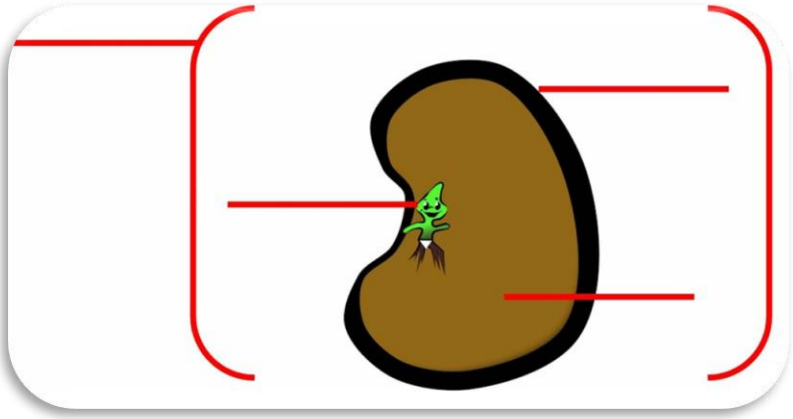
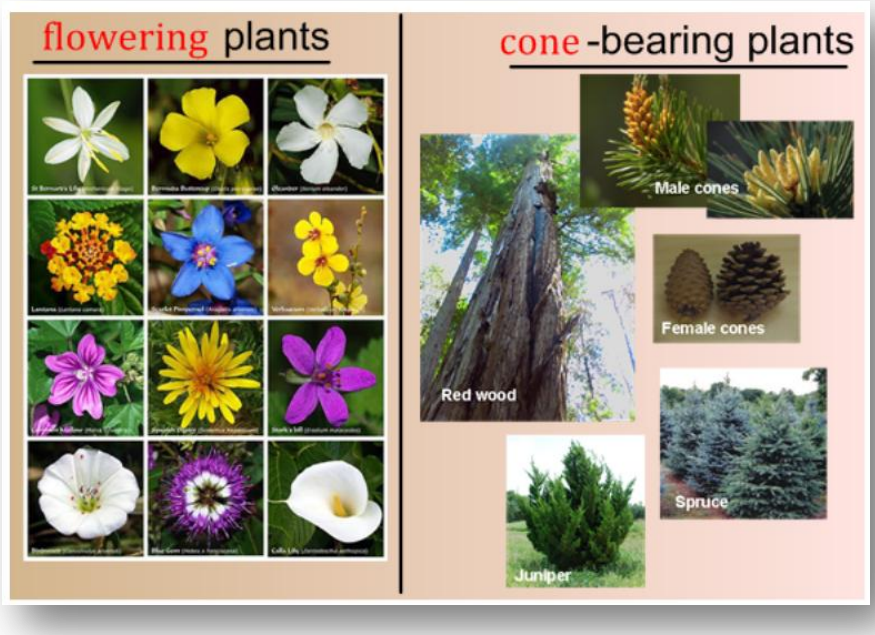
Germination **Plant Unit Reading and Activity Guide**

- When _____ are dispersed from the _____ plant, they can either lay _____ or they can begin to grow immediately given the right conditions.
- This early stage of seed growth is called _____.
- The roots begin to grow _____, while the stem and leaves grow _____.



Seed-producing

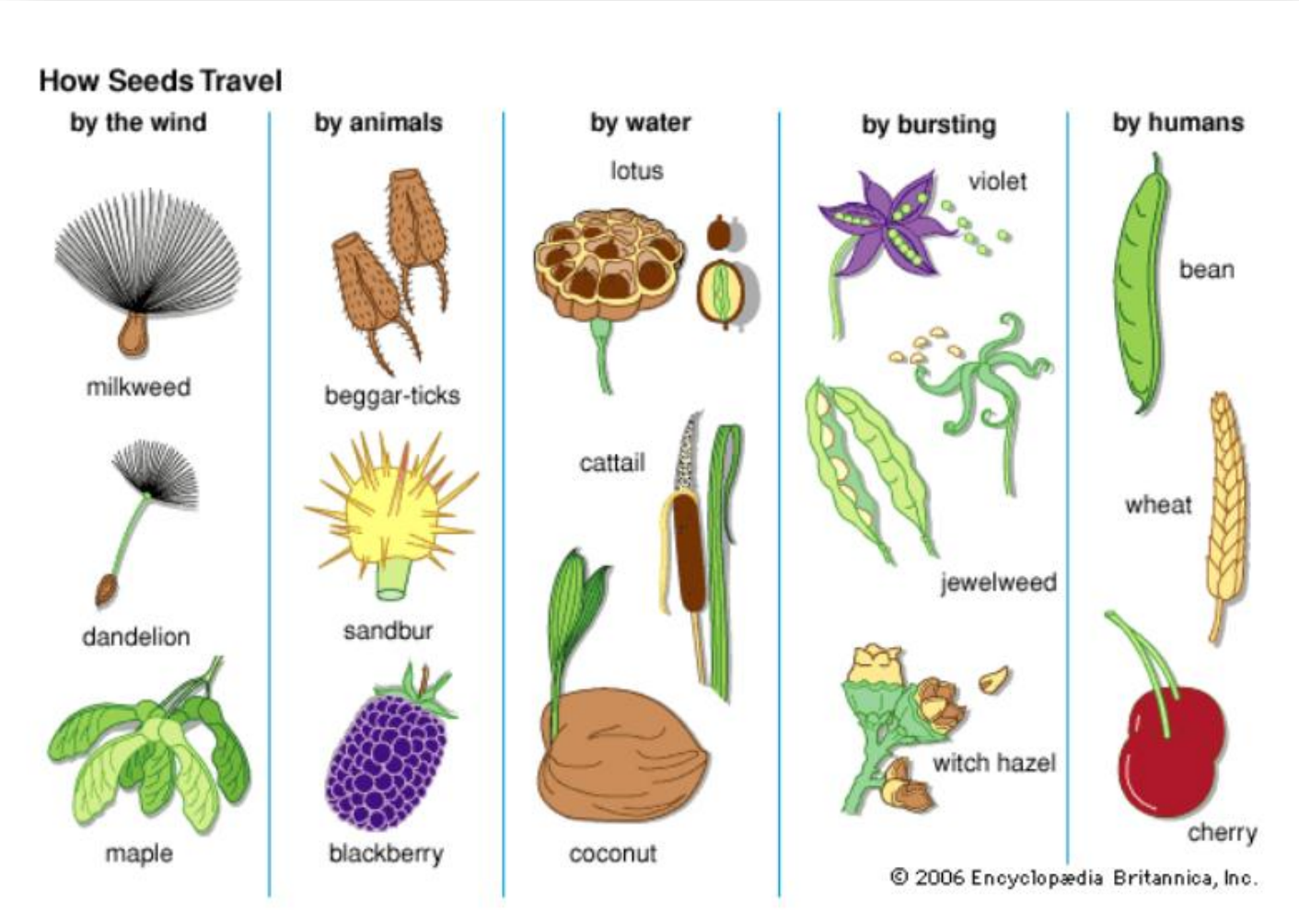
- Seed-producing plants are plants that reproduce through _____. Seed plants make their own seeds.
- Seeds contain the plant _____ (the beginnings of roots, stems, and leaves) and stored food (cotyledons) and are surrounded by a _____. From those seeds, new plants grow.



- There are two major groups of seed-producing plants: _____-bearing plants and _____ plants.
- Seeds have special structures that allow them to be dispersed by wind, water, or animals. The seeds coat helps protect the embryo from injury and also from drying out.

VISIT THE GERMINATION GIZMO!

THINK! Why is it important for a cotyledon to take up so much room inside a seed? (Respond in your science notebook.)



Dormancy

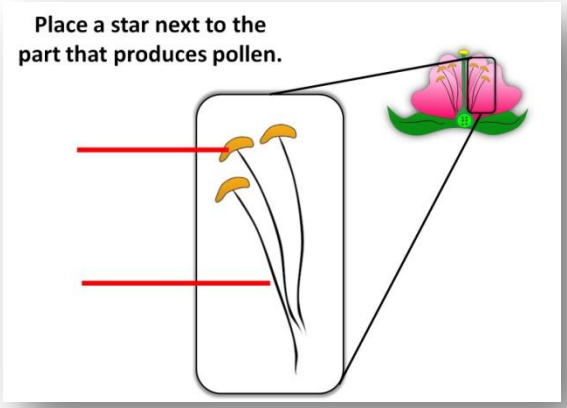
- Under certain conditions, when a mature plant or seed becomes or remains inactive, it is said to be _____.
- Dormancy is a period of time when the growth or activity of a plant or seed _____ due to changes in _____ or amount of water.
- Dormancy allows various species to survive in particular environments.
- It helps to ensure that seeds will germinate when _____ for survival of the small seedlings.
- For example, leaves fall from trees prior to the conditions of winter and the leaf buds do not open again until conditions are favorable in the spring.

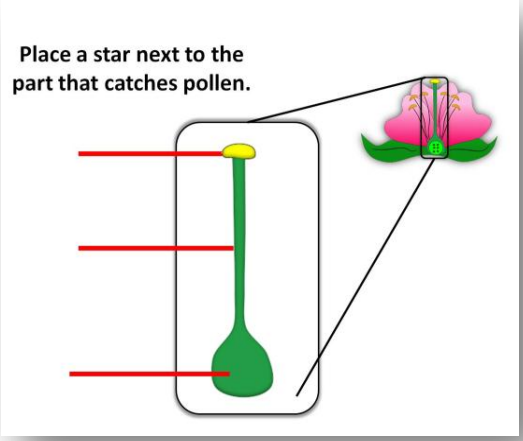
VISIT THE FLOWER POLLINATION GIZMO!

Flowering Plants

Flowers are the _____ structures of the flowering plants. The purpose of flowers is to _____. Many flowers contain both _____ parts needed to produce new flowers. Flower petals are often colorful or have a scent to attract insects and other animals.

_____- is the male part of a flower that has an anther on a stalk (filament). The anther produces the _____ that contains the sperm cells.



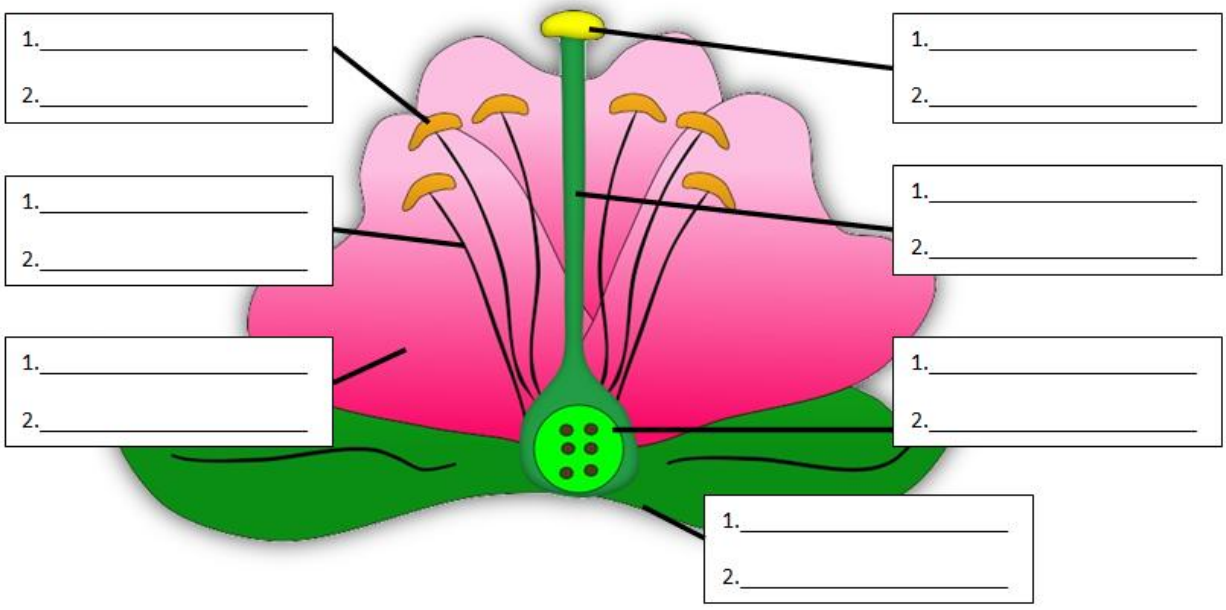


_____- is the female part of the flower that contains the _____.

- The ovary contains the _____ where the egg cells are produced.
- The stigma is the sticky top of the pistil that _____ grains.
- The style is a stalk down which the pollen tube grows after _____ has taken place.

Label the Flower: Use the word bank to identify the parts and functions on the flower diagram.

Anther	Attract pollinators	Catch pollen	Contains eggs	Future seeds	Filament	Ovary
Petals (corolla)	Produce pollen	Stigma	Style	Support anther	Support stigma	Ovules



Processes in a Flower

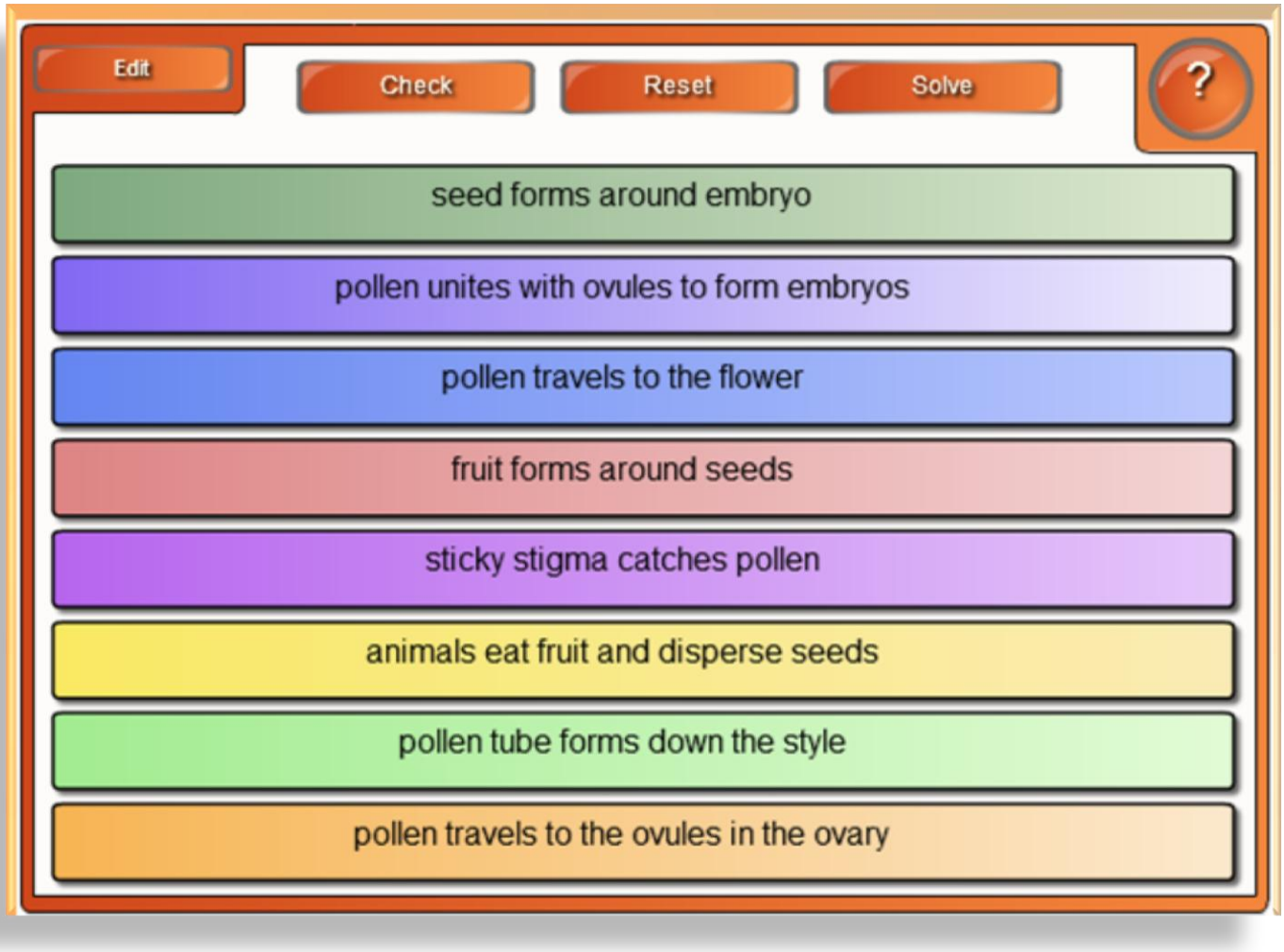
When pollen, which is produced in the stamen of a flower, transfers from _____ (pollination) and then enters the ovule, which is located in the ovary of a flower, _____ occurs.

Think! Create a Venn Diagram about seed dispersal and pollination. (Respond in your science notebook)

Seed production & Plant Growth/Development

- Once the ovule is fertilized it develops into a _____.
- A _____ (fleshy, pod, or shell) then develops to protect the seed.
- Seeds are structures that contain the _____surrounded by a protective covering.
- Over time the seed grows into a _____ with the structures necessary to produce more plants.
- _____ is the process whereby the organism becomes larger.
- Development is the process that occurs in the life of the organism that results in the organism becoming more _____ structurally.

- Organisms require _____ to grow and develop.



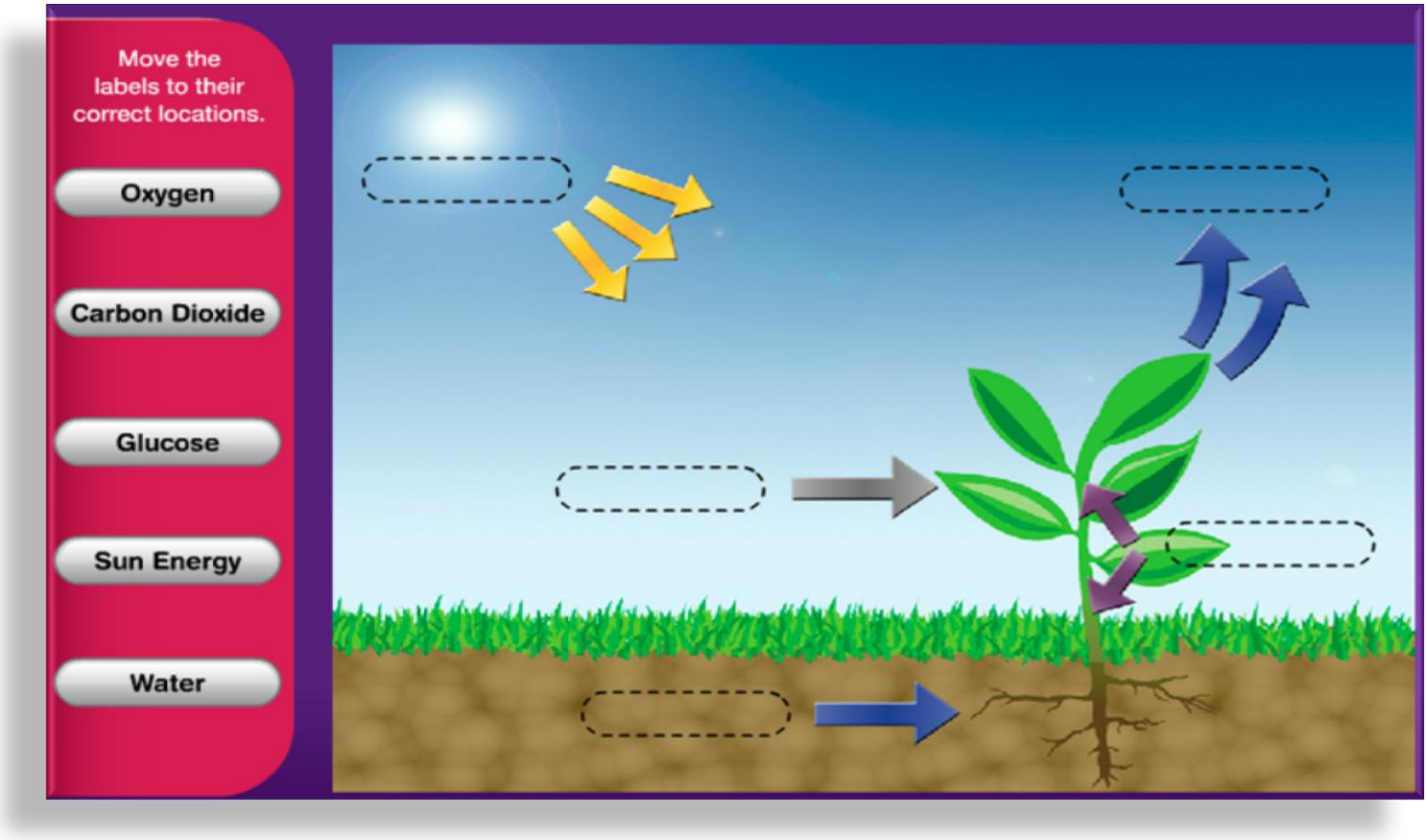
Think! Complete the Flower and Fruit Timeline Activity.

Processes in Leaves

- Leaves function as the site of _____, _____, and _____ in plants.

Photosynthesis

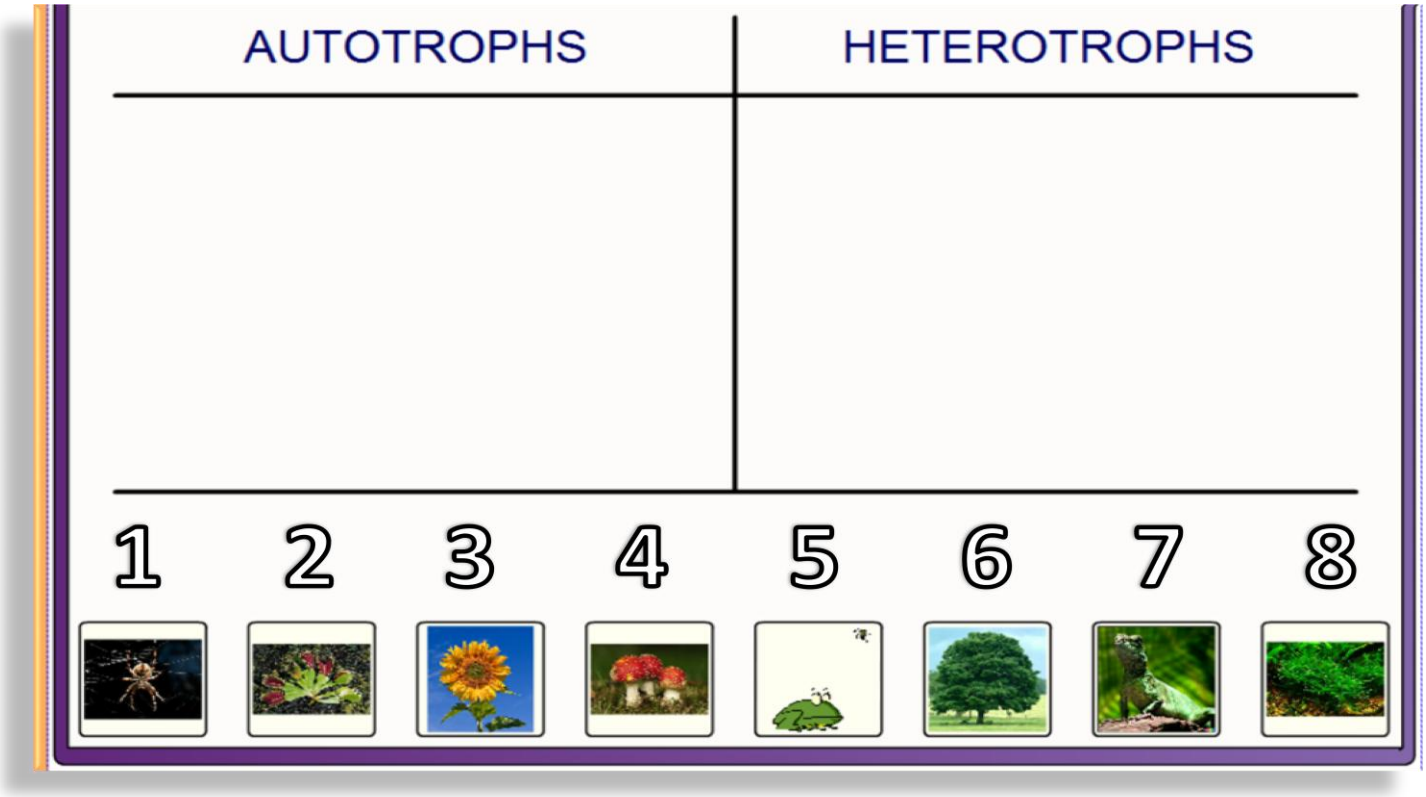
- Plants are organisms that make their _____, a simple sugar, for survival. The process by which they make this sugar is called _____.
- _____, found in the cells of the leaf, contain _____, a _____ pigment that absorbs light energy.
- During this process, plants use _____ gas from the air (taken in through openings, or pores, in the leaf called _____) and water (taken in through the roots) to make sugar (food) in the _____.
- During the process of photosynthesis, _____ is also produced. The oxygen is released into the air through the stomata.
- Photosynthesis is the process that provides the oxygen in the atmosphere that most living organisms need.



- All _____must obtain resources, such as food, oxygen, and water, which provide required energy to perform the basic processes of life, such as growing and

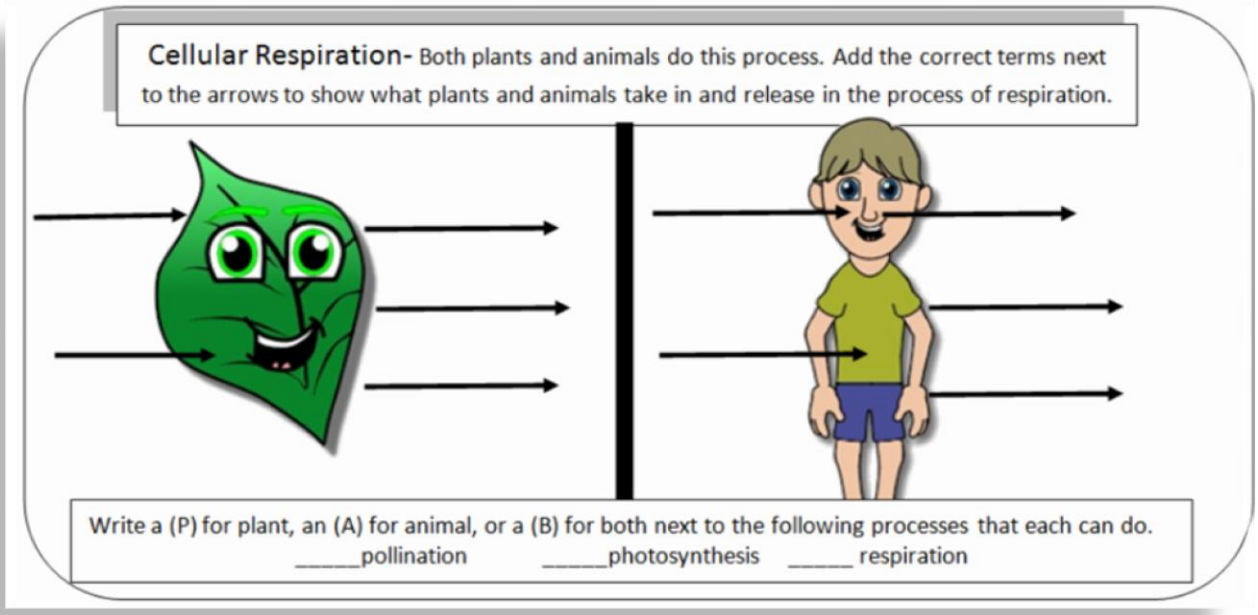
developing, or repairing injured parts.

- _____ (for example plants) provide their own food for energy through the process of photosynthesis, while _____ (for example animals) must find an external source for food.



Respiration

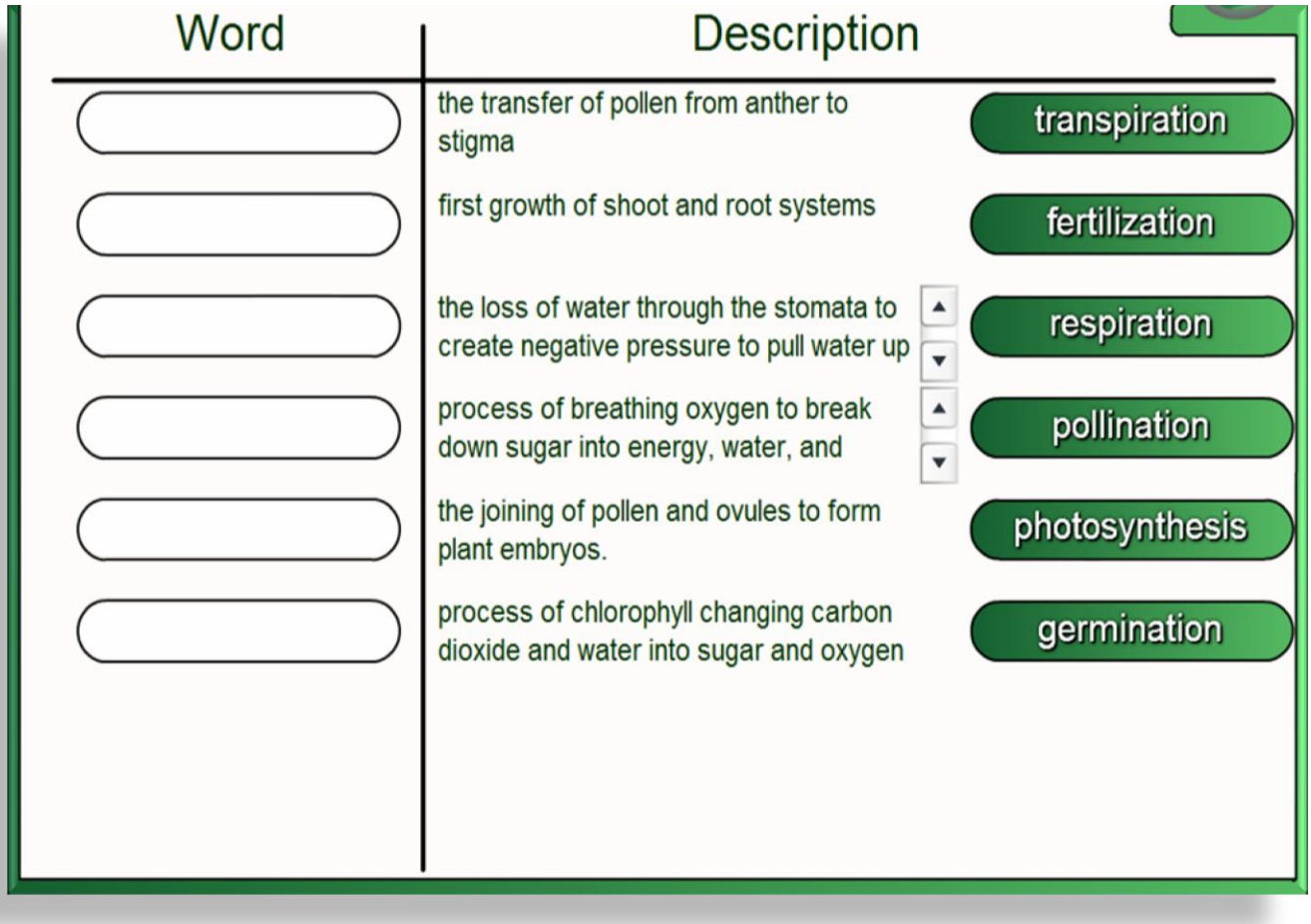
- The food (sugar) created through the process of photosynthesis is _____ needed by the plants to perform life functions.
- To obtain the energy from the food it produces, plants must break down the sugar in the cells throughout the plant in a process called _____.
- In this process, oxygen from the air (taken in through the stomata) combines with the sugar, which is then broken down into _____.
- During this process, _____. This energy can now be used by the plant to perform life functions.



- The carbon dioxide and water that are formed are then given off through the _____ in the _____.

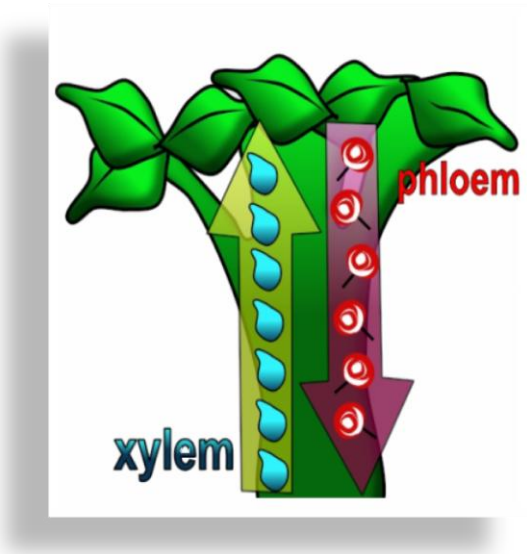
Transpiration

- Some of the water taken in through the roots of plants is used in the process of photosynthesis.
- However, plants _____ through the _____. This



process is called transpiration.

- Without a way to control _____, plants would wither up and die. Fortunately, plants are able to slow down transpiration.
- _____, mostly on the underside of the leaf, _____the stomata. When the stomata are closed, water cannot escape from the leaf.

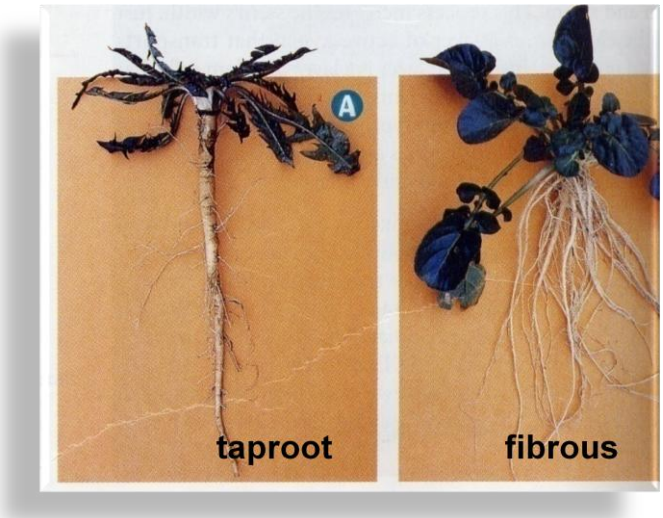


Vascular Plants

- This is the _____ group in the Plant Kingdom.
- These plants have a well-developed system for _____ and food; therefore, they have true _____, _____, and _____.
- Vascular plants have _____ structures that provide support and help circulate water and food throughout the plant.
- _____ transport water and minerals from the roots to the rest of the plant.
- _____ transport food from the leaves to the rest of the plant.
- Examples include _____ and many _____ with woody stems that grow very tall and grasses, dandelions, and tomato plants with soft herbaceous stems.

Stems & Roots

- Plants have structures that allow them to survive in their habitats when the conditions are not suitable.
- Stems _____ the plant and hold the leaves up to the light. Stems also function as food storage sites.
- The _____ in the stems transports _____ from the _____ to the leaves and other plant parts.
- The phloem in the stems transport _____ made in the _____ to growing parts of the plant.



Roots

- Help _____ the plant in the ground.
- They also absorb water and nutrients from the soil and _____ for the

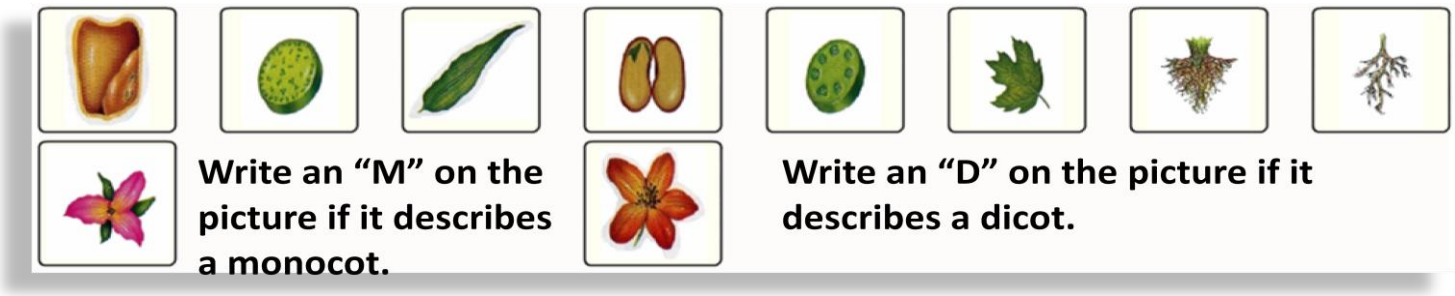
plants.

- The more _____ on the root that is available, the more water and nutrients it can absorb.
- _____ help to increase this surface area.
- There are two types of roots: _____ roots and taproots.
- Fibrous roots consist of _____ main roots that branch off to form a mass of roots.
  - Examples are grass, corn, and some trees.
- _____ consist of one large, main root with smaller roots branching off. Examples are carrots, dandelions, or cacti.

Activity: Describe how each part functions to promote plant survival.

Monocot/Dicot

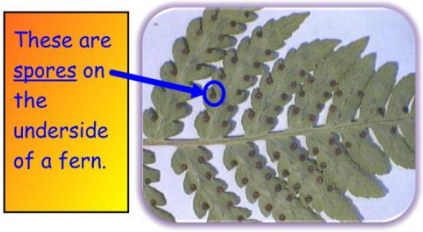
Monocotyledon (aka. Monocot)		Dicotyledon (aka. Dicot)	
Draw a picture of each description in the chary below.			
A seed with one food storage area is called a monocotyledon, or monocot.			A seed with two food storage areas is called a dicotyledon, or dicot.
Flowers of monocots have either three petals or multiples of three.			Flowers of dicots have either four or five petals or multiples of these numbers.
The leaves of monocots are long and slender with veins that are parallel to each other.			The leaves are usually wide with branching veins.
The vascular tube structures are usually scattered randomly throughout the stem.			The vascular tube structures are arranged in circular bundles.
Examples include : grass, corn, rice, lilies, and tulips			Examples include roses, dandelions, maple, and oak trees.



Classifying Plant Groups

Spore-producing

Spore-producing plants are plants that produce _____ for reproduction instead of _____. Spores are much smaller than seeds. Almost all flowerless plants produce spores. Examples include _____and _____.



Flowering Plants

Flowering plants differ from conifers because they grow their seeds inside an _____, which is embedded in a _____. The flower then becomes a _____ containing the seeds.

Examples include most trees, shrubs, vines, flowers, fruits, vegetables, and legumes.

Cone-bearing Plants

Most cone-bearing plants are evergreen with _____ leaves. _____ never have _____ but produce _____in _____. Examples include pine, spruce, juniper, redwood, and cedar trees.

Activity: compare /contrast cone-bearing, flowering, and spore producing plants

Nonvascular Plants

These plants do _____ have a well-developed system for transporting water and food; therefore, do not have true roots, stems, or leaves. They must obtain nutrients

directly from the environment and distribute it from cell to cell throughout the plant. This usually results in these plants being very _____. Examples include _____, _____, and _____.

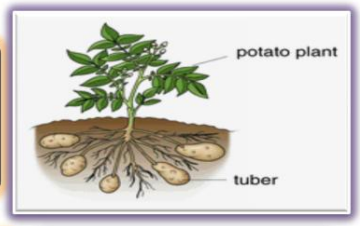
Draw a label for each type of non-vascular plant shown below.

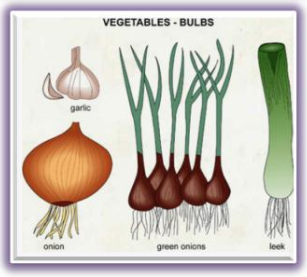
Sexual & Asexual Reproduction in Plants

Organisms have the ability to reproduce, or produce offspring that have similar characteristics as the parents. There are two basic types of reproduction:

Sexual reproduction: a reproductive process that involves _____ parents.

- The _____ (female reproductive cell) and _____ (male reproductive cell) from these two parents combine to make an offspring that is _____ from both parents.
- A process of reproduction that requires a sperm cell (in _____) and an egg cell (in the _____) to combine to produce a new organism.
- All flowering plants undergo sexual reproduction.





Asexual reproduction

- A process of reproduction that involves only _____ parent plant or plant part, and produces _____ to the parent plant.
- Many plants can grow new plants asexually from their _____. If a plant is cut or damaged, it can sprout new growth from the stems, roots, or leaves. Plants use a variety of parts to

produce new plants such as:

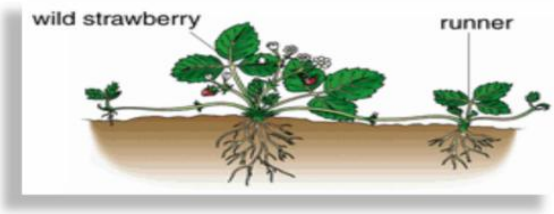
_____- These are underground stems. The "eyes" or buds of tubers, for example _____, grow into roots and shoots to produce a new plant.

Bulbs- Onions, for example, are big buds made of a stem and special types of _____.

_____- These are types of stems that run along the ground. New _____ or some _____ grow from the tips of runners. Many lawn grasses grow from runners.

Stem Cuttings

When a piece of cut stem is planted, - _____ may form from the cutting, and then a full plant develops. _____ and _____ are examples of plants grown from stem cuttings.



Roots

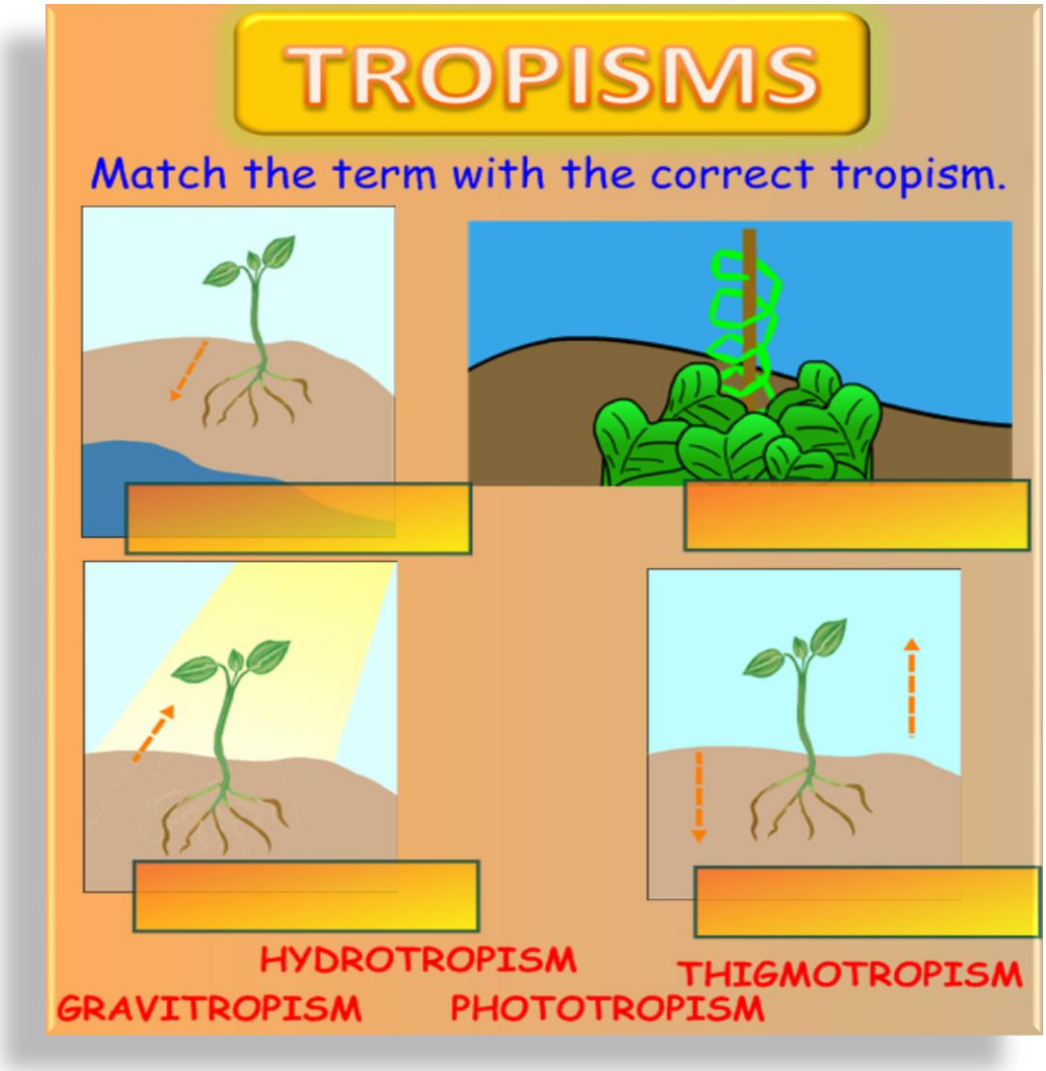
Some fruit trees and bushes send up "suckers" or new shoots from the roots.

Some plants have roots that can _____ from root pieces, such as a _____.

Leaves- Some houseplants produce little plants right on their leaves. For example, _____ can produce plants from leaves placed on top of soil.

Structures for Defense

- _____ that can defend the plant from being eaten by some animals
- _____ and leaves with _____ so that they are not eaten by animals
- Respond to _____- for example: the ability to close its leaves when touched (thigmotropism)



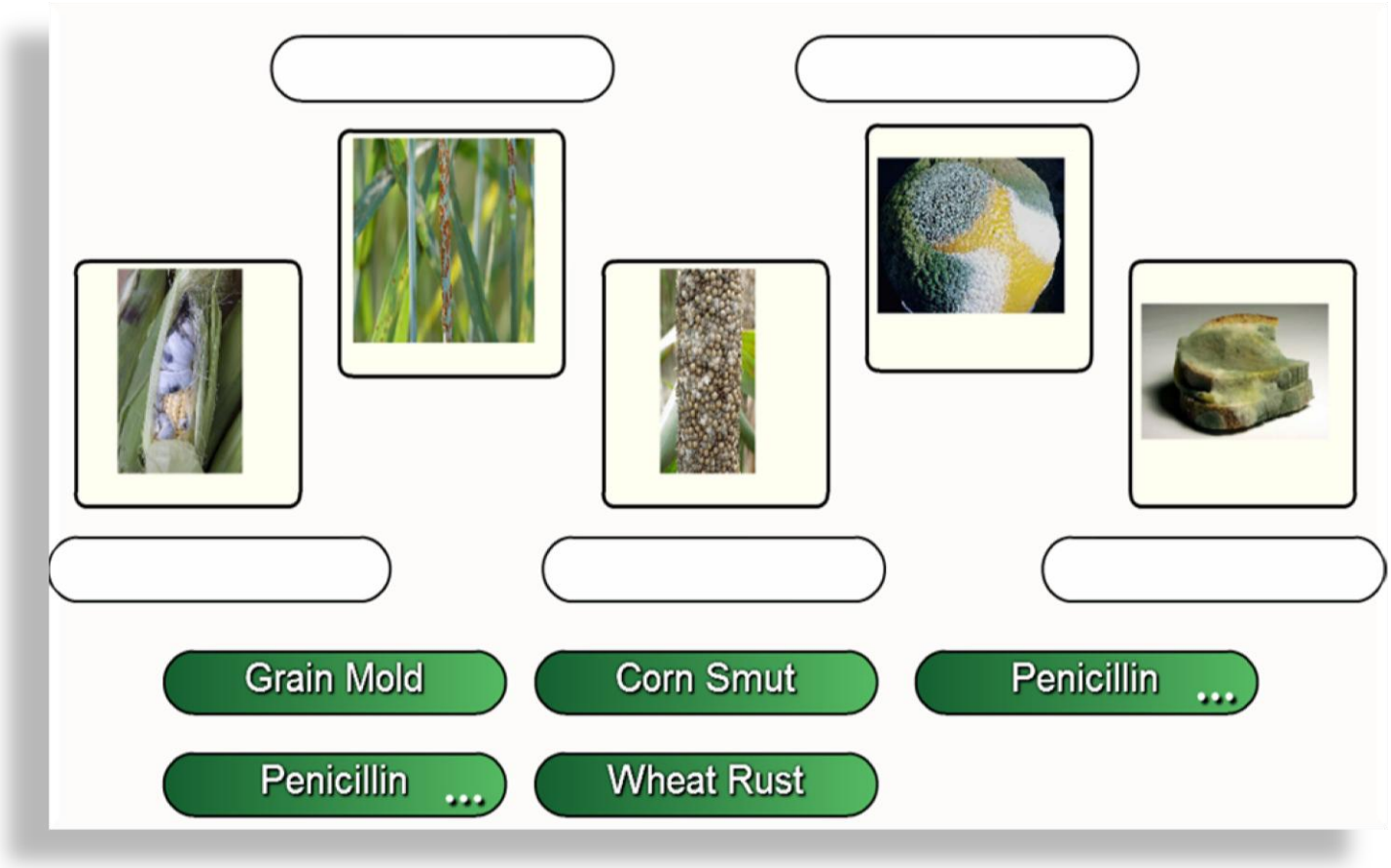
- A <u>stimulus (pl. _____)</u> is any - _____ in an organism's _____ that will cause the organism to react. Examples of environmental stimuli may be changes in the amount of _____ present, changes in _____, sound, amount of water, space, amounts or types of food, or other organisms present.
- The reaction to the stimulus is called a _____. It can be an action or behavior performed by the organism.

- Plants respond to changes in the environment by growing or moving their stems, roots, or leaves toward or away from the _____. This response, or behavior, is called a _____. <u>Examples of plant tropisms include:</u>

Stimuli	Response
light	
	gravitropism/geotropism
water	
touch	

Fungi-

- Fungi are a _____ of organisms that do _____ make their own food.
- Many types of fungi must _____ other organisms, such as plants.
- These fungi, for example _____, _____, and _____, cause diseases in those plants that result in huge crop losses.
- Diseases caused by fungi may also affect other important crops, such as rice, cotton, rye, and soybeans.
- If a fungus infects a tree, fruit, or grass, it can eventually _____.



Classification of Organisms

To study all of the organisms on Earth, biologists have devised ways of naming and classifying them according to their _____.

- The study of how scientists _____ organisms is known as _____.

- The modern classification system uses a series of levels to group organisms.
- An organism is placed into a broad group and is then placed into more _____ groups based on its _____.
- The levels of classification, from broadest to most specific, include:
  _____
- The more classification levels an organism shares with another, the more characteristics they have in common.

Kingdom

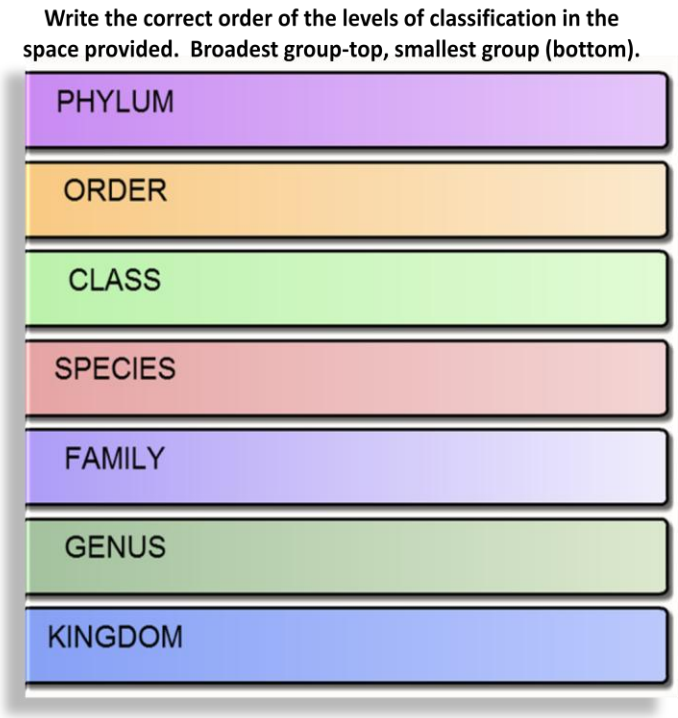
While scientists currently disagree as to how many kingdoms there are, most support a five-kingdom (Plants, Animals, Fungi, Protists, Monerans) system.
Organisms are placed into kingdoms based on their _____ and the number of cells in their body.

Phylum (pl. phyla)

In the Plant Kingdom, phyla are sometimes referred to as _____.
Plants are normally divided into two groups: _____.
In the Animal Kingdom, there are 35 different phyla. These phyla can be divided into two groups: vertebrates and invertebrates.

Class, Order, Family

These _____become even _____ and will include fewer organisms that have more in common with each other as they move down the levels.



Genus (pl. Genera)

Contains closely related organisms.
The genus is used as the _____ in an organism's scientific name.

Species

Consists of all the _____ of the same type which are able to breed and produce young of the _____.
The species is used as the _____ in an organism's scientific name.

Scientific name

The scientific name of an organism is made up of its _____. It is written in italics (Genus species) with the genus capitalized.
For example, Canis lupus is the scientific name for the _____and Pinus taeda is the scientific name for a _____.