

## Biology 103 In-Class Review

### Plant Tissues and Organs

Fill in the table with the visible structures that distinguish monocots from dicots:

|                                  | Monocots        | Dicots            |
|----------------------------------|-----------------|-------------------|
| Number of cotyledons in the seed | <b>1</b>        | <b>2</b>          |
| Pattern of veins in the leaf     | <b>parallel</b> | <b>network</b>    |
| Base number of flower parts      | <b>3</b>        | <b>4, 5, or 6</b> |
| Root system                      | <b>fibrous</b>  | <b>taproot</b>    |

Think of plants that you are familiar with and decide if they are monocots or dicots. List them here:

**Monocots**  
lilies  
onions  
grass  
corn

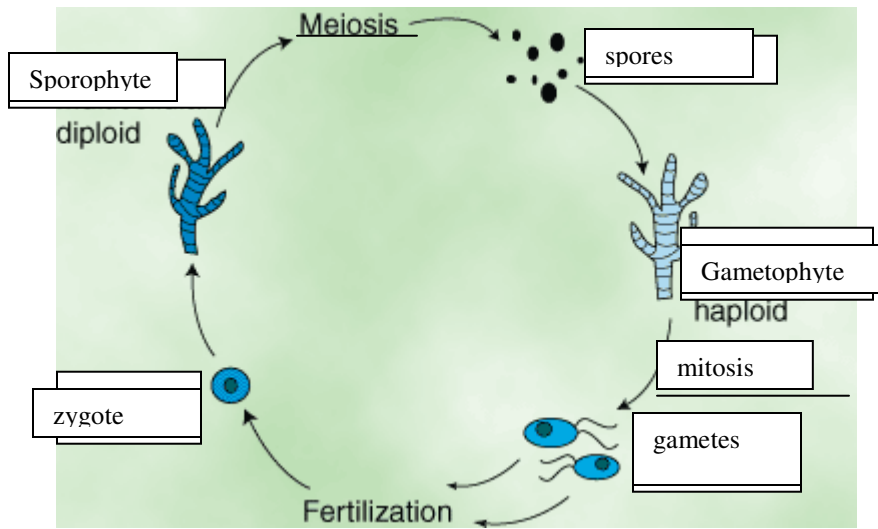
**Dicots**  
beans  
maple trees  
carrots  
ivy

Fill in the blanks in the table below:

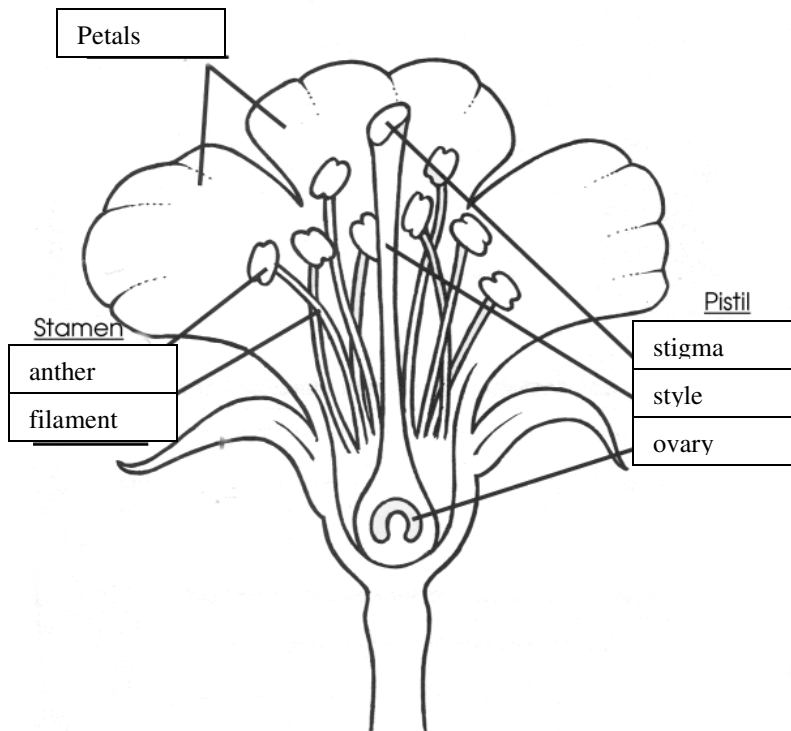
| Tissue class | types              | functions  |
|--------------|--------------------|--|
| Dermal       | Cuticle            | <b>waterproofing</b>   |
|              | <b>Epidermis</b>   | Forms the outer layer of plants, protects the plant, may have hairs or oil glands. |
| Ground       | Parenchyma         | <b>photosynthesis, storage, metabolism, hormone production</b>                     |
|              | <b>Collenchyma</b> | Flexible support. One example is "strings" in celery stalks.                       |
|              | Sclerenchyma       | <b>Rigid support, tough fibers</b>   |
| Vascular     | Xylem              | <b>water transport</b>   |
|              | <b>Phloem</b>      | <b>sugar transport</b>   |

### Plant Reproduction

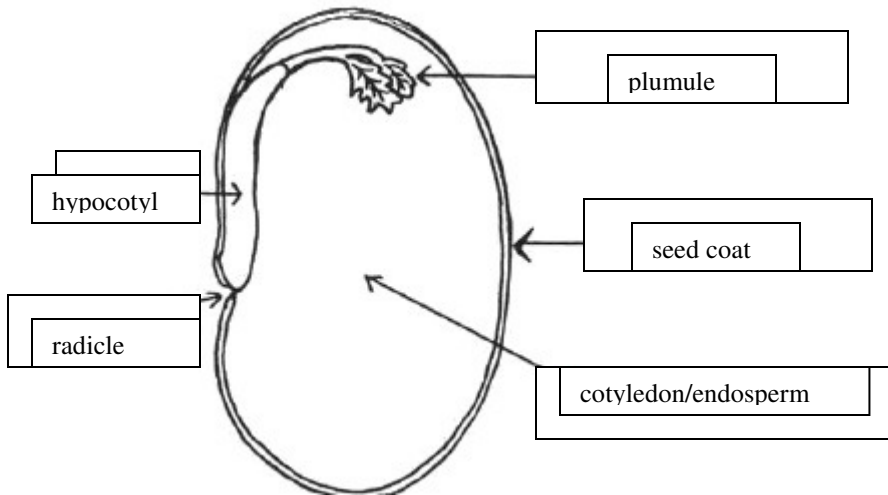
Fill in the blanks in this generalized diagram of the alternation of generations in plants. Fill in the boxes with names of the structures, and blanks with the name of the process occurring.



Fill in the diagram below with the names of the flower parts:



Fill in the blanks in the diagram below with the parts of the bean seed:



Suppose you were planting a wildlife-friendly garden. What shapes, colors, and other features would you look for in flowers to attract each of the following?

| Hummingbirds   | Butterflies  | Moths  | Honeybees and other bees  |
|--|--|--|---|
| <ul style="list-style-type: none"> <li>• red, orange, purple, or blue</li> <li>• lots of nectar</li> <li>• narrow tubes</li> </ul> | <ul style="list-style-type: none"> <li>• blue, yellow</li> <li>• nectar source</li> <li>• flat platforms or clusters of small tubes</li> </ul> | <ul style="list-style-type: none"> <li>• bright white</li> <li>• highly scented</li> <li>• nectar</li> <li>• night blooming</li> </ul> | <ul style="list-style-type: none"> <li>• blue, purple, yellow</li> <li>• flat platforms or open tubes</li> <li>• scented</li> <li>• nectar source</li> <li>• pollen source</li> </ul> |

What features of a fruit would show that it is dispersed by:

| Wind  | Water   | Animals   | Explosive/mechanical  |
|---|---|---|---|
| <ul style="list-style-type: none"> <li>• wings or parachutes</li> <li>• small</li> <li>• dry</li> </ul> | <ul style="list-style-type: none"> <li>• hollow or spongy outsides (air spaces for floating)</li> </ul> | <ul style="list-style-type: none"> <li>• fleshy and edible OR</li> <li>• sticky, spikes, hooks</li> <li>• seeds may be hard to pass through a digestive system</li> </ul> | <ul style="list-style-type: none"> <li>• fruits explode when ripe, or shatter when dry</li> <li>• some have sticky seeds</li> </ul> |

## Plant Regulation

Fill in the table below with the primary effects of the five classes of plant hormones:

| Hormone class | Effects   |
|---------------|---|
| Auxins        | <ul style="list-style-type: none"><li>• tropisms</li><li>• apical dominance/ vertical growth</li><li>• adventitious roots</li><li>• fruit development</li></ul> |
| Gibberellins  | <ul style="list-style-type: none"><li>• internode elongation</li><li>• seed germination</li><li>• stimulates ovary to grow into fruit</li></ul>                 |
| Cytokinins    | <ul style="list-style-type: none"><li>• stimulates cell division</li><li>• lateral bud growth</li></ul>   |
| Ethylene gas  | <ul style="list-style-type: none"><li>• inhibits elongation</li><li>• ripens fruits</li><li>• abscission layer</li><li>• senescence</li></ul>                   |
| Abscisic acid | <ul style="list-style-type: none"><li>• senescence</li><li>• inhibits gibberellins</li><li>• induces seed and bud dormancy</li></ul>                            |

Which plant hormone would be most useful if you wanted to:

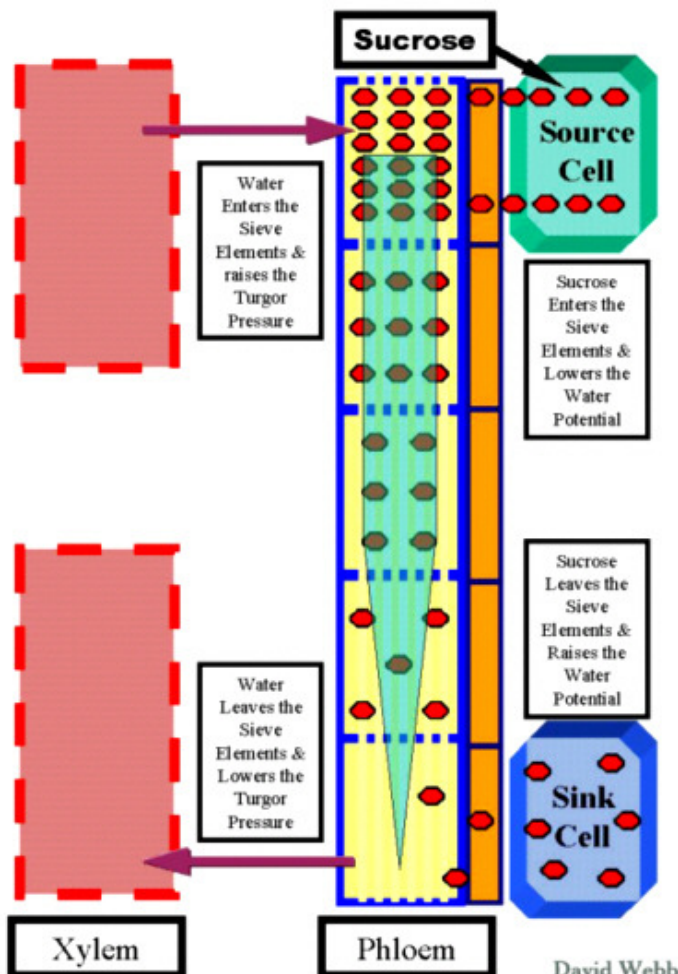
- make cuttings from houseplants grow roots?  
auxin
- turn dwarf plants into regular-sized plants?  
gibberellin
- quickly ripen a bunch of green bananas?  
ethylene gas
- make a culture of plant cells divide rapidly?  
cytokinins
- get some seeds to germinate quickly?  
gibberellins
- develop a product to add to the water of cut flowers to make them last longer?  
cytokinins

## Plant Transport

What are the roles of the following structures during transpiration?

- root hairs
  - absorb water
  - transport minerals into cells
- endoderm
  - controls how much water enters the vascular cylinder
- xylem vessels and tracheids
  - carries water from roots to leaves
- guard cells and stomata in the leaf
  - open or close to allow or prevent water evaporation at the leaf surface

Below is a diagram of sugar transport in plants, illustrating the pressure-flow hypothesis. Answer the following questions based on this diagram:



a. How does sugar get from the source cells into the phloem cells?

active transport

b. Why does pressure rise in the phloem cells after sugar is moved into them?

concentration of sugar in the cell causes water to enter by osmosis, raising the pressure.

c. How is sugar removed from phloem cells into the sink cells?

active transport

d. What happens to the pressure in the phloem cells after sugar is removed, and why?

less sugar in the cells causes water to leave by osmosis, which lowers pressure.

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