



# 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.**

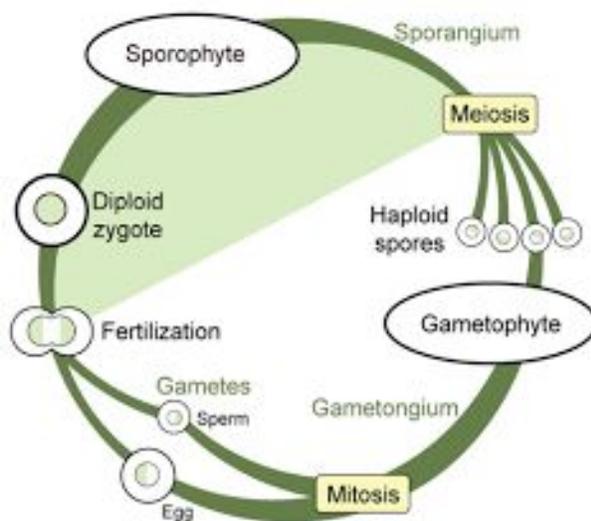
6.L.1.1 Summarize the basic structures and functions of flowering plants required for survival, reproduction and defense.

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.



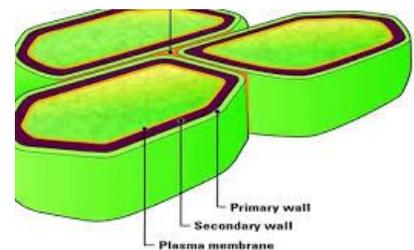
- \_\_\_\_\_ and \_\_\_\_\_ are sex cells.
- For a new plant to be produced, a sperm cell must fuse with, or \_\_\_\_\_, an egg. This is called \_\_\_\_\_ reproduction.
- The fertilized egg can grow into a sporophyte, and the cycle can \_\_\_\_\_ again.

- 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.

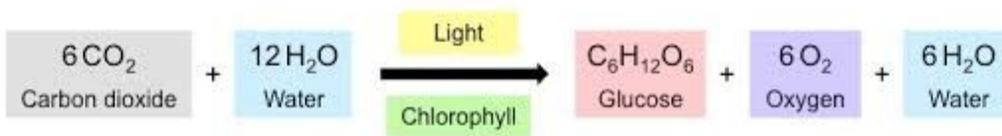
• Inside a plant cell is a large central \_\_\_\_\_, a membrane-bound organelle that stores water and helps to keep the plant upright.



• If the vacuole \_\_\_\_\_ water, the plant begins to \_\_\_\_\_.

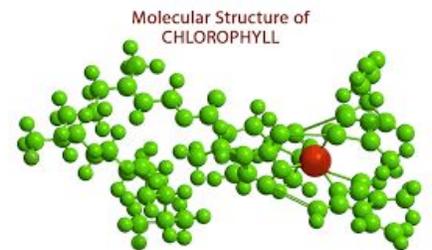
• Almost all plants are \_\_\_\_\_. Producers make their \_\_\_\_\_ food by using energy from their surroundings.

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



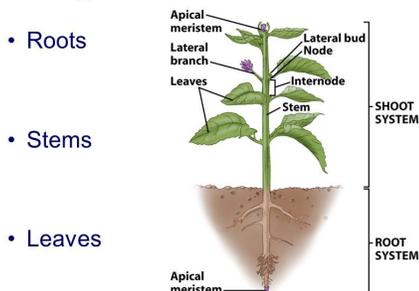
• In plants, photosynthesis occurs in an organelle called a \_\_\_\_\_. Chloroplasts contain special pigments called chlorophyll.

• \_\_\_\_\_ 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?

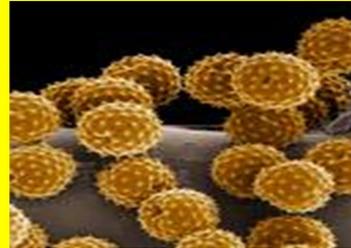
•Seed plants are vascular plants that reproduce by making seeds. A \_\_\_\_\_ is a plant embryo enclosed in a protective coating.

•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.

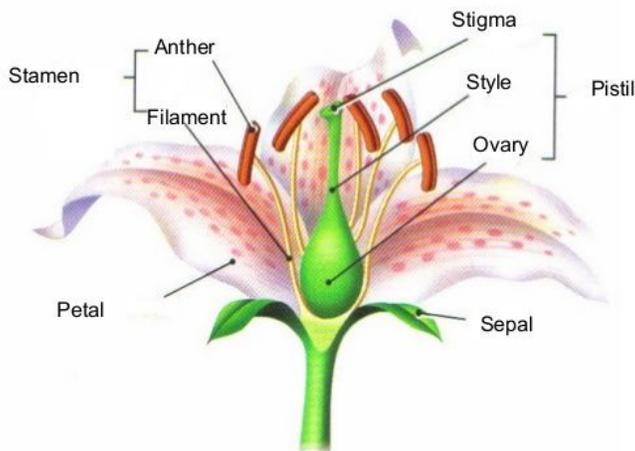
• \_\_\_\_\_, such as pine trees, also produce \_\_\_\_\_.

• \_\_\_\_\_ 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



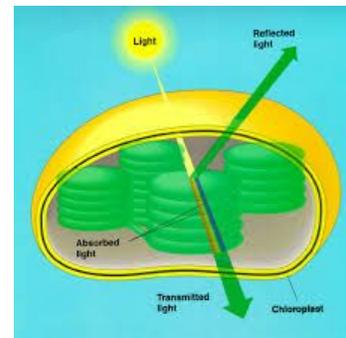
### Fueled By the Sun

#### 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.

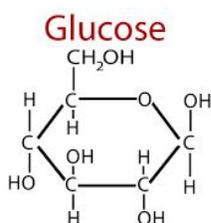
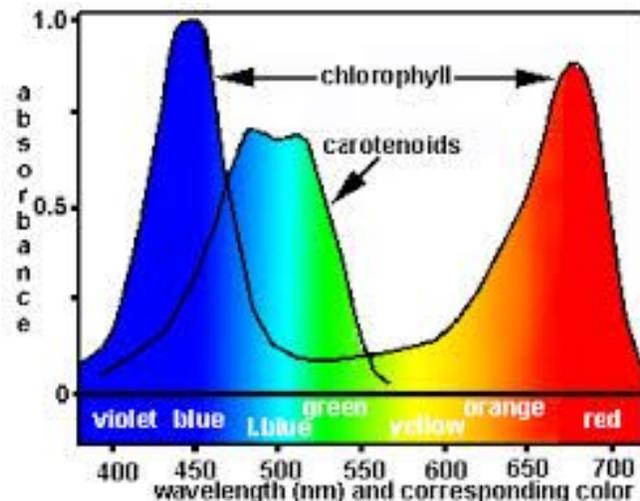
•Chloroplasts are made up of two membranes that surround stacks of smaller, circular membranes that contain chlorophyll, a \_\_\_\_\_ pigment.



•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?

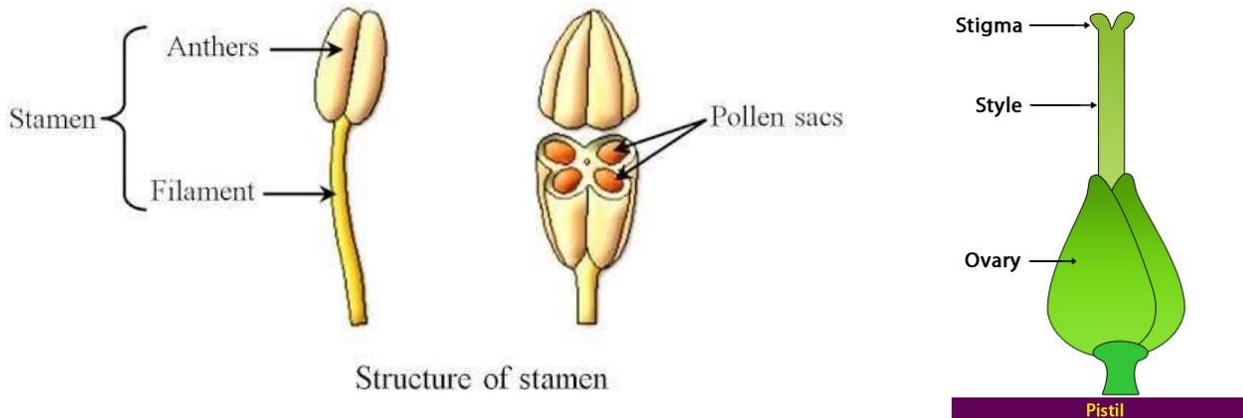
- In \_\_\_\_\_ plants, sperm, which have tails and swim to eggs to fertilize them, are released in the presence of water.
- The fertilized eggs grow into \_\_\_\_\_.
- Some seedless plants, such as \_\_\_\_\_, have a visible gametophyte phase.
- In most \_\_\_\_\_ plants, the sporophyte makes \_\_\_\_\_ 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.

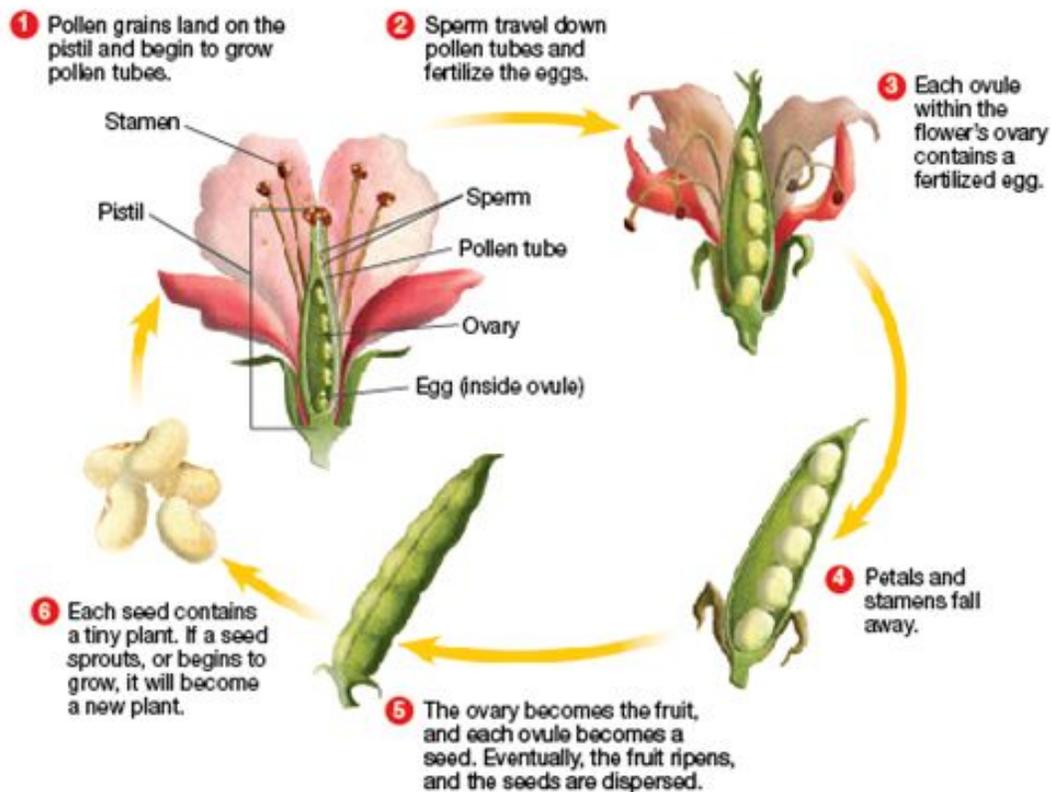
• A \_\_\_\_\_ is the \_\_\_\_\_ reproductive structure of flowers. When pollen reaches the tip of a pistil, called the \_\_\_\_\_, pollination occurs.



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

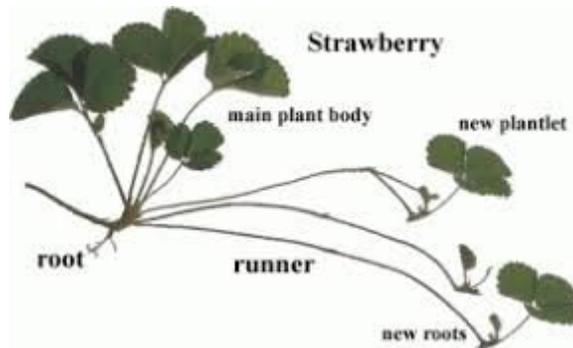
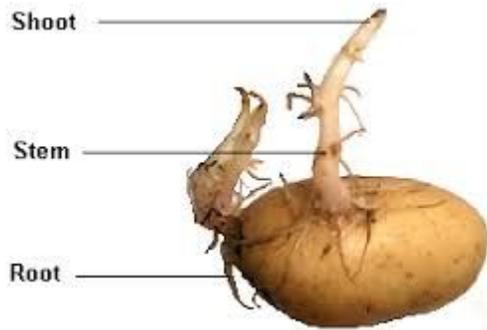
• \_\_\_\_\_ travel into the ovary and fertilize the eggs, which develop an \_\_\_\_\_: a tiny, undeveloped plant.

• 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 surround and control 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.

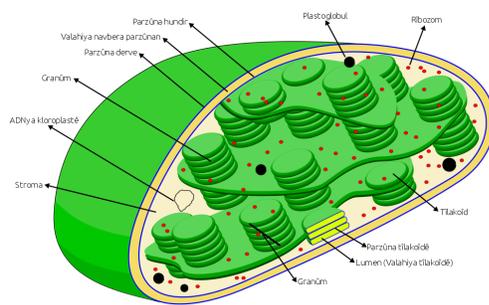
• \_\_\_\_\_ contains \_\_\_\_\_ energy that cells need to carry out life processes.

- \_\_\_\_\_ 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?





