) prakritik paribesho kainosh udhiron kibhabe abhibashon korar?
(2) paribeshaer paribarthoner sahoto udhironal kibhabe saajbho dey?
## Unit 4: Plant and Animal Adaptations

**Essential Question:** How are plants and animals well-suited to live in their environments?

**Key Idea 4.3:** Describe how animals must be adapted to their environment in order to survive.
- Structures and their functions (e.g., wings, legs, fins, scales, feathers, fur, etc.)
- Understand that animals respond to change in the environment (e.g., heart rate, eye blinking, shivering)
- Animals change as seasons change
  - Hibernation
  - Migration (i.e., moving from place to place to meet needs) including human

**Scientific Terms:**
1. migrate
2. hibernate
3. perspire

**Content:**
Animals must be adapted to their environment in order to survive. Often an animal is born with changes to its body that give it a better chance of survival than other animals of its species. Changes such as longer legs or larger eyes allow an animal to find more food and live longer than those that have not changed. When animals with these body changes have babies, the changes are passed on to their young. Eventually, the animals with these characteristics become the most common members of the species.

For example, bats are the only mammals that fly. Their ancestors were small mammals that lived in trees. Over millions of years, these mammals grew flaps of skin on their bodies. They began to glide from one tree to another to find food. Eventually, the bones of their front feet lengthened. The long fingers were covered with thin skin, which formed the bat’s wings.

Animals such as lynxes grow more fur for the cold winter. This fur insulates the
animals. It keeps their body heat in and the cold out.

Seals, whales, and walruses all live in cold-water habitats. They have a thick layer of blubber, or fat, under their skin that helps keep their body warm.

Animals lose much of their body heat through their ears. The arctic fox has tiny ears compared to those of its cousin, the red fox. The arctic fox’s smaller ears help it keep more heat in its body.

A penguin’s feathers help keep it warm in cold water. The outer feathers are waterproof to keep water away from the penguin’s skin. Fluffy feathers called down trap warm air between its skin and its outer feathers.

The long legs and beak of the ibis allow it to walk into shallow rivers and find food in the riverbed.

A bullfrog’s eyes are on the top of its head. This positioning allows the frog to look out for danger without bringing the rest of its body out of the water.

A mountain goat’s foot has a hard covering called a hoof. Each hoof is split and has a rubbery bottom to give the goat a secure grip on uneven, rocky ground.

Animals respond to changes in the environment too.

When the weather warms, they perspire. When it cools, they shiver. Other changes cause their eyes to blink, or speed up their hearts and breathing. Animals learn about environmental changes through their senses. This information can warn of danger or help find food and mates.
To perspire is to release extra heat by letting water escape through the skin.

Animal species have adapted their behaviors to survive seasonal changes. Some animals may migrate to warmer or cooler climates. You may have noticed that you see certain birds only in the spring and summer. Perhaps you have seen geese flying north or south. Other animals, such as chipmunks and bears, hibernate during the winter by living on stored fat.

To migrate is to move from one place to another, usually with the change of seasons.

To hibernate is to go to sleep for the winter and live on stored fat.

In nature, animals compete fiercely for food, space, light, water and mates. For example, the peacock with the brightest tail has the best chance of attracting mates and reproducing.

Some animal behaviors are influenced by environmental conditions. Birds and other animals build nests when the seasons and the conditions are right for the eggs and the young.

Besides behavior, certain animal characteristics are influenced by changing environmental conditions. For example, animals may store fat or grow thick coats to prepare for winter. They might also change fur color to white for camouflage in the snow. When the weather warms, they shed their winter fur and fat, and change color again.

Animals are the sizes they are for a reason. Their size helps them survive. Giraffes can eat food that other animals cannot reach. They can also spot their enemies quickly. With their long necks, they can see over
bushes and trees. Some monkeys can move quickly because they are so small. Their speed helps them get food and avoid enemies.

There are differences among members of the same population. These differences are called variations. Variations among organisms might include color, shape, or size. Variations can affect the survival of a population. Animals that survive can reproduce. The variations that helped them survive are passed on to their young. For example, an island had too little food for all the elephants. The small elephants needed much less food than the large elephants. They were better able to live and reproduce. After a time, there were only small elephants living on the island.

Color can also affect survival. Suppose there are two colors of insects in a population. The two colors are green and red. The green insects are more likely to survive in a grassy place. They are not as easy to find as the red insects.

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<tbody>
<tr>
<td>1. What do animals do when they perspire?</td>
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<tr>
<td>2. Give one example of how an animal responds to changes in the seasons.</td>
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<tr>
<td>3. Give one example of how certain animal characteristics are influenced by changing environmental conditions?</td>
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<td>4. How does color affect survival?</td>
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<tr>
<td>1. হ্যামাঙ হলে গাছীরা কি করে?</td>
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<td>2. ফল পরিবর্তনের সাথে গাছীরা কিভাবে প্রতিরোধ করে তার একটি উদাহরণ দাও।</td>
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<tr>
<td>3. প্রাকৃতিক পরিবেশের পরিবর্তন কিভাবে গাছীর দিশিয়ায়কে প্রভাবিত করে তার একটি উদাহরণ দাও।</td>
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<td>4. পরিবেশে টিকে থাকার ক্ষেত্রে গাছীর বর্ণ কিভাবে সাহায্য করে?</td>
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Unit 4: Plant and Animal Adaptations

Essential Question: How are plants and animals well-suited to live in their environments?

Key Idea 4.4: Recognize that traits of living things are both
* inherited (color of flowers, eye color).
* learned/acquired (being able to swim, having scars)

Scientific Terms: 1. trait 2. inherited 3. offspring

Content:

Traits are qualities or characteristics of a living thing or a species. Most fish have one eye on each side of their head. Bean plants have green leaves, and birds have two wings.

A species is a group of living things that share characteristics. All human beings belong to the same species. All dogs belong to the same species too.

Scientists group living things according to their shared characteristics. Living things reproduce members of their own species. Most living things look very much like other members of their species. No two tigers have stripes in exactly the same place, but you can tell at a glance that each one is a tiger. Tigers belong to the same species.

Inherited traits are passed down from parents to offspring.

Offspring are new living things that parents produce, or the young of plants and animals.

Some traits can be inherited and some can be learned.

Inherited traits are passed from parents to their young. For example, frogs are able to swim when they are born. A parent frog will pass on the ability to swim to its young. If two
black dogs have puppies, most of their puppies will probably be black. Sunflowers produce seeds that grow into new sunflowers.

A living thing can develop a new characteristic after it is born. These characteristics cannot be inherited or passed on. For example, you can build large muscles by lifting weights. You can dye your hair blond. A parrot can learn to say human words. But these traits cannot be passed on to offspring.

The ability to swim is a trait that must be learned by humans. It is not an inherited trait. Even if a mother and father are champion swimmers, their children can swim only if they are taught.

Review:
1. What are offspring?
2. Give an example of a trait.
3. Give an example of a trait that you inherited.
4. Give an example of a characteristic you learned.
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<th>উত্তরমালা</th>
<th>Answer Key</th>
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<td><strong>Unit 4</strong></td>
<td></td>
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<tr>
<td><strong>4.1</strong></td>
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<td>3. Chicken, horses.</td>
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<td>5. Oxygen.</td>
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<td>6. Fish.</td>
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<td><strong>4.2</strong></td>
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<tr>
<td>1. Cactus store water in their leaves and trunks. They have small needle-like leaves so water doesn’t easily evaporate. Many desert plants store the sun’s energy but don’t make food during the hot daytime so that they do not lose water.</td>
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<td>2. The leaves of some green plants change position as the direction of light changes. Parts of some plants change with the seasons. Fruit and seeds leave the plants; leaves may change color and drop. Later, new leaves and flowers grow.</td>
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|   | flying north or south.  
3. Animals may store fat or grow thick coats to prepare for winter. They might also change fur color to white for camouflage in the snow. When the weather warms, they shed their winter fur and fat, and change color again.  
4. Suppose there are two colors of insects in a population. The two colors are green and red. The green insects are more likely to survive in a grassy place. They are not as easy to find as the red insects.  
4.4  
1. Offspring are new living things that parents produce, or the young of plants and animals.  
2. Traits are qualities or characteristics of a living thing or a species. Most fish have one eye on each side of their head. Bean plants have green leaves, and birds have two wings.  
3. My parents have blue eyes and so do I. My parents are very tall and so am I.  
4. My parents were born and raised in China so they don’t speak English. I came to America when I was in third grade. I speak English in school and speak Chinese at home to my parents. I am bilingual. That’s my characteristic. |