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**Biology A & B: Plants**

**Earth Science: Plants**

**Tropisms**

Vocabulary in this section includes~

Tropism:

Gravity:

Touch:

Water:

Chemicals:

 A **tropism** is a plant's growth response toward or away from a stimulus, or action. An example of a tropism is a plant turning its leaves toward a light. The light is the stimulus and causes the plant to respond by turning its leaves in the direction of the light in order to receive more. Light can also be the stimulus for tropisms when the stems of plants grow toward light or when the roots of plants grow away from light into the ground.
 ***There are four other types of tropisms besides responses to light; these are responses to gravity, touch, water, and chemicals.*** **Gravity** often causes plant roots to grow downward and their stems to grow upward, even if the plant or seed is planted upside-down. When a climbing vine touches an object (like a plant or wall) the growth changes direction toward the object. **Water tropisms** may cause plants to grow downward or sideways to seek out water. **Chemical tropisms** may also cause plants to grow toward or away from certain chemicals.

**Example:** A newly sprouting seed is planted upside-down in the soil as shown below. Which of the following statements describes a tropism the plant may display?


A. The roots will grow downward into the soil.
B. The plant's stem will grow down into the soil and die.
C. The roots will not be able to find water.

**Answer:** A. Gravity or water will cause the roots to begin to grow downward into the soil even though the seed was planted upside-down.

**Life Cycle of Non-Flowering Plant**

Vocabulary in this section includes~

Non-Flowering Plants:

Spores:

Seeds:

Gametes:

Fertilization:

 ***There are two different types of non-flowering plants: those that produce spores and those that produce seeds***. A **seed** is a plant embryo packaged with stored food in a protective coat. A **spore** is a reproductive cell or group of cells. It is neither a male or female sex cell. It can develop into a plant that can produce sperm or eggs. Mosses, ferns, horsetails, and liverworts are all spore-producing non-flowering plants. They do not use flowers or fruit to reproduce as flowering plants do and can ***reproduce asexually*** (without differing sex cells). During the life cycle of a non-flowering plant, there are two main stages. Each stage produces a different type of plant structure. One structure produces egg and sperm cells (also called **gametes**), and the other produces spores.
 In the first stage of the life cycle of a spore-producing non-flowering plant, eggs and sperm are produced. The eggs and sperm then unite and undergo a process called **fertilization** that allows reproduction to take place. After reproduction, a new plant structure is formed and spores develop inside. When the conditions are right, the spores are released, and they will eventually grow into the plant structure that produces new gametes and continues the cycle. Spores can exist in a dormant stage for long periods of time before the conditions are suitable for them to begin growing. They are different from seeds because they do not have stored food inside to nurture a young plant. Spores need more specific environmental conditions to grow into young plants than seeds do, but they are often more resistant to bad weather and soil conditions.
 ***Seed producing, non-flowering plants do not produce spores, but do produce seeds. Conifers, such as pine trees, and cycads produce their seeds in cones.***

**Example:** What will happen if a non-flowering plant releases spores during a very dry period?

**A.** The spores will die, and the plant will be unable to reproduce.
**B.** The spores will remain dormant until there is enough water for them to grow.
**C.** The plant will be able to reproduce once, but no more than that.
**D.** The plant will continue to release spores until conditions for growth become favorable again.

**Answer:** B. Spores do not need the correct conditions, including amount of water, temperature, or soil, in order to survive in a dormant state. They can stay inactive for a very long time. Eventually, if the conditions become right, they will begin to grow into a plant.