

Anatomy of Plants – Student Notes

Directions:

Fill in the blanks.

Plant Cell Biology Segment

1. Plants

- Plants
 - are _____ organisms
 - are incapable of movement
 - produce food through _____

2. Animals

- Animals
 - are multicellular organisms
 - are capable of _____, on their own
 - cannot produce their own “food”
 - _____ food from surroundings

3. Cell Types

- Include:
 - Prokaryotic
 - pro = before; _____ = nucleus
 - found in bacteria
 - do not contain a nuclei
 - lack membrane-bound _____

Fun Fact: Since viruses are acellular – they contain no organelles and cannot grow and divide – they are considered neither prokaryotic or eukaryotic.

4. Cell Types

- Include:
 - Eukaryotic
 - _____ = good; karyon = nucleus
 - found in plants and animals
 - contain a _____
 - contain membrane-bound organelles

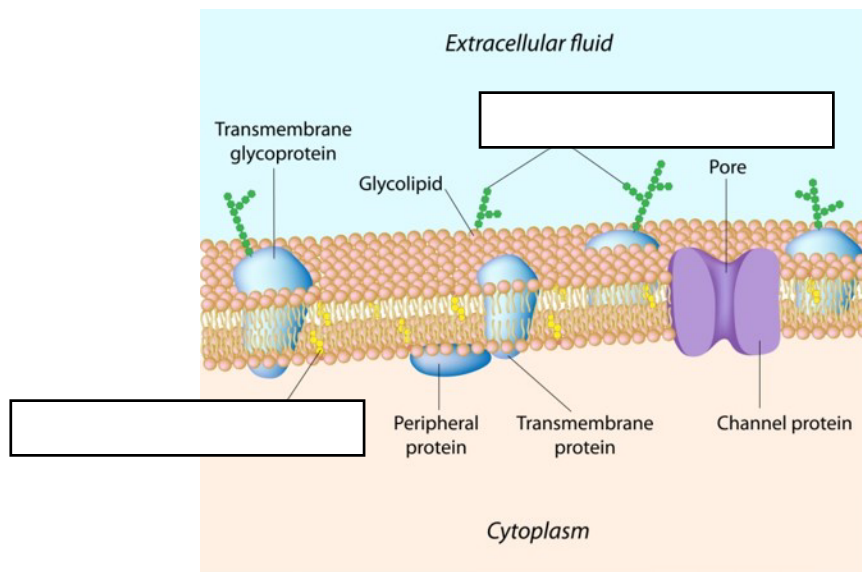
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5. Cell Membrane

- Surrounds the cell as a thin layer of protein (about _____-millionths of a millimeter thick)
- Can be found _____ the cell wall
- Allows some substances to pass into the cell while blocking others

6. Cell Membrane

- Is also known as the plasma membrane
- Is involved in cellulose production for the assembly of cell walls
- Is composed of highly structured proteins and phospho-lipids



7. Cell Wall

- Are found only in _____
- Surrounds the cell
- Provides structural support and _____
- Bonds with other cell walls to create plant structure

8. Chloroplast

- Is an elongated organelle containing _____
- _____ light and carbon dioxide to usable energy

Organelle: specialized part of a cell which has a specific function

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9. Cytoplasm

- Is a _____ material outside the nucleus, but inside cell membrane
- Contains the cytoskeleton, _____ and the organelles

Fun Fact: substance of a living cell, including the cytoplasm and nucleus, is known as the protoplasm.

10. Golgi Apparatus

- Is a _____, layered organelle (dictyosomes) which resembles a stack of pancakes
- Is located near the nucleus
- Packages proteins and carbohydrates for export from the cell
- Modifies _____ and lipids before distributing them

11. Mitochondria

- Is the _____ of the cell
- Are spherical, rod-shaped organelles
- Have a _____ membrane
- Converts energy stored in glucose to ATP for the cell (Respiration)

ATP: adenosine triphosphate, the molecule which provides the energy in the cells of all living things

12. Nucleus

- Controls functions of the cell
- Contains _____ in chromosomes
- Is surrounded by the _____ membrane

Chromosome: structure of nucleic acids and proteins which carries genetic information in the form of genes

13. Ribosomes

- Are _____ organelles found in large numbers in the cytoplasm
- Create proteins from amino acids
- Can only be seen with an electron microscope
- Composed of two _____ containing RNA and proteins

14. Rough Endoplasmic Reticulum

- Is located in the _____
- Is covered with ribosomes which give it a rough appearance
- Transports materials through the cell, _____, stores and creates proteins

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15. Smooth Endoplasmic Reticulum

- Is located in the cytoplasm
- _____ materials through the cell
- Contains enzymes
- Produces and digests _____ and membrane proteins

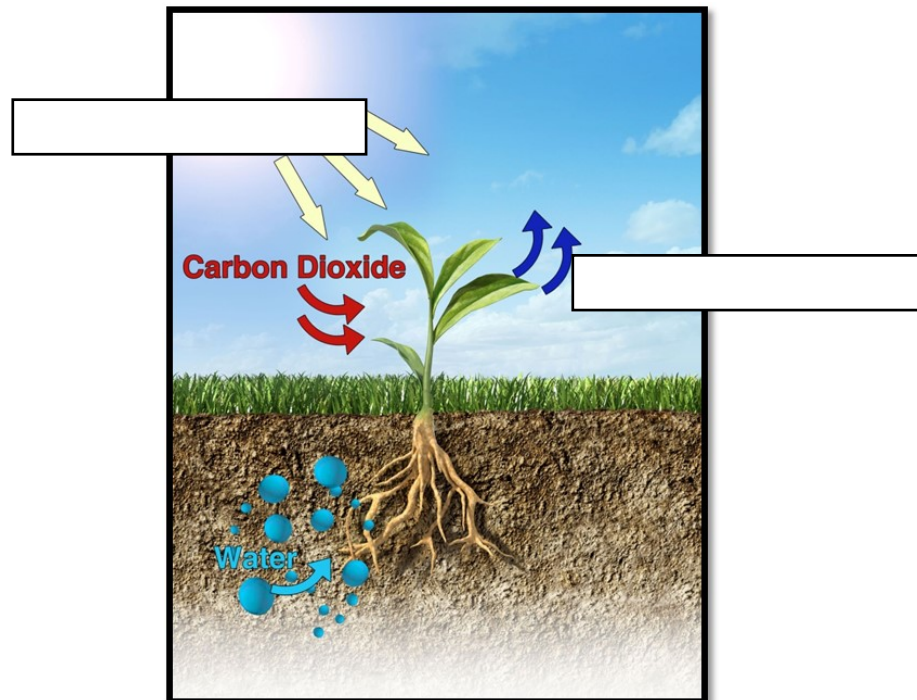
Enzymes: proteins which assist chemical reactions in living cells

16. Vacuole

- Is surrounded by a membrane
- Is filled with _____
- Takes up most of the cell
- Maintains the shape of the cell
- Is the “cell _____”

17. Photosynthesis

- Is the process of converting light energy to chemical energy
- Takes place in the chloroplasts using chlorophyll



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Plant Structures: Roots Segment

1. Roots

- Are usually _____
- Anchor plants in soil
- Absorb water and _____
- Can store food for plant

2. Root Tissues

- Include:
 - epidermis
 - _____
 - vascular cylinder or _____

3. Root Systems

- Includes:
 - two _____ types:
 - taproot system
 - _____ root system

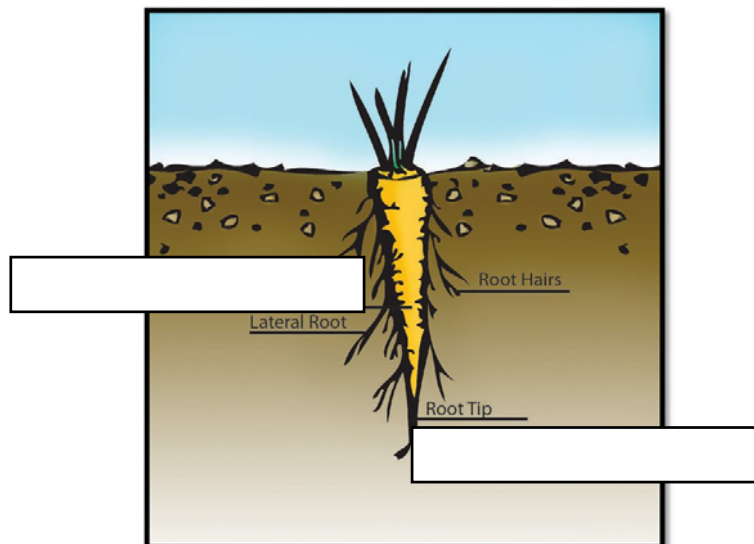
4. Taproot System

- Is found in many _____ such as carrots and beets
- Is derived directly from the _____ root emerging from the seed

Dicotyledons: flowering plants with two seed cotyledons

5. Taproot System

- Has one prominent root known as the taproot or primary root



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6. Fibrous Root System

- Are found in most _____
- Consists of an extensive mass of _____, widely spread roots

Monocots: flowering plants with only one seed cotyledon

7. Root Types

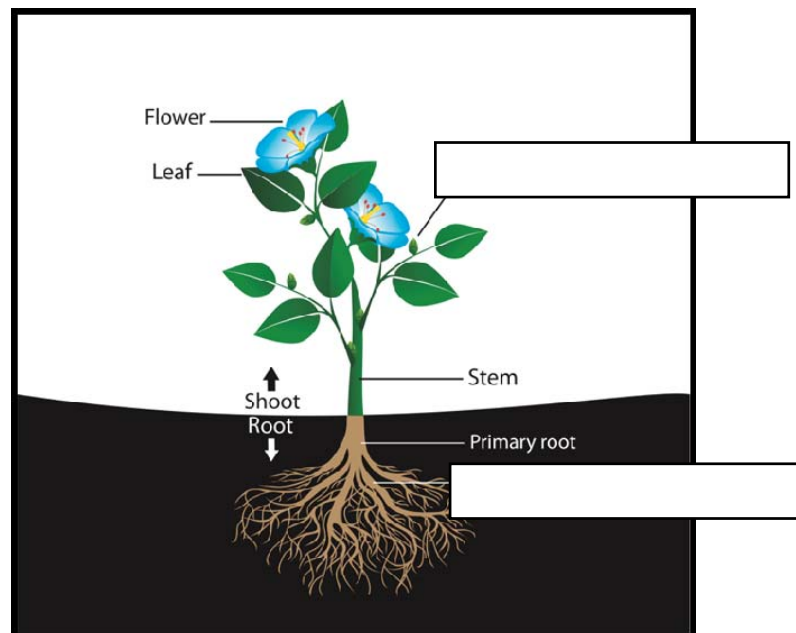
- Include:
 - _____
 - lateral roots
 - adventitious _____
 - fibrous roots

8. Taproot

- Characteristics are:
 - single, _____ roots
 - grow directly downward
 - sprout other _____ roots
 - can be modified for food and water storage and uptake

9. Lateral Roots

- Extend horizontally from the taproot
- Extract nutrients and water from the soil



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10. Adventitious Roots

- Form from _____ tissues
- Arise in stems and leaves
- Are used when _____ plants from cuttings

11. Fibrous Roots

- Are thin, _____ roots
- Collect water and nutrients close to the soil surface
- Sprout from _____ roots

Fun Fact: Grasses are considered to have fibrous root systems.

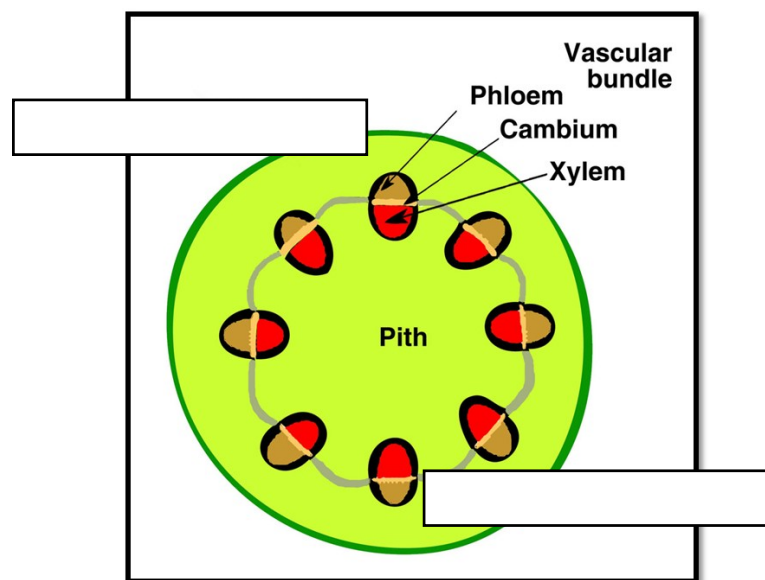
Plant Structures: Stems Segment

1. Stems

- Support the leaves, flowers and _____ of plants
- Conduct movement of water and nutrients to and from the roots and leaves
- Store _____

2. Stem Tissues

- Include:
 - epidermis
 - cortex
 - xylem
 - phloem
 - cambium



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3. Stem Types

- Include:
 - _____
 - grow above ground
 - subterranean
 - grow below ground
 - _____
 - no obvious stem above or below ground

4. Xylem

- Transports _____ from the roots up the plant
- Provides _____ and support in the stem

Fun Fact: In trees, new xylem tissues are produced each year. As these new tissues are added, older xylem tissues die and create the “rings” that can be seen in tree trunks.

5. Phloem

- Transports _____ and other molecules made during photosynthesis
- Is always _____

Plant Structures: Flowers Segment

1. Flowers

- Are _____ for sexual reproduction
- Produce gametes
- Play a key role in _____

Gamete: mature male or female sex cell which is able to unite with another of the opposite sex in sexual reproduction

2. Flower Parts

See *Flower Identification Activity* for slide graphic

3. Flower Parts

- Include:
 - _____
 - flower stalk
 - receptacle
 - part of flower stalk bearing floral organs
 - sepal
 - leaf structures at flower base, protects young buds, all together known as _____

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4. Flower Parts

- Include:
 - petal
 - located in and above the sepals, attracts pollinators, all together known as corolla
 - _____
 - male part of the flower, makes pollen grains
 - filament
 - stalk of the stamen, contains the _____

5. Flower Parts

- Include:
 - anther
 - _____ pollen
 - pollen
 - grains containing the male sex cells
 - pistil
 - _____ part of the flower

6. Flower Parts

- Include:
 - _____
 - sticky top of pistil, receptive surface for pollen grains
 - style
 - stalk of the pistil, where pollen _____ grows

7. Flower Parts

- Include:
 - ovary
 - base of the pistil, matures to become _____
 - _____
 - located in the ovary, carries female sex cells

8. Flower Types

- Include:
 - _____
 - has stamen, pistil, petals and sepals
 - incomplete
 - _____ part missing

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9. Flower Types

- Include:
 - _____
 - both stamen and pistil are present and functioning
 - imperfect
 - stamen or _____ is missing

Plant Structures: Leaves Segment

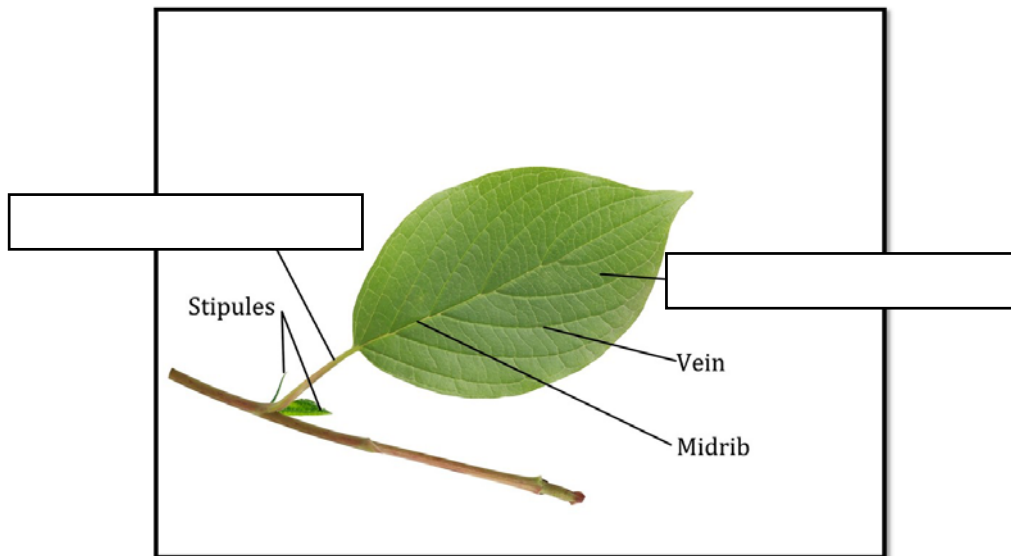
1. Leaves

- Are the _____ site of food production for the plant (chloroplasts)
- Contain structures which convert sunlight to chemical energy (_____)

2. Leaf Tissues

- Include:
 - epidermis
 - _____
 - veins

3. Leaf Parts



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4. Leaf Parts

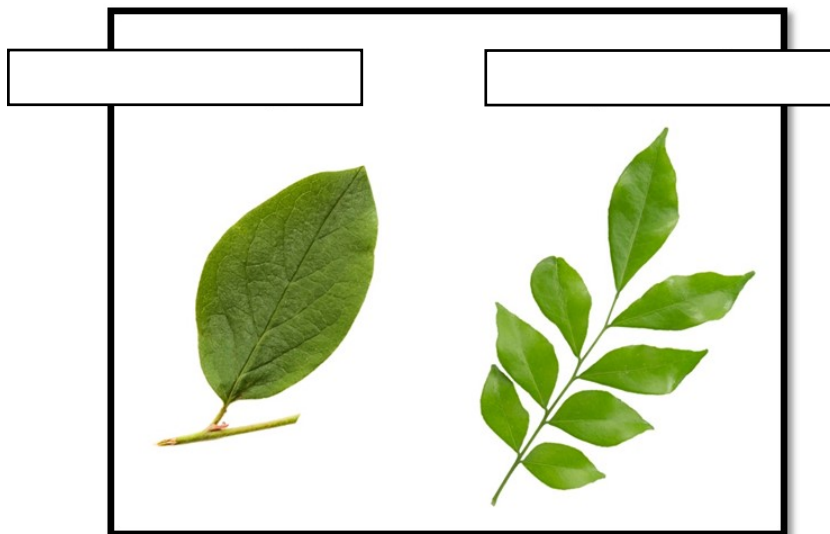
- Include:
 - _____
 - main, central vein of a leaf
 - petiole
 - leaf stalk which _____ the leaf to the plant
 - stem
 - main support of the plant

5. Leaf Parts

- Include:
 - stipule
 - small, leaf-like appendages at the base of the _____
 - _____
 - transports water, minerals and food energy throughout the plant

6. Leaf Types

- Include:
 - simple
 - not divided into separate units
 - compound
 - leaflets arranged on both sides of an axis



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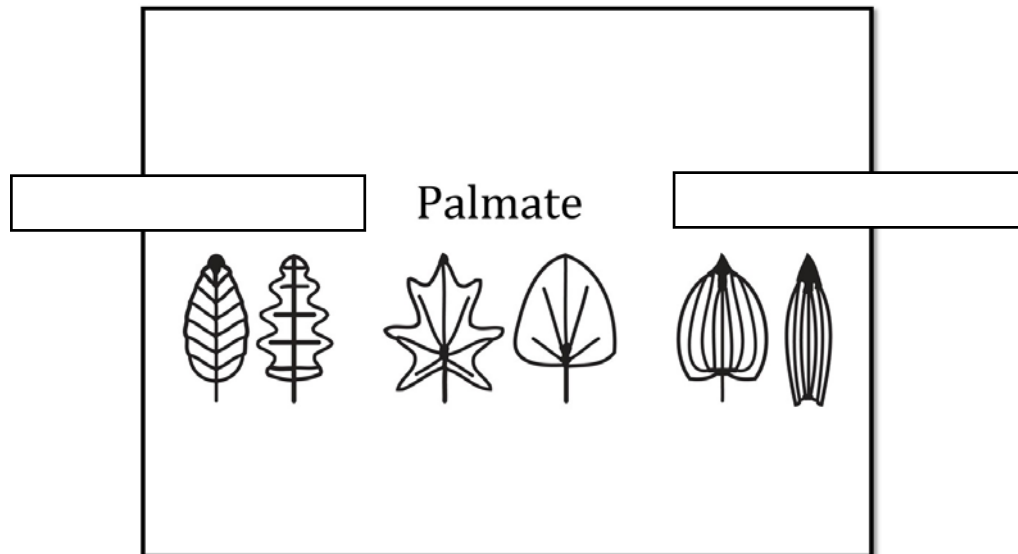
7. Leaf Vein Patterns

- Include:
 - parallel
 - several large veins run alongside each other from the base of the blade to the tip (_____)
 - _____
 - several main veins of about equal size, all of which extend from a common point at the base of the leaf (dicots)

8. Leaf Vein Patterns

- Include:
 - _____
 - one large, central vein, the midrib, with other _____ veins branching from the sides

9. Leaf Vein Patterns

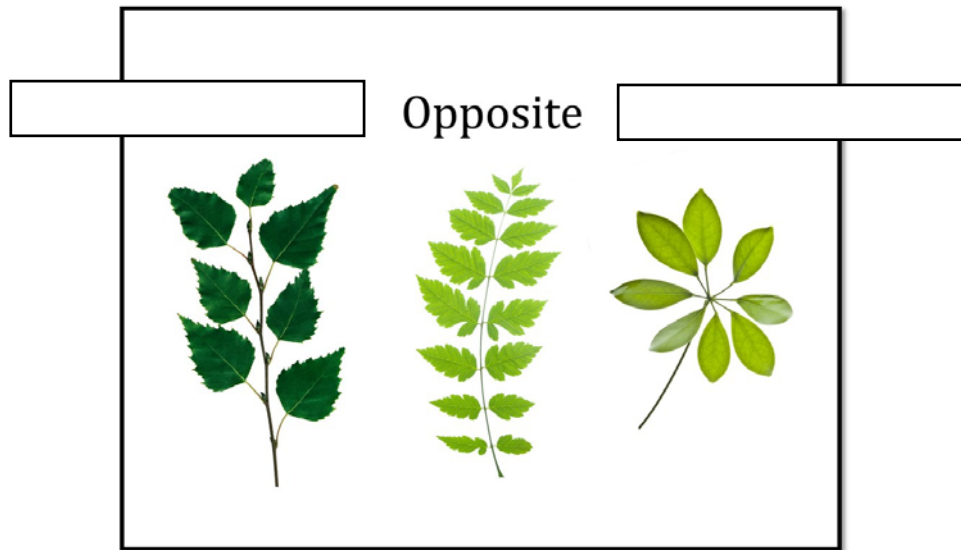


10. Leaf Arrangements

- Include:
 - _____
 - one leaf produced at each node
 - opposite
 - leaves in pairs at nodes
 - _____
 - three or more leaves per node

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11. Leaf Arrangements



Plant Structures: Fruit Segment

1. Fruit

- Evolves from the _____ ovary after pollination and fertilization
- May be either fleshy or dry in appearance
- Plants produce fruit to protect and disseminate seeds
- Contains one or more _____

2. Fruit Types

- Include:
 - _____
 - formed from one ovary
 - aggregate
 - formed from a single flower with many ovaries
 - _____
 - developed from a fusion of separate flowers on a single structure

Anatomy of Plants – Student Notes

Plant Structures: Seeds Segment

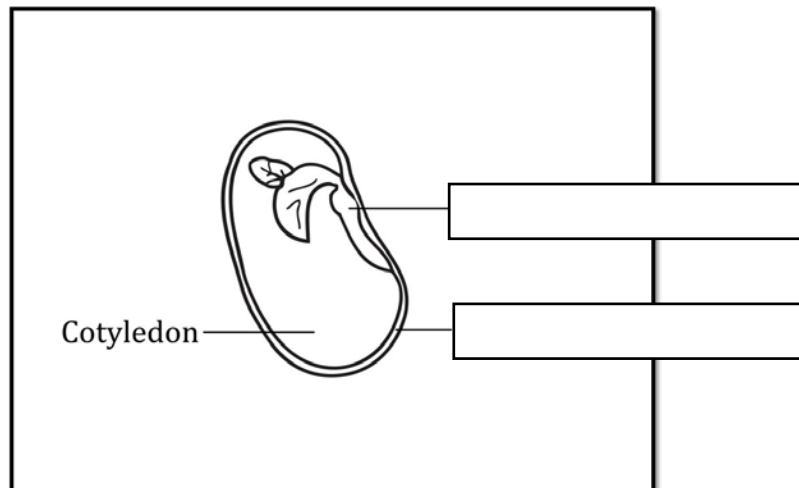
1. Seeds

- Primary function is _____
- Are used in the process of plant propagation
 - plant propagation is the creation of new plants through cuttings, seed, bulbs or other plant parts
- Serve as a _____ unit for many plants
 - dispersal is the transportation of seeds away from the parent plant in order to create new plants

2. Seeds

- Contain three parts:
 - seed _____
 - protects the embryo
 - cotyledon
 - temporary food supply, also known as seed leaf
 - _____
 - an undeveloped plant inside a seed

3. Seeds



4. Monocots

- Are embryos with a _____ cotyledon
- Contain flower parts in multiples of three
- Have adventitious roots
- Store nutrients in _____

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5. Dicots

- Are embryos with _____ cotyledons
- Contain flower parts in multiples of four or _____
- Have roots which form from the radical