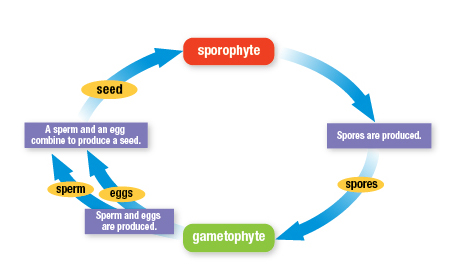
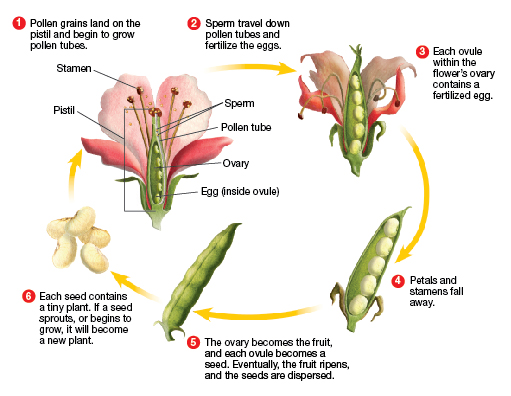
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1. How do plants obtain and use energy?
   1. Plants use photosynthesis to change light energy to chemical energy in the form of sugar.
   2. Plant cells have organelles called *chloroplasts* where photosynthesis takes place.
   3. Chloroplasts are made up of two membranes that surround stacks of smaller, circular membranes that contain chlorophyll, a green pigment.
   4. Chlorophyll absorbs light energy from the sun.
   5. Sunlight is made up of various wavelengths of light. Different wavelengths of visible light are seen as different colors.
   6. Chlorophyll absorbs many wavelengths, but it reflects more green light than it reflects other colors of light. As a result, most plants look green
   7. The light energy captured in chloroplasts is changed and stored in the bonds of a sugar called glucose.
   8. In the same process, oxygen gas is released.
   9. 
   10. In plants, extra glucose is stored as starch or changed to other types of sugar such as fructose or sucrose.
   11. In **cellular respiration**, cells use oxygen to release stored energy from the bonds of sugar molecules. This occurs in organelles called mitochondria.
   12. Cellular respiration also produces carbon dioxide and water.
2. What are the phases of a plant’s life?
   1. All plants complete their life cycle by alternating between two phases: the sporophyte and the gametophyte.
   2. In one phase, plants called sporophytes produce spores by meiosis. The spores are then released.
   3. Meiosis is a process of cell division in which each daughter cell receives half the chromosomes of the parent cell.
   4. Under the right conditions, spores grow into plants called gametophytes.
   5. Female gametophytes make eggs and male gametophytes make sperm.
   6. When a sperm fertilizes an egg, they form an embryo, which develops into a seed. The seed is released and can grow into a new sporophyte.
   7. 
3. How do seedless plants reproduce?
   1. In seedless plants, sperm, which have tails and swim to eggs to fertilize them, are released in the presence of water.
   2. The fertilized eggs grow into sporophytes.
   3. Some seedless plants, such as mosses, have a visible gametophyte phase.
4. How do seed plants reproduce?
   1. In most seed plants, the sporophyte makes two types of spores, male and female, that grow into microscopic male and female gametophytes.
   2. The male gametophyte is pollen, a tiny structure where sperm forms, which can be carried by wind, water, or animals.
   3. The female gametophyte produces eggs. **Pollination** happens when pollen lands on and fertilizes the female plant reproductive structure.
5. How do flowering plants reproduce?
   1. Flowers are reproductive structures with specialized leaves called sepals and petals, which can attract animal pollinators such as insects.
   2. A **stamen** is the male reproductive structure of flowers. At the tip of each is an *anther*, where pollen is produced.
   3. A **pistil** is the female reproductive structure of flowers. When pollen reaches the tip of a pistil, called the *stigma*, pollination occurs.
   4. A pollen tube grows down through the pistil into the ovary, where one or more ovules contain eggs.
   5. Sperm travel into the ovary and fertilize the eggs, which develop an embryo: a tiny, undeveloped plant.
   6. The ovule develops into a seed that surrounds and protects the embryo. The ovary becomes a fruit, which protects the seeds and helps them spread.
   7. 
6. How do plants reproduce asexually?
   1. Asexual reproduction allows a plant to reproduce without seeds or spores. Part of a parent plant, such as a stem or root, produces a new plant.
   2. Plantlets, tubers, and runners are examples of structures that plants use to reproduce asexually.
   3. Plantlets grow on the edges of a plant’s leaves. They fall off and grow on their own.
   4. Tubers, such as a potato, are underground stems that store nutrients and grow into a new plant.
   5. Runners, such as strawberries, are above-ground stems that can grow into new plants.
7. What are some ways plants respond to their environment?
   1. Anything that causes a reaction or change in an organism is a **stimulus**. Plants can respond to internal stimuli, such as water levels in cells.
   2. A stoma is an opening in the leaf’s surface which helps a plant exchange gases and respond to its water levels.
   3. Stomata are surrounded by two guard cells that open and close the stoma. When open, carbon dioxide enters, and oxygen and water vapor exit.
   4. The loss of water from leaves is called **transpiration**.
   5. A plant wilts when it loses more water than it can absorb through roots.
   6. When a plant is wilting, its stomata close, preventing further water loss.
   7. Plant growth in response to a stimulus is called a **tropism**.
   8. Plant tropisms are controlled by plant hormones, which are chemical messengers that cause changes in cells.
   9. A change in the direction of plant growth in response to light is called phototropism.
   10. Hormones build up in cells on the shaded side of the stem, causing them to lengthen, which makes the stem bend toward the light.
   11. A change in the direction of plant growth in response to gravity is called gravitropism.
   12. Most stems grow upward, away from Earth’s gravitational pull, and most roots grow downward, toward the pull of gravity.
   13. **Dormant** describes the inactive state of a seed or other plant part when conditions are not right for growth.
   14. Some plants shut down during winter or a dry season, living off of stored sugars.
   15. Many plants come out of dormancy in the spring, triggered by more direct sunlight, longer days, and increased rain.
8. In Season
   1. A plant’s growing season occurs when temperature, light, and water conditions favor growth for that type of plant.
   2. Out-of-season produce is grown in a greenhouse or shipped from other parts of the world.