



Structures and Functions of Living Organisms

Date:

6.L.1 Understand the structures, processes and behaviors of plants that enable them to survive and reproduce.

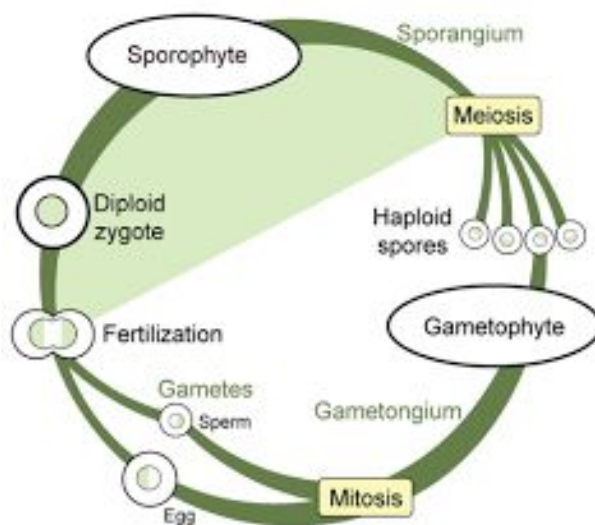
6.L.1.1 Summarize the basic structures and functions of flowering plants required for survival, reproduction and defense.

6.L.1.2 Explain the significance of the processes of photosynthesis, respiration and transpiration to the survival of green plants and other organisms.

Plants Alive

What are the characteristics of plants?

- All plants are _____, which means their bodies are made up of more than one cell.
- Plants are _____, which means their cells contain membrane-bound _____, including a _____ with the cell's DNA.
- All plants have a life _____ made up of _____ stages: *sporophyte* and *gametophyte*.
- In the _____ stage, plants make spores that are genetically identical to the parent plant.
- In the _____ stage, plants produce gametes. Female gametophytes produce eggs and male gametophytes produce sperm.

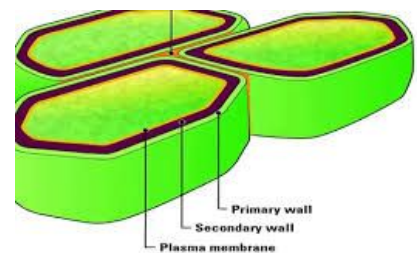


- _____ and _____ are sex cells.
- For a new plant to be produced, a sperm cell must fuse with, or _____, an egg. This is called _____ reproduction.
- The fertilized egg can grow into a sporophyte, and the cycle can _____ again.

Plant cells are surrounded by a rigid _____ that lies outside the cell membrane. The cell wall _____ and _____ the plant cell.

- The cell wall determines the size and shape of a plant cell. A carbohydrate called _____ is the main component of plant cell walls.

- The _____ of a cell wall helps plants stand upright.



_____ cell walls form in some plant cells after the cells are mature. These secondary cell walls give wood its strength.

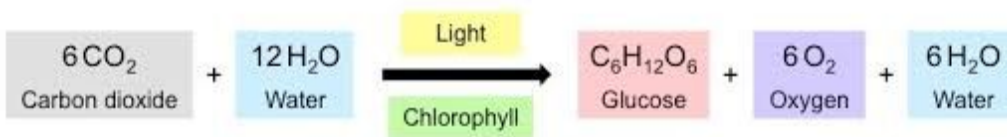
• Inside a plant cell is a large central _____, a membrane-bound organelle that stores water and helps to keep the plant upright.



• If the vacuole _____ water, the plant begins to _____.

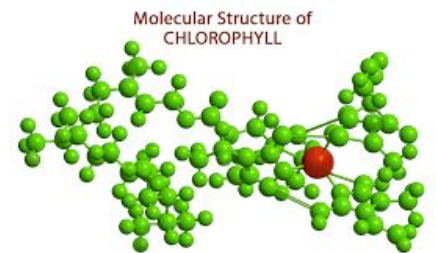
• Almost all plants are _____. Producers make their _____ food by using energy from their surroundings.

• The process that plants and other organisms use to convert solar energy to chemical energy is called _____.



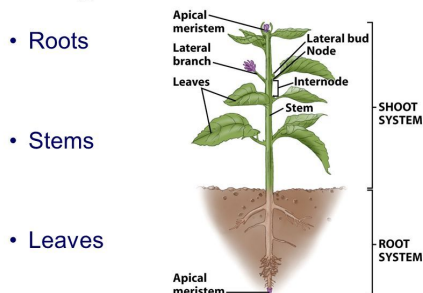
• In plants, photosynthesis occurs in an organelle called a _____. Chloroplasts contain special pigments called chlorophyll.

• _____ is a green pigment that captures energy from sunlight.



• Chloroplasts use this _____, along with _____ and water, to make food in the form of a sugar called _____.

Organs of Vascular Plants



Parts of a Vascular Plant...

• The _____ system is made of roots and other underground structures.

• The above-ground structures, such as stems, leaves, and flowers, make up the _____ system.

•The ___ major organs of vascular plants are _____, _____, and _____.

• _____ tissue transports water and materials between roots and shoots.

Seeds of Success

How are seed plants classified?

•Seed plants are vascular plants that reproduce by making seeds. A _____ is a plant embryo enclosed in a protective coating.

•Seed plants produce _____, a tiny structure in which sperm forms. The sperm cell fertilizes an egg cell, which develops into an embryo inside a seed.

•Seed plants are _____ based on whether or not their seeds are enclosed in a fruit.

pollen

The tiny granules that contain the male gametes of seed plants.



• _____ are plants that produce seeds that are not enclosed in a fruit. This includes cyads, ginkgoes, and conifers.

• _____ produce seeds in large, woody structures called *cones* that grow in a thick trunk.

• _____ produce round, grape-like seeds not covered by a cone.

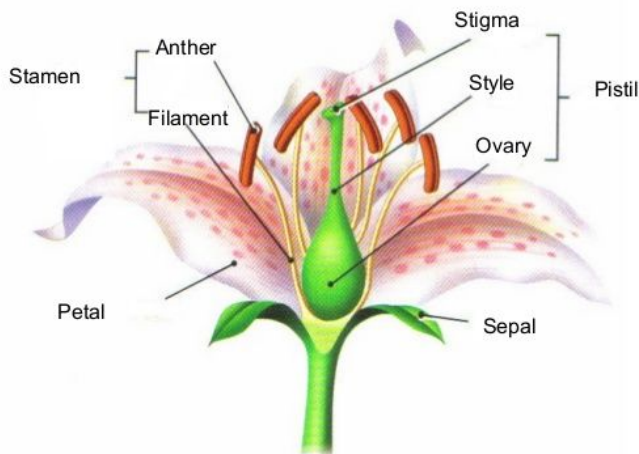
• _____, such as pine trees, also produce _____.

• _____ are vascular plants that produce flowers and fruits that surround and protect seeds. Flowers are reproductive structures of angiosperms.



- _____ cover and protect the flower while it is budding. Petals attract pollinators.
- A _____ is the male reproductive structure. The stamen is made up of an anther, which produces pollen, attached to a filament.
- A _____ is the female reproductive structure. The seed develops in the ovary at the base of the pistil. The _____ matures into a fruit covering the seed.

Structure of Flowers



Pharmaceuticals and Plants



- Many modern medicines are derived from _____ found in plants. Tropical rain forests are a source of many potential medicinal plants.

- The white willow tree's bark has a compound called _____ that led to the development of aspirin.

- Foxglove is a flowering plant that produces compounds used to make medicine for the _____.



Plant Processes



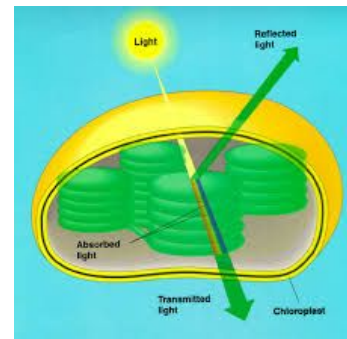
Fueled By the Sun

How do plants obtain and use energy?

•Plants use _____ to change _____ energy to _____ energy in the form of sugar.

•Plant cells have organelles called _____ where photosynthesis takes place.

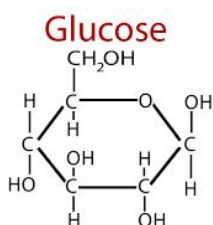
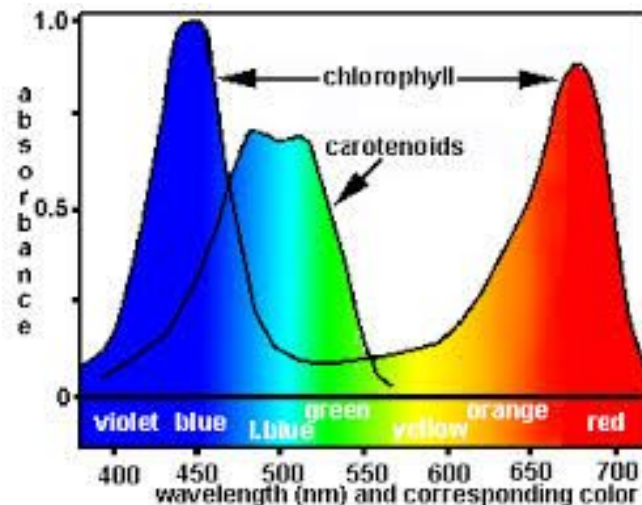
•Chloroplasts are made up of two membranes that surround stacks of smaller, circular membranes that contain chlorophyll, a _____ pigment.



•Chlorophyll _____ light energy from the sun.

•Sunlight is made up of _____ wavelengths of light. Different wavelengths of _____ light are seen as different colors.

•Chlorophyll absorbs _____ wavelengths, but it _____ more green light than it reflects other colors of light. As a result, most plants look green.



•The _____ energy captured in chloroplasts is changed and _____ in the bonds of a sugar called glucose.

- In the same process, _____ gas is _____.
- In plants, _____ glucose is _____ as starch or changed to other types of sugar such as _____ or _____.
- In _____, cells use oxygen to release stored energy from the bonds of sugar molecules. This occurs in organelles called _____.
- Cellular respiration also _____ carbon dioxide and water.

Glucose + Oxygen → Carbon Dioxide + Water + ATP



How do seedless plants reproduce?

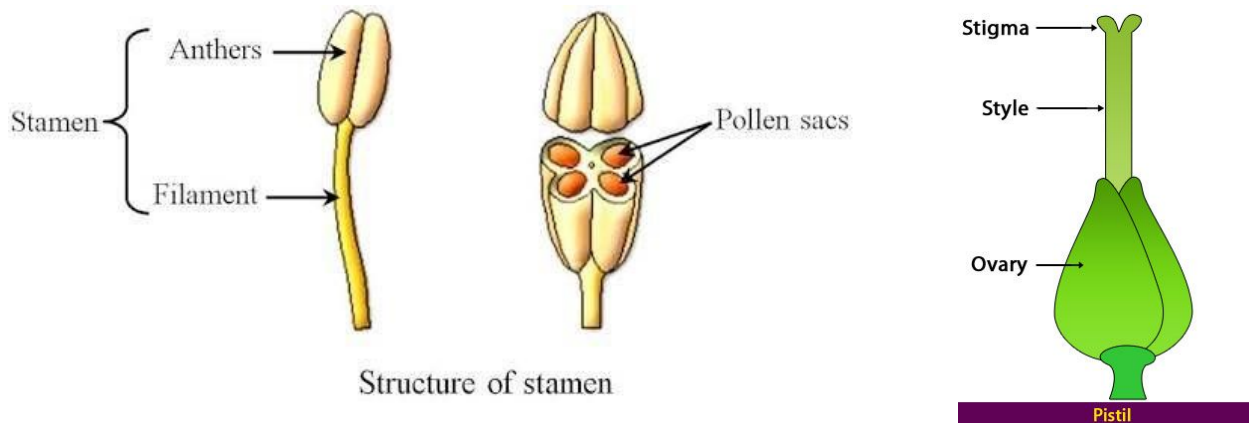
- In _____ plants, sperm, which have tails and swim to eggs to fertilize them, are released in the presence of water.
- The fertilized eggs grow into _____.
- Some seedless plants, such as _____, have a visible gametophyte phase.
- In most _____ plants, the sporophyte makes _____ types of spores, male and female, that grow into microscopic male and female gametophytes.
- The _____ gametophyte is _____, a tiny structure where sperm forms, which can be carried by wind, water, or animals.
- The _____ gametophyte produces _____. _____ happens when pollen lands on and fertilizes the female plant reproductive structure.

How do flowering plants reproduce?

- _____ are _____ structures with specialized leaves called sepals and petals, which can attract animal pollinators such as insects.

• A _____ is the _____ reproductive structure of flowers. At the tip of each is an _____, where pollen is produced.

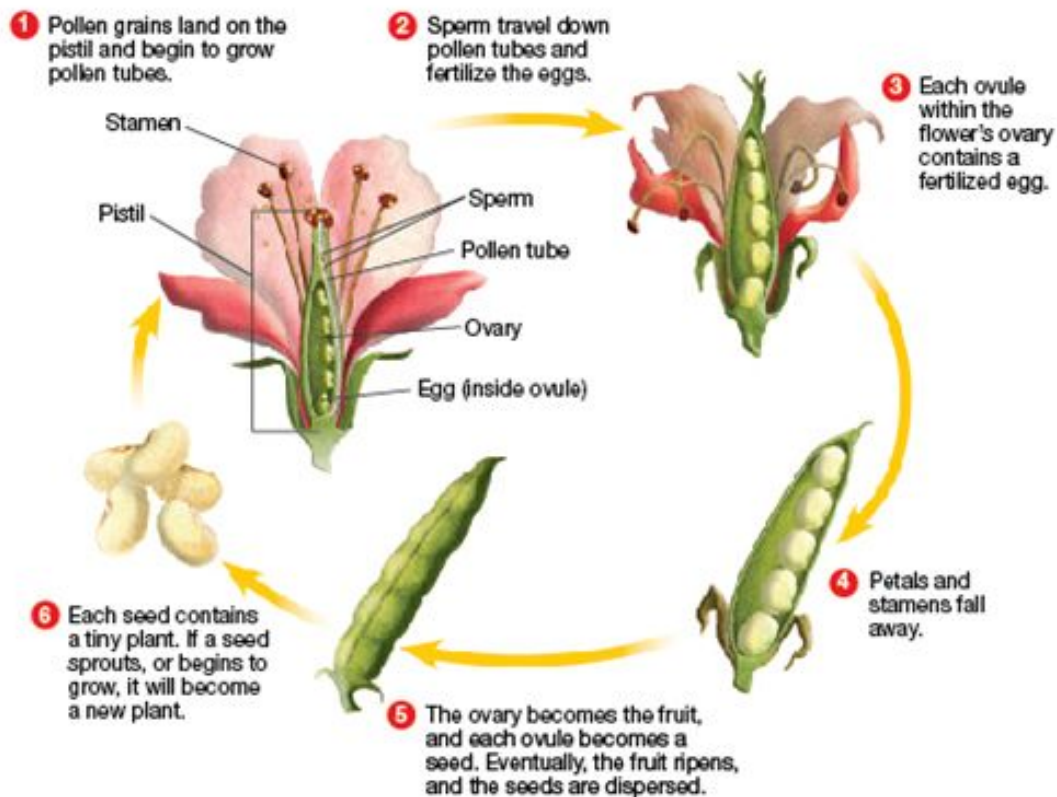
• A _____ is the _____ reproductive structure of flowers. When pollen reaches the tip of a pistil, called the _____, pollination occurs.



• A _____ tube grows down through the pistil into the ovary, where one or more _____ contain eggs.

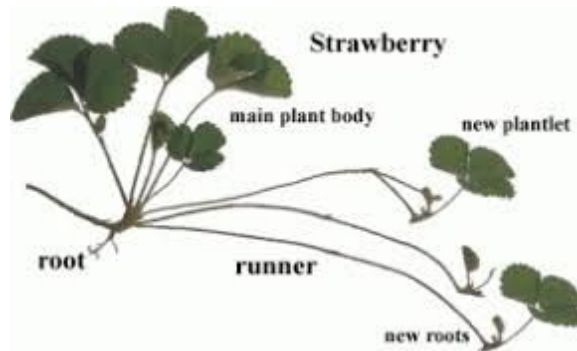
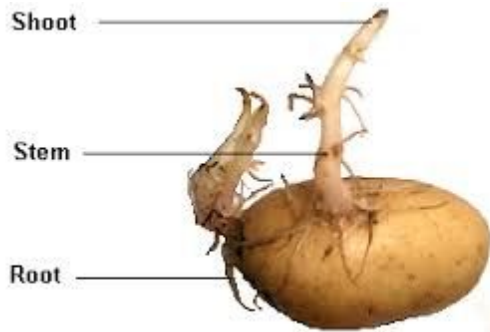
• _____ travel into the ovary and fertilize the eggs, which develop an _____: a tiny, undeveloped plant.

• The ovule _____ into a seed that surrounds and protects the embryo. The _____ becomes a _____, which protects the seeds and helps them spread.



How do plants reproduce asexually?

- _____ 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.
- Plantlets, tubers, and runners are _____ of structures that plants use to reproduce asexually.
- _____ grow on the edges of a plant's leaves. They fall off and grow on their own.
- _____, such as a potato, are underground stems that store nutrients and grow into a new plant.
- _____, such as strawberries, are above-ground stems that can grow into new plants.



Action, Reaction

What are some ways plants respond to their environment?

•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.

•A stoma is an opening in the leaf's surface which helps a plant exchange gases and respond to its water levels.



•Stomata are surrounded by two guard cells that open and close the stoma. When open, carbon dioxide enters, and oxygen and water vapor exit.

•The loss of water from leaves is called transpiration.

•A plant wilts when it loses more water than it can absorb through roots.

•When a plant wilts, its stomata close, preventing further water loss.



•Plant growth in response to a stimulus is called a tropism.

•Plant tropisms are controlled by plant hormones, which are chemical messengers that cause changes in cells.

•A change in the direction of plant growth in response to light is called phototropism.



• _____ build up in cells on the _____ side of the stem, causing them to lengthen, which makes the stem bend toward the light.

• A change in the direction of plant growth in response to gravity is called _____.

• Most _____ grow _____, away from Earth's gravitational pull, and most _____ grow _____, toward the pull of gravity.



• _____ describes the inactive state of a seed or other plant part when conditions are not right for growth.

• Some plants _____ down during winter or a dry season, living off of stored sugars.

• Many plants come out of dormancy in the _____, triggered by more direct sunlight, longer days, and increased rain.

In Season

• A plant's growing _____ occurs when temperature, light, and water conditions _____ growth for that type of plant.

• Out-of-season produce is grown in a greenhouse or shipped from other parts of the world.

Photosynthesis

Energize!

How do the cells in an organism function?

• _____ must capture and use _____ or they will die.

• _____ energy, living things _____ replace cells, build body parts, or reproduce.

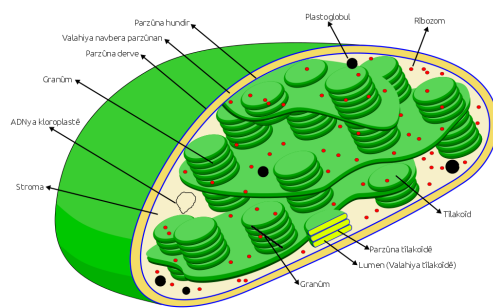
• _____ contains _____ energy that cells need to carry out life processes.

- _____ make their own food. Most use energy from the sun. Some use chemicals to make food.
- _____ must eat other living things to get food. They may eat producers or other consumers.
- _____ get energy by breaking down dead organisms or wastes of other organisms.

Cooking with Chloroplasts

How do plant cells make food?

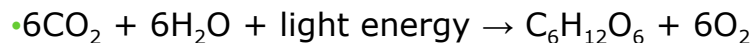
- _____ is a process by which plants use energy from sunlight, carbon dioxide, and water to make sugars.
- _____ is _____ into the air during photosynthesis.



- Photosynthesis takes place in organelles called _____.

- A green pigment called _____ in chloroplasts captures energy from sunlight.

- This _____ is used to _____ carbon dioxide and water to form the sugar glucose and oxygen gas.



- Plants _____ glucose, which is a _____ that stores chemical energy.

- When organisms eat plants, they use the _____ sugars for _____. What occurs in the organelle shown below?



