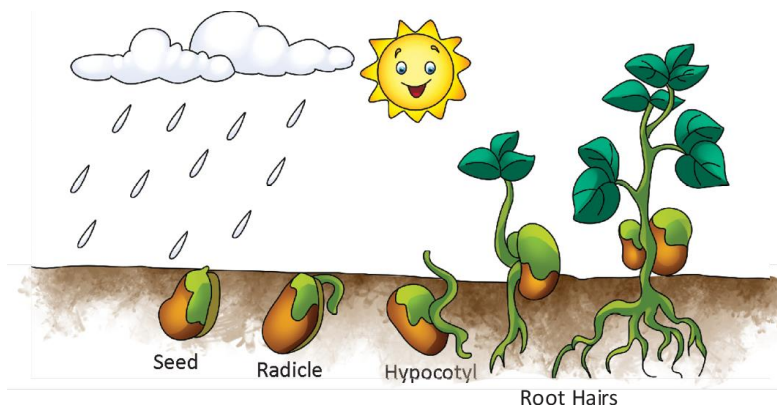


From Seed to Plant

What is a Plant?

A plant is a living thing that grows in the ground. Plants are very important because they give us food to eat (like apples and carrots), wood for building, and oxygen to breathe.

The journey of most plants begins with a tiny seed!



The Journey Begins: The Seed

A seed is like a tiny package with a baby plant inside, waiting for the right time to grow.

What's Inside a Seed?

- **Seed Coat:** This is the hard, outer shell. Its job is to protect the baby plant inside, like a little coat of armor.
- **Embryo:** This is the tiny, baby plant. It has the beginnings of roots, a stem, and leaves.
- **Food Store (Cotyledon):** This is the food packed inside the seed for the embryo. The baby plant uses this food for energy until it can make its own.

What a Seed Needs to Grow (Germination)

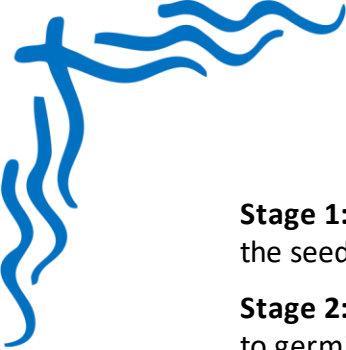
For a seed to "wake up" and start growing, it needs three main things. This process of a seed sprouting is called germination.

The 3 Keys to Germination:

- **Water:** Water softens the seed coat and signals the embryo to start growing.
- **Warmth:** Seeds need the right temperature to grow. Too cold or too hot, and they will stay sleeping. Most seeds like to be warm, but not hot.
- **Air (Oxygen):** Just like us, the baby plant needs to breathe to get energy from its food store.

The Life Cycle of a Plant

A plant goes through different stages in its life. This is called a life cycle because it happens over and over again.



Stage 1: Seed The journey starts with a seed, often planted in soil. The soil helps hold the seed in place and provides it with water and nutrients.

Stage 2: Germination (Sprouting) When the seed gets water, warmth, and air, it begins to germinate.

- A tiny root grows downwards into the soil to find water.
- A tiny shoot grows upwards towards the light.

Stage 3: Seedling The shoot pokes out of the soil, and the plant is now called a seedling. It's a young, small plant. The seedling grows its first leaves and starts using sunlight to make its own food.

Stage 4: Adult Plant The seedling grows bigger and stronger, becoming an adult plant. It develops all its main parts:

- **Roots:** Anchor the plant and absorb water and nutrients from the soil.
- **Stem:** Supports the plant and acts like a straw, carrying water from the roots to the leaves.
- **Leaves:** The "kitchen" of the plant! They use sunlight, air, and water to make food for the plant. This process is called photosynthesis.
- **Flower:** Many adult plants grow flowers. Flowers are often colorful and smell nice to attract bees and butterflies. Their main job is to make new seeds.
- **Fruit:** After the flower is pollinated (often by bees), it can grow into a fruit. The fruit protects the new seeds inside.

Stage 5: Making New Seeds (Pollination) Bees and other insects help move pollen between flowers. This is called pollination. Pollination allows the flower to create new seeds, and the cycle can start all over again!

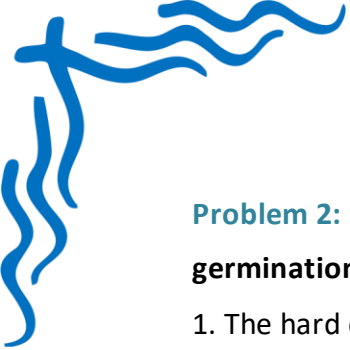
Practice Problems with Solutions

Problem 1: Matching Match the plant part to its job.

Plant Part	Job
1. Root	A. Makes food using sunlight.
2. Leaf	B. Makes seeds.
3. Stem	C. Soaks up water from the soil.
4. Flower	D. Carries water to the leaves.

Solution:

- Root → C. Soaks up water from the soil.
- Leaf → A. Makes food using sunlight.
- Stem → D. Carries water to the leaves.
- Flower → B. Makes seeds.



Problem 2: Fill in the Blanks Use the words from the box to complete the sentences.

germination, seed coat, seedling, sunlight

1. The hard outer part of a seed is called the _____.
2. The process of a seed sprouting is called _____.
3. A young plant that has just sprouted is a _____.
4. Leaves need _____ to make food for the plant.

Solution:

- seed coat
- germination
- seedling
- sunlight

Problem 3: What If? You plant a bean seed in a pot with soil. You give it water and put it in a warm, dark closet. Will it grow? Explain why or why not.

Solution:

Step 1: What does a seed need to germinate? A seed needs water, warmth, and air to sprout.

Step 2: Does the seed have what it needs? Yes. It has water (you watered it), warmth (it's in a warm closet), and air.

Step 3: What will happen next? The seed will germinate and sprout. A root will grow down and a shoot will grow up.

Step 4: What will happen after it sprouts? The new seedling needs sunlight to make food and grow strong. Since it is in a dark closet, it will grow tall and pale for a little while, searching for light, but it will not be able to survive for long. It will eventually die without sunlight.

Final Answer: Yes, the seed will start to grow (germinate) because it has water and warmth. But the new plant (seedling) will not survive for long because it needs sunlight to make food.

Summary of Main Concepts

- A plant's life starts with a seed.
- A seed contains a baby plant (embryo), a food store, and a protective seed coat.
- To germinate (sprout), a seed needs water, warmth, and air.
- A young plant is called a seedling.
- An adult plant has roots, a stem, leaves, and often flowers and fruits.
- Each plant part has an important job. Leaves make food, roots get water, and flowers make new seeds.
- This life cycle allows plants to keep growing, generation after generation.