

## Unit 12: Interactions of Plant Systems

Name: \_\_\_\_\_

Period: \_\_\_\_\_

Test Date: \_\_\_\_\_

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## UNIT 12 WARM-UPS

<p><b>Question:</b></p>   <p>Answer:</p>	<p>Date: _____</p>
<p><b>Question:</b></p>   <p>Answer:</p>	<p>Date: _____</p>
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**Question:**

Date: \_\_\_\_\_

Answer:

**Question:**

Date: \_\_\_\_\_

Answer:

**Question:**

Date: \_\_\_\_\_

Answer:

**Question:**

Date: \_\_\_\_\_

Answer:

**Question:**

Date: \_\_\_\_\_

Answer:

## *Properties of Water Lab*

### **Station A:**

Draw a picture of your observation.

Why do you think this is happening?

### **Station B:**

Draw a picture of your observation with water.

Draw a picture of your observation with ethanol.

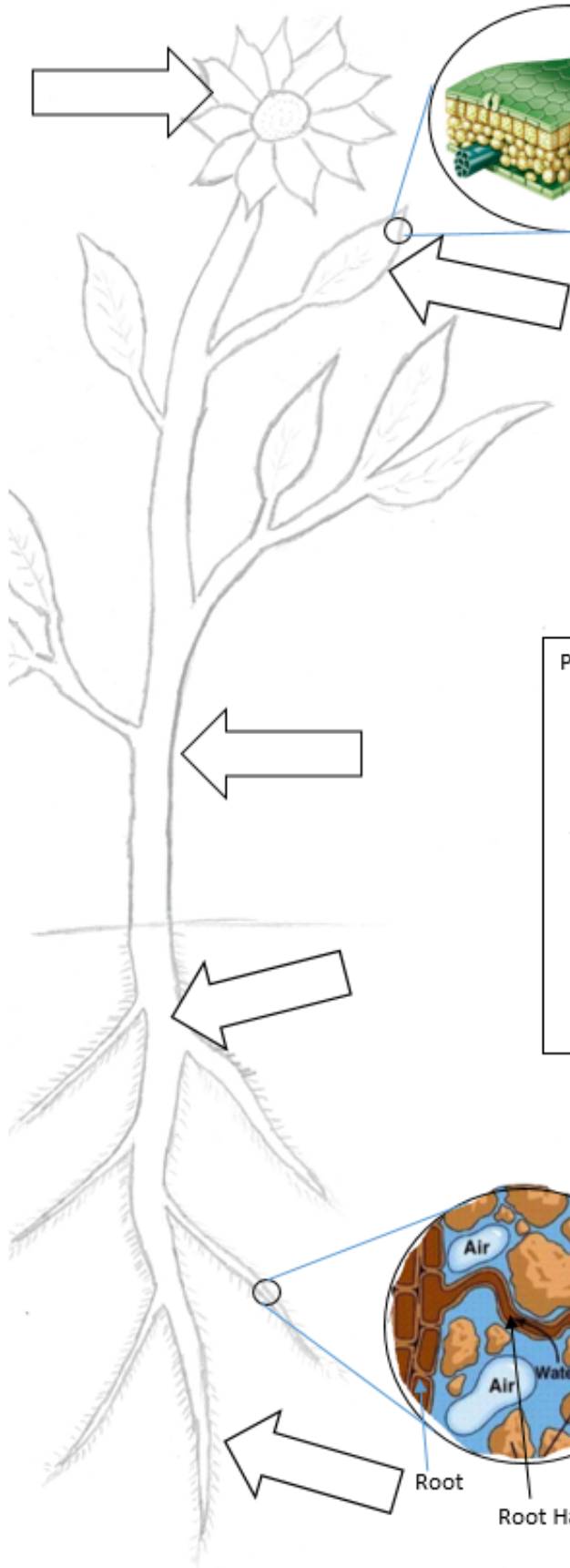
Describe the differences in the two drops and why you think the two liquids are behaving differently.

### **Station C:**

Draw the straws and the water levels in each.

Why do you think the water traveled higher in one of the straws?

# Plant Structure Notes



Leaf Structure:  
The Leaf is the primary site of \_\_\_\_\_.  
The leaf is also where most of the plants  
\_\_\_\_\_ is lost, this is known as transpiration.  
Leaf take in CO<sub>2</sub> for the plant, and give off \_\_\_\_\_  
to the atmosphere.

**Leaves = \_\_\_\_\_**

## Photosynthesis Review:

When plants convert light energy into chemical energy.



Which part of the plant takes in the following?

H<sub>2</sub>O: \_\_\_\_\_

CO<sub>2</sub>: \_\_\_\_\_

Light Energy: \_\_\_\_\_

## Root Structure:

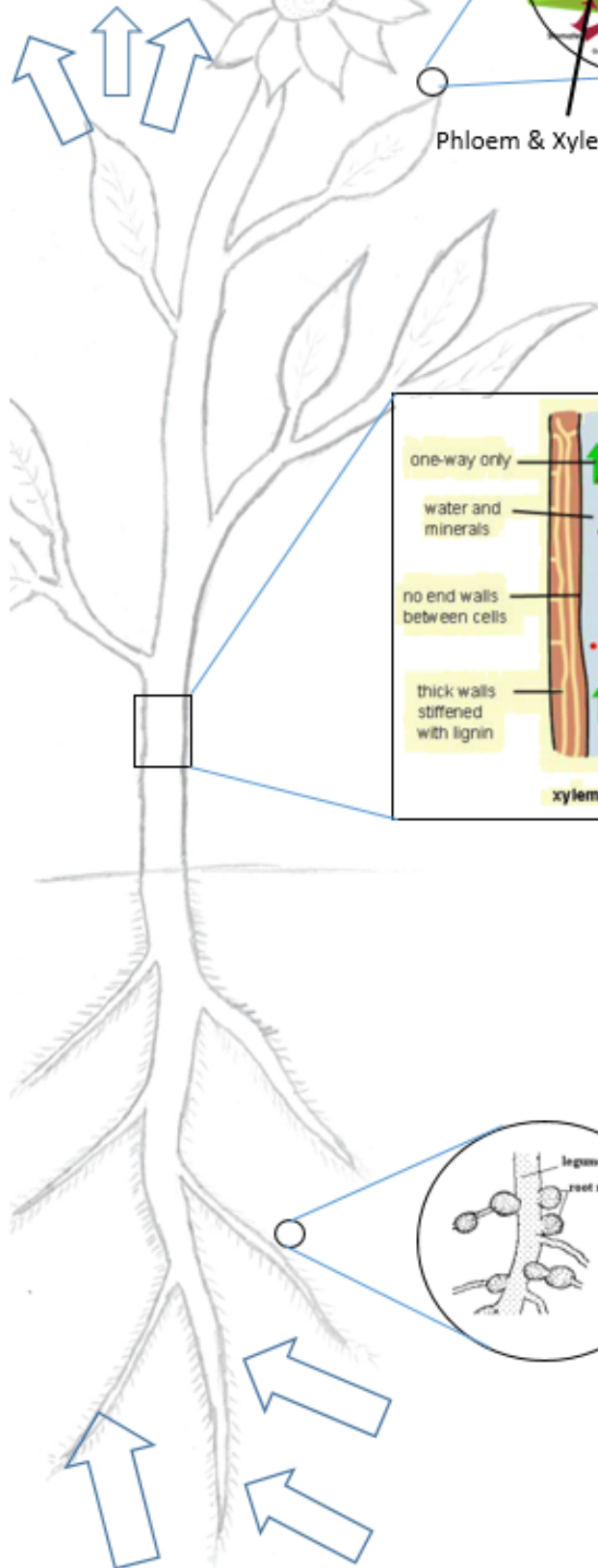
Roots anchor a plant to the ground.

Roots are covered with small \_\_\_\_\_.

Root hairs are the primary site of  
\_\_\_\_\_ and mineral absorption.

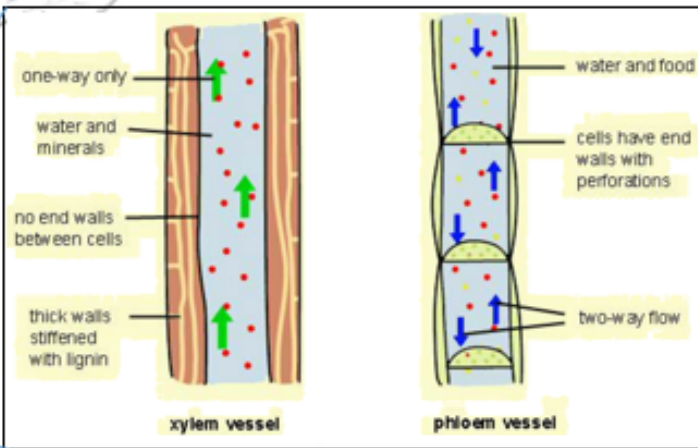
# Transpiration Notes

Transpiration =  
Water Loss  
through leaves



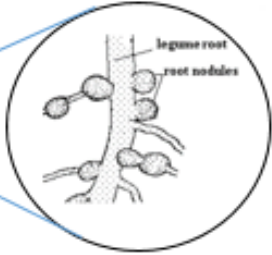
Phloem & Xylem Tubules

Phloem:  
Phloem carries \_\_\_\_\_ (sugars) around the plant for energy.  
  
Phloem mostly starts in the \_\_\_\_\_ of plants because leaves make carbohydrates through \_\_\_\_\_.



\_\_\_\_\_ is water loss through leaves in plants.  
This process is primarily carried out though the \_\_\_\_\_ and \_\_\_\_\_.  
  
Why does xylem carry out transpiration? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Xylem:  
Xylem carries \_\_\_\_\_ and \_\_\_\_\_ upward to the plant.  
Xylem mostly originates in the \_\_\_\_\_ of plants because roots take in \_\_\_\_\_ and \_\_\_\_\_.



Root Nodules:  
Nodules are key to plant survival. Nodules facilitate the uptake of \_\_\_\_\_ and other minerals, which plants need to survive.  
  
Bacteria form a \_\_\_\_\_ relationship with the plant and \_\_\_\_\_ nitrogen from atmospheric nitrogen to a biologically usable form for the plant.

## The Role of Xylem in Transpiration

**Problem:** Does the number of leaves on the celery stalk affect the rate of transpiration?

**Hypothesis:** \_\_\_\_\_

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<b>Initial Observation</b>	<b>Final Observation</b>
<b>Initial Length of the Stalk</b>	<b>Final Length of the Stalk</b>
<b>Rate of Transpiration=</b> <b>(Initial Length-Final Length)/20 minutes</b>	

**Conclusion:** What does this demonstrate about the properties of water?

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## Flower Dissection Background Information

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### Flower Purpose

The purpose of a flower is sexual reproduction. The flower contains the reproductive organs of the plant and produces seeds. Although not all flowers are alike, most share a common structure and function.

### Flower Structure

Flowers are made up of layers of parts, or **whorls**, which are arranged in circles on a short axis called a **receptacle**.

The outer layers of the flower play an important role – attraction and protection. The outer whorl, the **calyx**, is made up **sepals** which can be free or joined. Sepals are usually green, but sometimes can be the same colors as the petals. They protect the flower while it is in the bud. The **petals** come in a variety of sizes, shapes, colors and patterns. Colorful petals and alluring fragrances attract animals that assist in pollination. These animals are called pollinators.

The inner whorls have the most important role; which is reproduction. The male reproductive part is the **stamen**, which consists of an **anther** situated atop a long stalk, or **filament**. Flowers have several stamen (depending on the species of plant) which may be independent (free) or joined in various ways. **Pollen** grains are produced within the stamen's anther. These pollen grains contain the male **gametes** (reproductive cells) that can fertilize the plant's eggs. Pollen has an extremely hard wall that protects the contents from drying out the as the grains are shed.

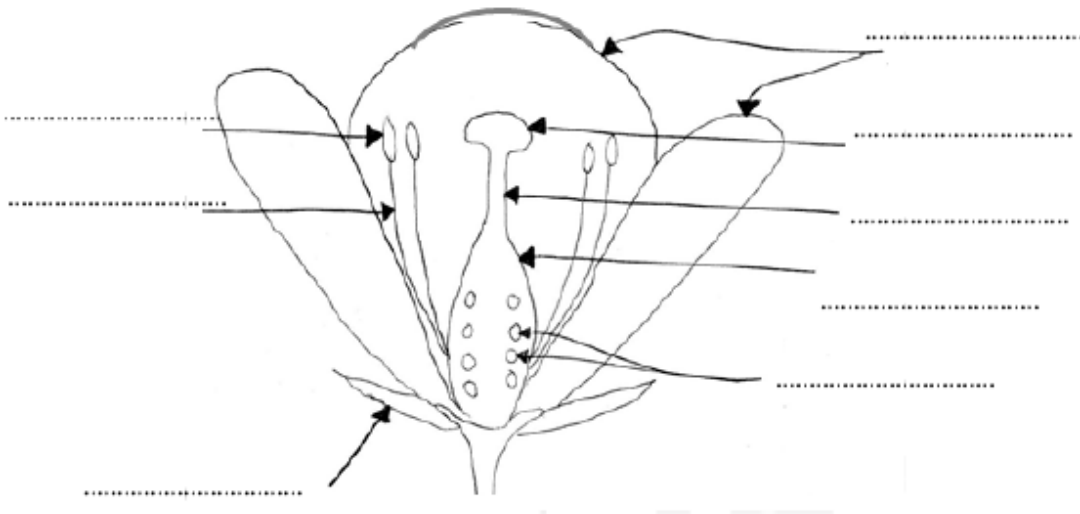
The **pistil** (carpel), or female reproductive organ, is the central whorl of the flower. It consists of three parts: the ovary, style, and stigma. Each pistil has a swollen base, or **ovary** that contains young seeds, or **ovules**, each containing an egg cell. A **style** leads from the ovary up to a receptive tip called the **stigma** that receives pollen grains, holds them and stimulates the growth of compatible pollen. It can also prevent the growth of foreign or incompatible pollen (such as from another species of flower).

When the right pollen grain attaches to the stigma, the grain germinates and a pollen tube begins to grow. The pollen tube grows down the style creating a pathway for two male gametes to travel to the ovule. The tube enters the ovary and reaches the underdeveloped seed, or ovule. Fertilization takes place when the pollen tube bursts to release two male gametes into the **embryo sac**. One fertilizes the **egg** and the other fuses with two other cells in the embryo sac to form the nutritive tissue (endosperm) that acts as a food source for the new embryo.

This unique form of fertilization makes the flowering plants different from all other kinds of plants. Once the egg cell has been fertilized the ovules develop into **seeds**. The fleshy part of the fruit is usually the wall of the ovary. The fruit holds the seed until ready to be dispersed.

## Angiosperm Reproduction Notes

Use the names of the plant reproductive parts in the box below to label the diagram of the flower.



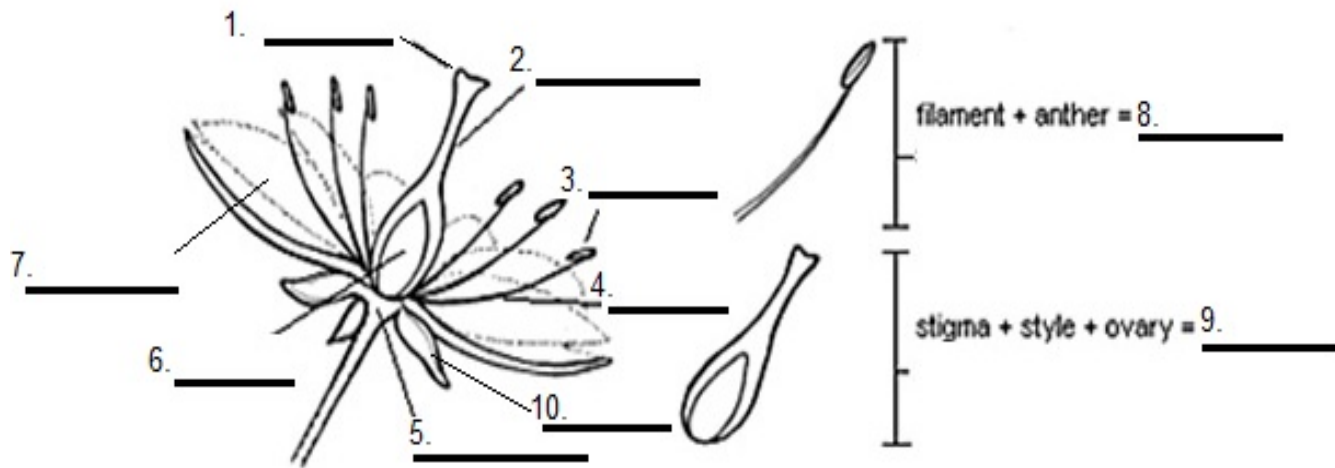
stigma	ovule	sepal	anther
ovary	petals	filament	style

1. Circle the three female reproductive parts in pink and the two male reproductive parts in blue.

Match the parts of the flower to their function to complete the table below:

Name of reproductive part	Function
	Holds the anther up.
	The egg cell. This will become the seed when it has been fertilised.
	Small leaves under the flower, which protected the flower bud.
	Produces the male reproductive cells, pollen.
	Contains the female reproductive cells.
	A structure between the ovary and the stigma.
	Attract insects to the flower.
	The place where pollen lands for pollination to occur.

**Flower Dissection Questions:** Answer the following questions using the flower background information as well as your findings from the flower dissection.



11. What is the female reproductive organ of the flower called? \_\_\_\_\_

12. What three parts make up the female reproductive organ?  
 \_\_\_\_\_, \_\_\_\_\_ & \_\_\_\_\_

13. What is the male reproductive organ of the flower? \_\_\_\_\_

14. What two parts make up the male reproductive organ? \_\_\_\_\_ & \_\_\_\_\_

15. What floral structures are responsible for attracting pollinators? \_\_\_\_\_

16. Circle the structure that does not belong with the others:

*Stigma*                      *Ovary*                      *Anther*                      *Style*                      *Ovule*

17. What structure is produced in the anther and contains the male sex cells? \_\_\_\_\_

18. After seeds mature what happens to the ovary? \_\_\_\_\_

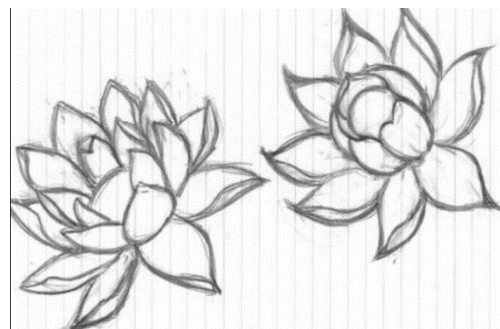
19. Draw and label what has to travel between both sets of organism below for pollination to take place.



Male Cone



Female Cone



Flowers

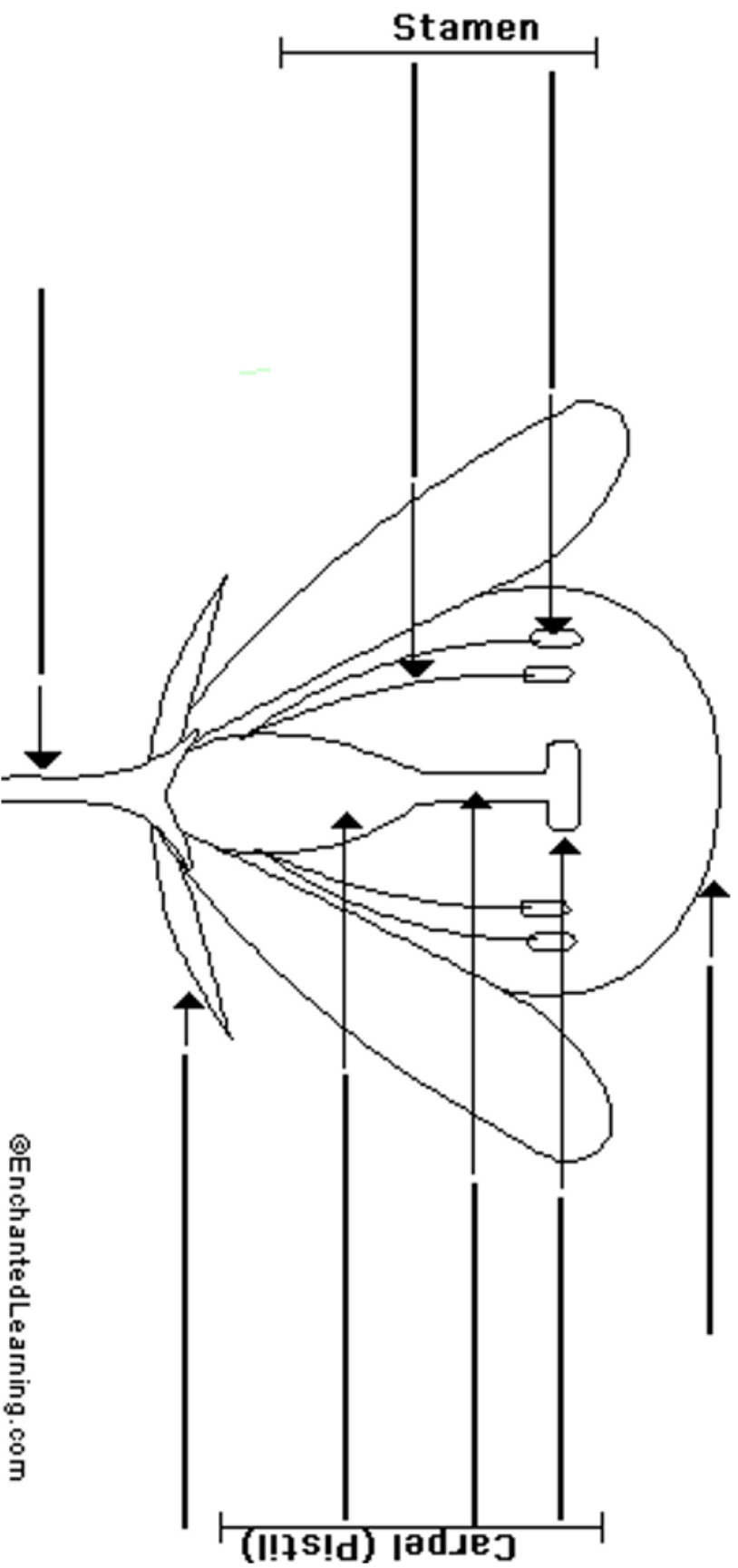
20. How do you know? (Provide at least two evidences): \_\_\_\_\_

# Flower Labeling Diagram

Directions:

1. Label the flower below.

2. Using dots from your pen or pencil, trace the pathway of pollen from male to female parts.

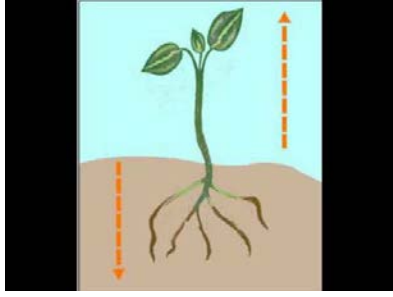
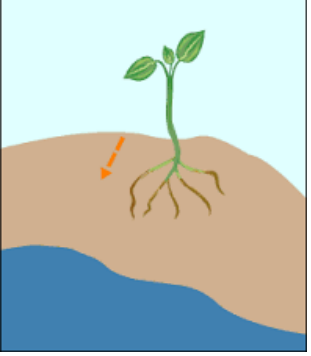




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Pollen moves from \_\_\_\_\_ (part) to \_\_\_\_\_ (part).

# Tropism Notes

Tropism - \_\_\_\_\_

<b>Geotropism</b>	 A diagram showing a green seedling with three leaves growing out of a mound of brown soil. The roots are shown extending downwards into the soil. Two vertical orange dashed arrows are present: one on the left pointing downwards and one on the right pointing upwards, indicating the direction of gravitational pull.	
<b>Hydrotropism</b>	 A diagram showing a green seedling with three leaves growing out of a mound of brown soil. The roots are shown extending downwards and then curving to the left towards a blue area representing water. An orange dashed arrow points from the soil towards the water, indicating the direction of the water gradient.	
<b>Thigmotropism</b>	 A photograph of a green plant with large, heart-shaped leaves growing up against a chain-link fence. The plant's stems are clearly seen curving and climbing over the vertical bars of the fence, demonstrating thigmotropism.	
<b>Phototropism</b>	 A photograph of a potted plant with several green stems in a red plastic pot, sitting on a wooden surface. A black desk lamp with a white shade is positioned to the right, shining light on the plant. The stems of the plant are leaning towards the lamp, demonstrating phototropism.	

## Plant Hormone Stations

Station	Observations	Hormone Involved	Effect of Hormone
1	A -		
	B -		
2	A -		
	B -		
3	A-		
	B-		
4	A-		
	B-		
5	A-		
	B-		

## UNIT 12 VOCABULARY - PLANTS

1. **Xylem** – tissue that transports water and dissolved minerals in vascular plants
2. **Transpiration** – release of vapor through the stomata of plant tissues in the leaves
3. **Phloem**– tissue that transports sugars in vascular plants
4. **Tropism** – movement or growth of a plant in response to an environmental stimulus
5. **Hormones**– chemical signal that is produced in one part of an organism and affects cell activity in another part
6. **Capillary Action** – ability of a liquid to flow in narrow spaces without the assistance of, an in opposition to, external forces like gravity
7. **Adhesion** – attraction between molecules of different substances(water sticks to the walls of xylem tissue)
8. **Cohesion** – attraction between molecules of the same substance (water molecules sticking to water molecules)
9. **Angiosperm**– group of seed producing plants whose embryos are enclosed by a flower or fruit
10. **Gymnosperm** – “naked seed” – group of seed-producing plants whose seeds are encased in cones
11. **Nonvascular** – plants without vascular tissue (xylem & phloem)
12. **Vascular**– plants that do have vascular tissue (xylem & phloem)
13. **Guard Cell** –Cells that control the opening and closing of the stomata.
14. **Levels of Organization**- From smallest to largest: cells→tissue→organ→organ system→organism
15. **Reproduction**- the biological process by which new individual organisms – "offspring" – are produced from their "parents". **Reproduction** is a fundamental feature of all known life; each individual organism exists as the result of **reproduction**.
16. **Response**- a reaction to something.
17. **Roots System**- the organ of a plant that typically lies below the surface of the soil.
18. **Shoots System**- Collective term for the generally above ground portion of a plant comprised of the stem/trunk, branches, flowers, and leaves.
19. **Specialized Cells**- Cells that perform specific specialized functions in organisms.
20. **Transport**- The method by which nutrients and water travel throughout the plant.
21. **Stomata**- minute aperture structures on plants found typically on the outer leaf skin layer, also known as the epidermis. They consist of two specialized cells, called guard cells that surround a tiny pore called a stoma.
22. **Stamen**- the pollen-producing reproductive organ of a flower.
23. **Pistil**- the female organs of a flower, comprising the stigma, style, and ovary.
24. **Anther**- the part of a stamen that contains the pollen.
25. **Filament**- the slender part of a stamen that supports the anther.
26. **Stigma**- the part of a pistil that receives the pollen during pollination.
27. **Style**- a narrow, typically elongated extension of the ovary, bearing the stigma.
28. **Ovary**- the hollow base of the carpel of a flower, containing one or more ovules.