THE MIGHTY PLANTOFE

(Opportunity for Excellence)

Name:_____

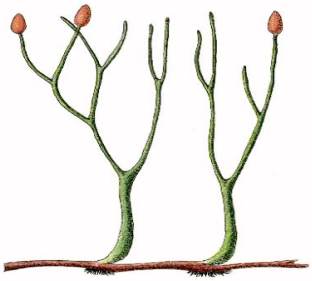
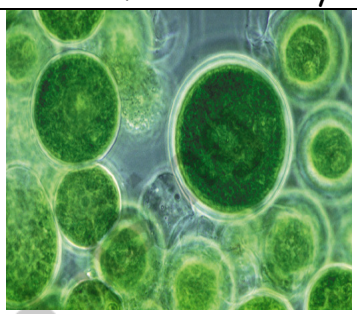
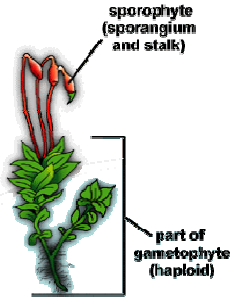
Due:_____

Please respond intelligently to the comment from the angry student below.

Plants are very important because…

- The energy flow of life occurs from plants as they get energy from the sun. We eat plants
- Plants provide oxygen to breathe
- Many important things are made of plants
- Any wood / fossil fuels
- Any fiber / other than metals.
- Plastics (most are oil based).
- Chemicals (most are from plants).
- Plants are important to our lives

Please place the following pictures in the correct order 1-7 according to their evolutionary history. 1 is the earliest, 7 is the latest. Provide a name for the ones you know underneath.

 6	 (First Vascular Plants) 2	 1	 6
 3	 4	 (First Seed Plants) 5	Draw a hornwort in the space below. 

What is Algae? Why is Algae so important to our world?
Draw algae here

Strings of green work for algae or circles
Algae can be brown or red but is usually green.

- Algae produce more than 71% of the Earth's oxygen.
- Algae remove huge amounts of Carbon Dioxide from the air. Carbon Dioxide causes global warming, so algae is one of our most important allies in the fight against climate change.
- They are the basis of most food chains in the ocean and in fresh water. No algae, no fish.
- Algae may become the next fuel of the future.
    - A form of bio-diesel gasoline.

What is a lichen? How does a lichen represent a mutualism between two species? Can you name the types of lichen below?

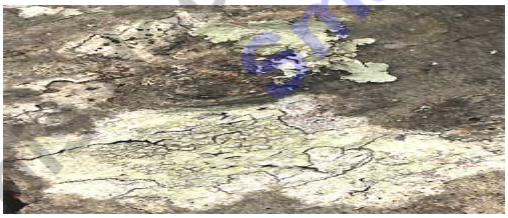
- Lichen: Algae and fungus growing together in a symbiotic relationship.

- The fungi extract food from the environment, while the algae are photosynthetic. This is mutualistic symbiosis.


Foliose Lichen


Fruticose Lichen

Crustose lichen



		
Foliose	Crustose	Fruticose

Why do most bryophytes live close to the ground and in moist environments?

- Bryophytes must live close to the ground because they lack tubes (vascular tissues) in the plant to bring water and food up and down.

Please identify, and then label the bryophyte below?

Please correctly name the type of non-vascular plant in the boxes under the picture.

Liverwort

Mosses

Hornwort

Draw a seedless vascular plant in the box below? How do these types of plants reproduce?

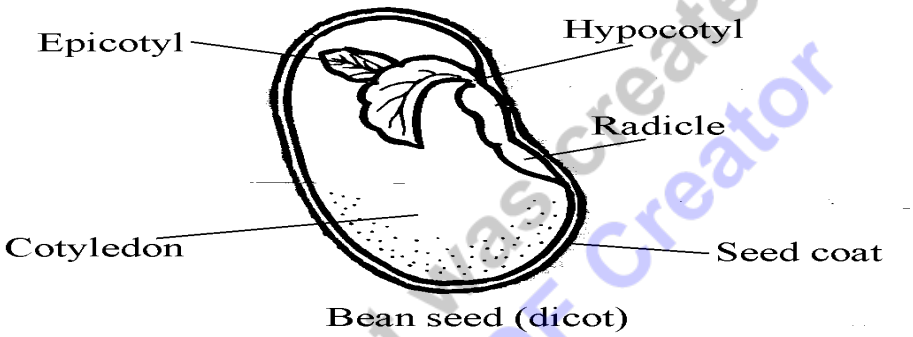
- Ferns: Flowerless and seedless vascular plant, having true roots from a rhizome, and fronds that uncurl upwards; and reproduces with bisexual spores.

Please check off the box when each is covered below.

◊ What does the picture below represent? -Provide a description.

- The picture below shows a seed. A seed is a mature fertilized plant ovule consisting of an embryo and its food source and having a protective coat.

◊ What are some of the parts to the picture below? - Label them.



Bean seed (dicot)

◊ What are some ways to break its dormancy? – Provide them.

Factors that break seed dormancy.

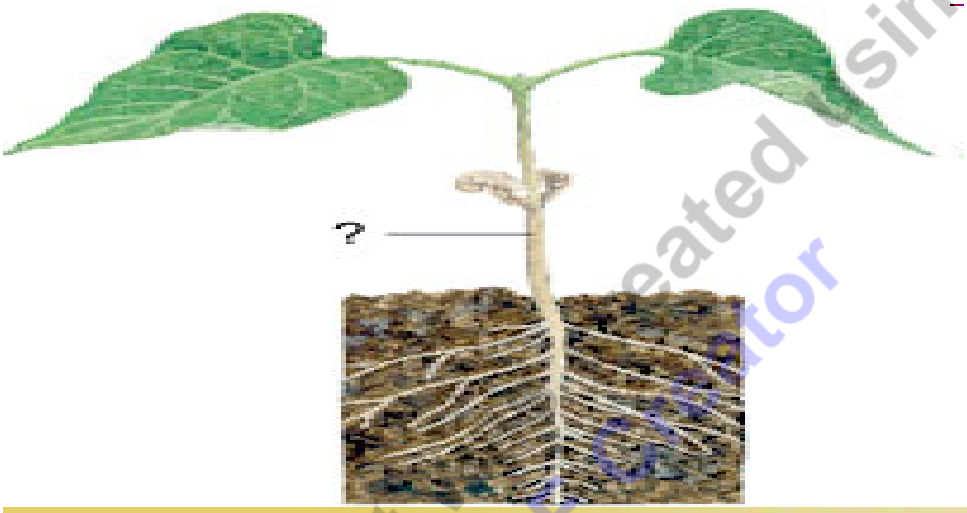
- Mechanical Abrasion.
- Digestion processes of animals.
- Temperatures – Warm and Cold + Fire.
- Water

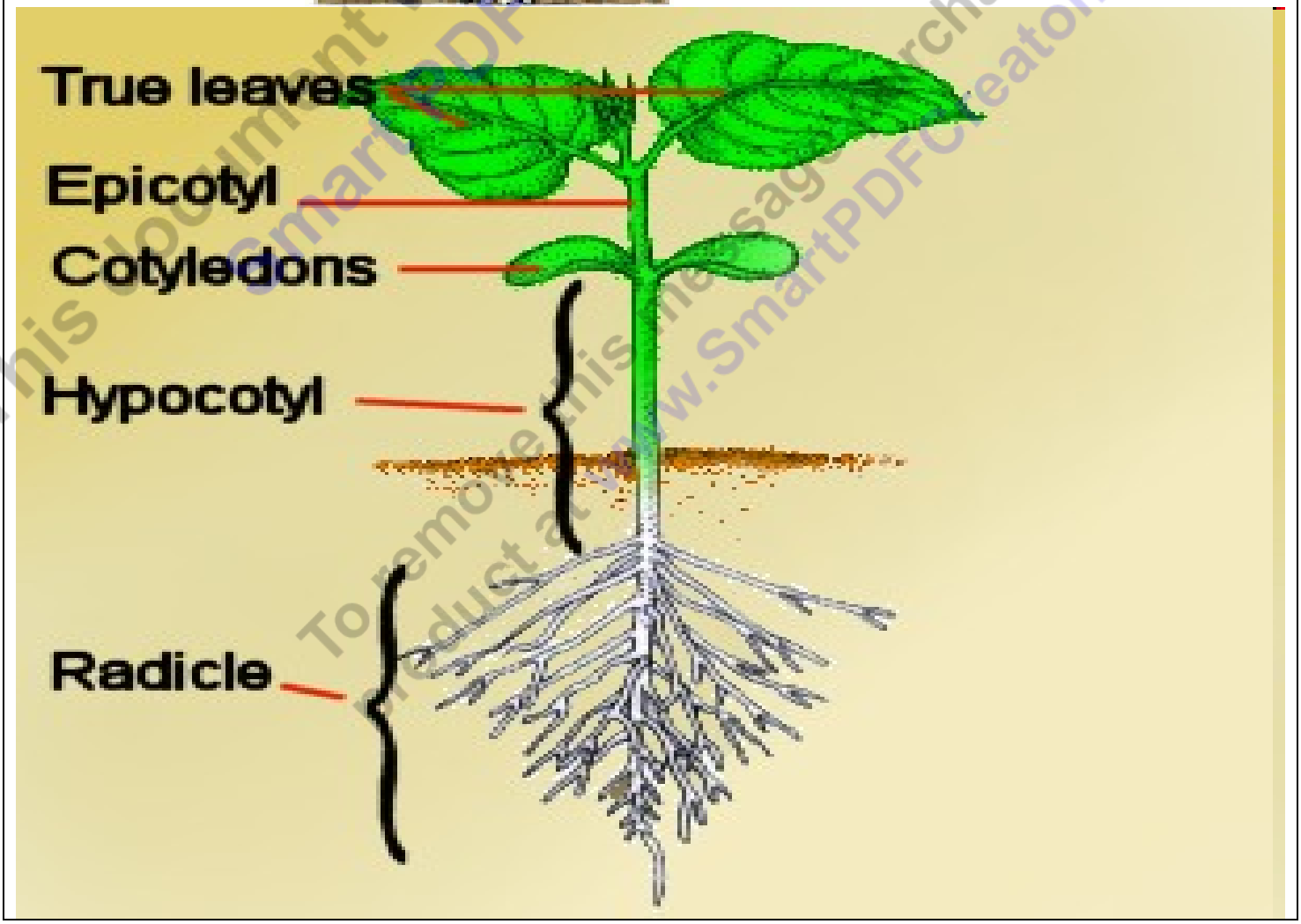
◊ What do you know about the person below? – Provide information.

George Washington Carver -As an agricultural chemist, Carver discovered three hundred uses for peanuts and hundreds more uses for soybeans, pecans and sweet potatoes. Among the listed items that he suggested to southern farmers to help them economically were his recipes and improvements to/for: adhesives, axle grease, bleach, buttermilk, chili sauce, fuel briquettes, ink, instant coffee, linoleum, mayonnaise, meat tenderizer, metal polish, paper, plastic, pavement, shaving cream, shoe polish, synthetic rubber, talcum powder and wood stain.

Please label and provide a brief description of the following terms associated with a young plant. Check off each term after you have described and labeled them. Make sure your arrow accurately points to that plant feature.

◊ True Leaves ◊ Cotyledons ◊ Epicotyl ◊ Hypocotyl ◊ Radicle ◊ Seed Coat

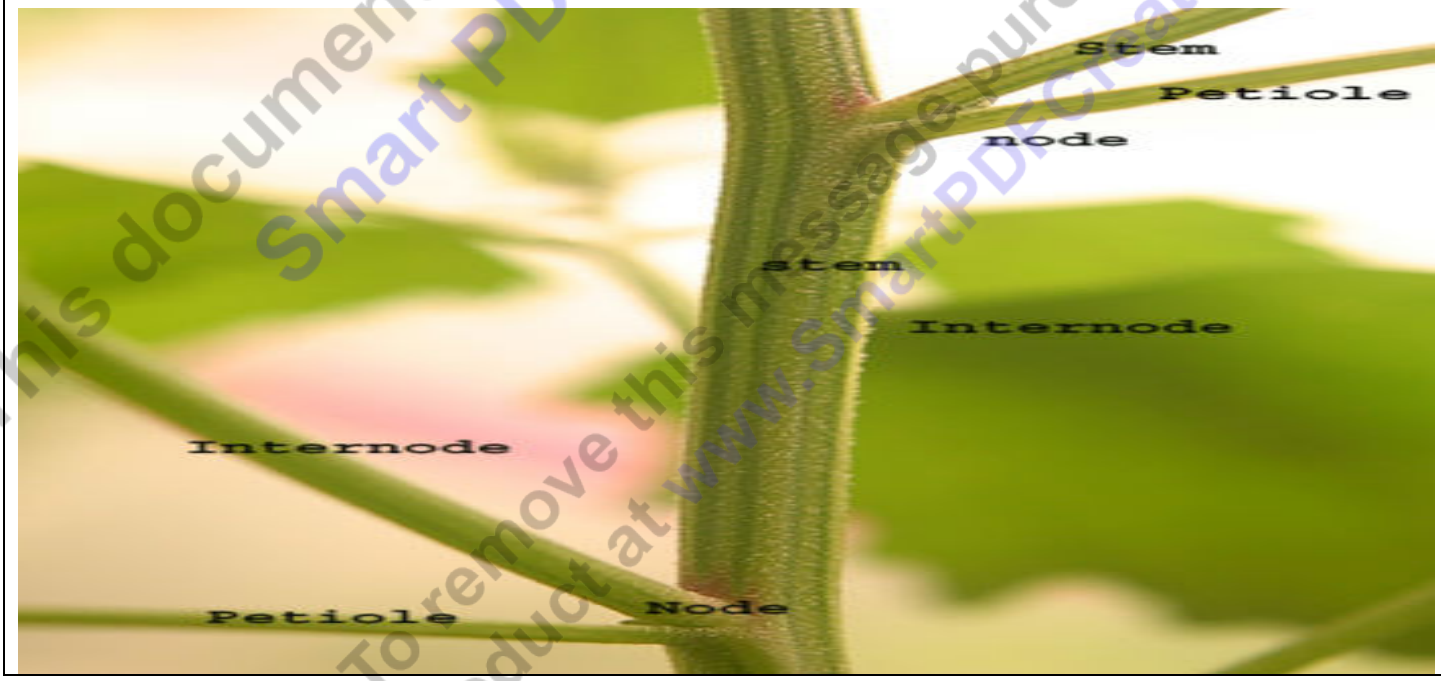




Please accurately label the parts of a stem on the picture below. Please check off each box

after you have used the term.

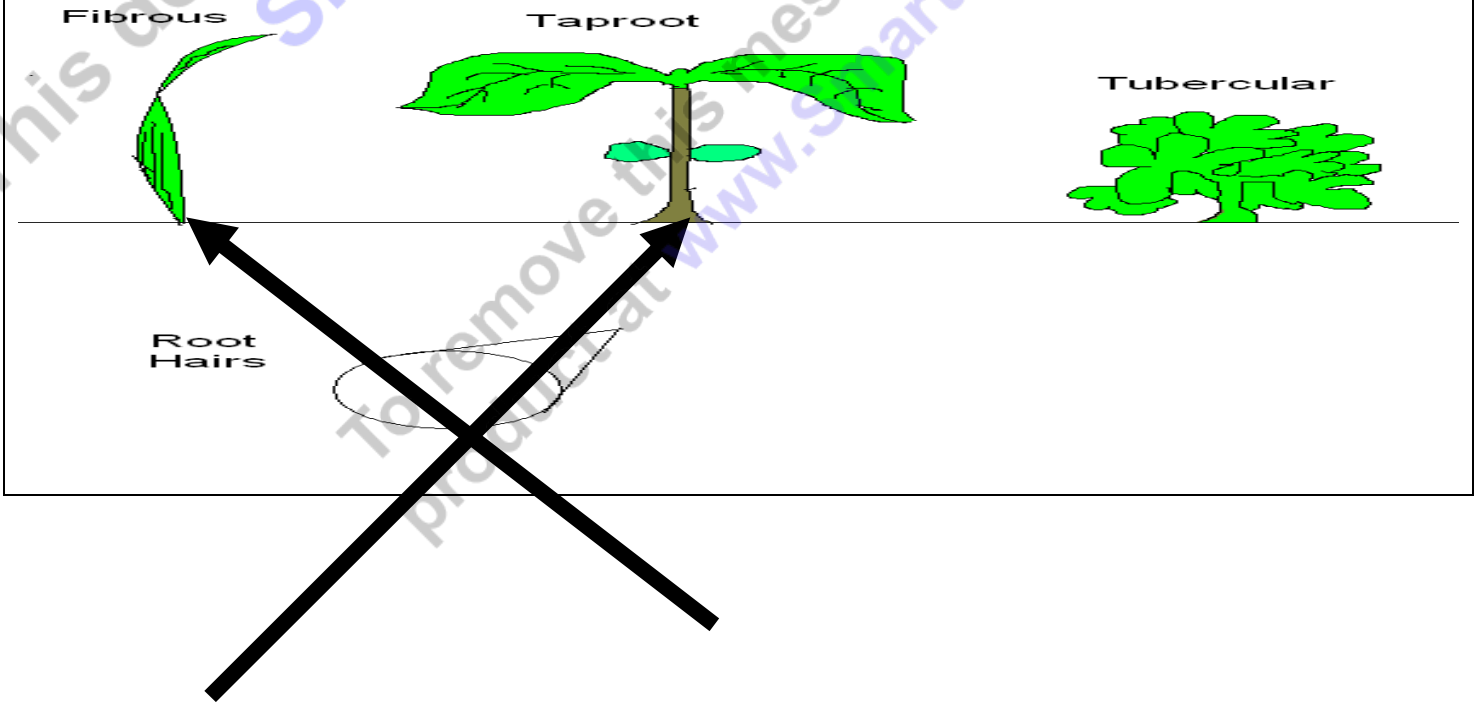
◊ Node ◊ Internode ◊ Petiole ◊ Stem



Which plant below is a dicotyledon, and which is a monocotyledon? Explain using the pictures, boxes, and circles to described the differences between the two.

This side is a monocotyledon because…	This side a dicotyledon because…
• Seedling has one cotyledon • Veins in leaf are parallel. • Flower petals are in 3's. • Never woody. • Vascular bundles are scattered.	• Veins on leaf are branched. • Flower parts are groups of 4 to 5. • Secondary growth can be woody. • Vascular bundles are in a ring.

Please draw the root type below the surface.



Which of the following is not a reason why plants need water?

1 A) Water is needed for photosynthesis.
2 B) Keeps plants rigid and not wilted.
3 C) Water cools the plant down during warm weather.
4 D) Water carries dissolved nutrients and minerals throughout plant.
5 E) Water needs to travel from the leaves to the roots.

Please describe how the plant below does the following.

◊ Moves ◊ Stem Elongation ◊ Promotes Growing (Root tips)
◊ Opens Stoma in leaves ◊ Promotes fruit ripening

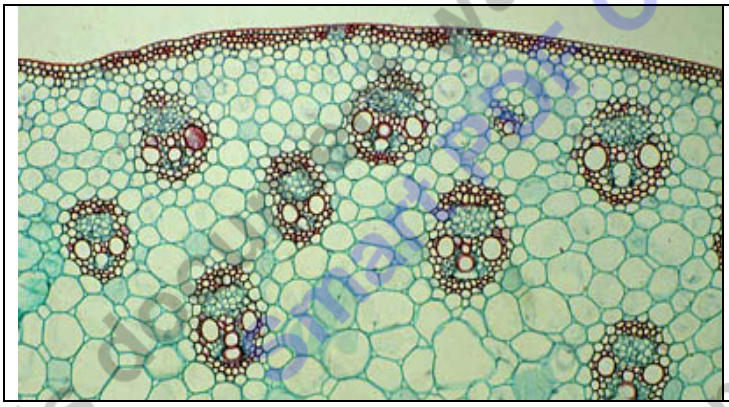
- Plant hormones are chemicals that affect flowering; aging; root growth; distortion, killing of leaves, stems, and other parts; prevention or promotion of stem elongation; color enhancement of fruit; prevention of leafing and/or leaf fall; and many other conditions.

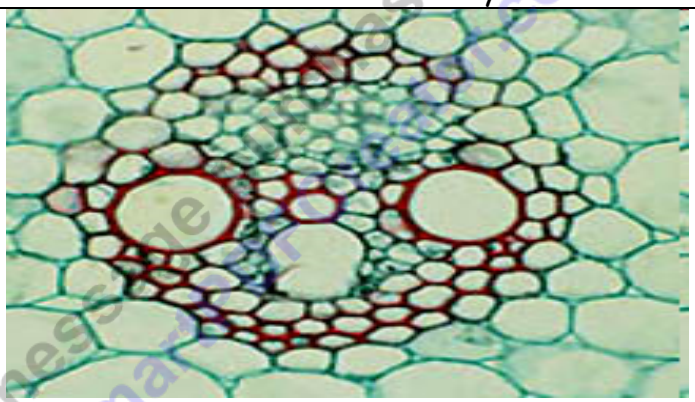
Some plant hormones.

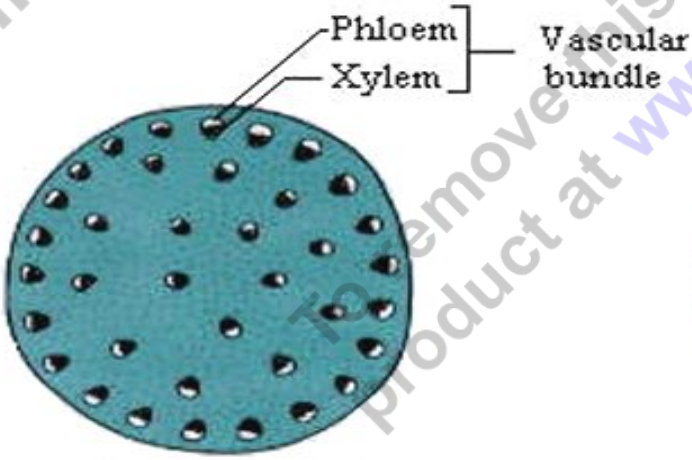
- Auxin: Promotes stem elongation and bud dormancy.
  - Phototropism: When plants grow toward a light source.
- Gibberellins: Make stems longer.
- Cytokinins: Promotes cell division. They are produced in growing areas like the tips.
- Abscisic Acid: Opens and closes stomata, has role in seed dormancy.
- Ethelyene: A gas that promotes fruit ripening.

Please label the cross section below with the following terms. Is the cross section a monocot or dicot? How can you tell?

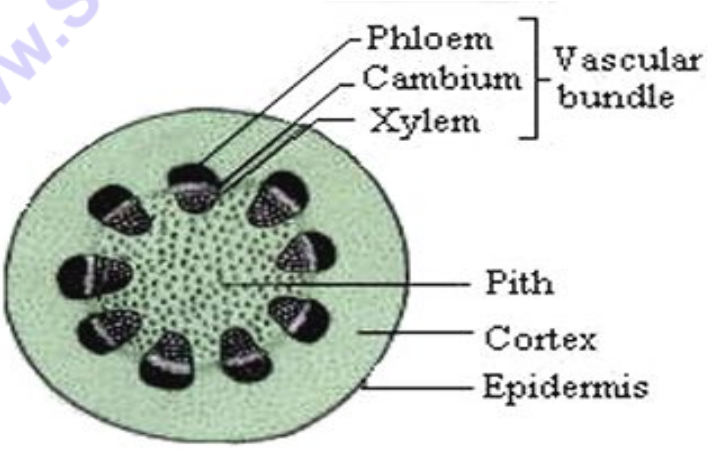
◊ Ground Tissue ◊ Dermal Tissue ◊ Vascular Tissue ◊ Vascular Bundle ◊ Xylem ◊Phloem



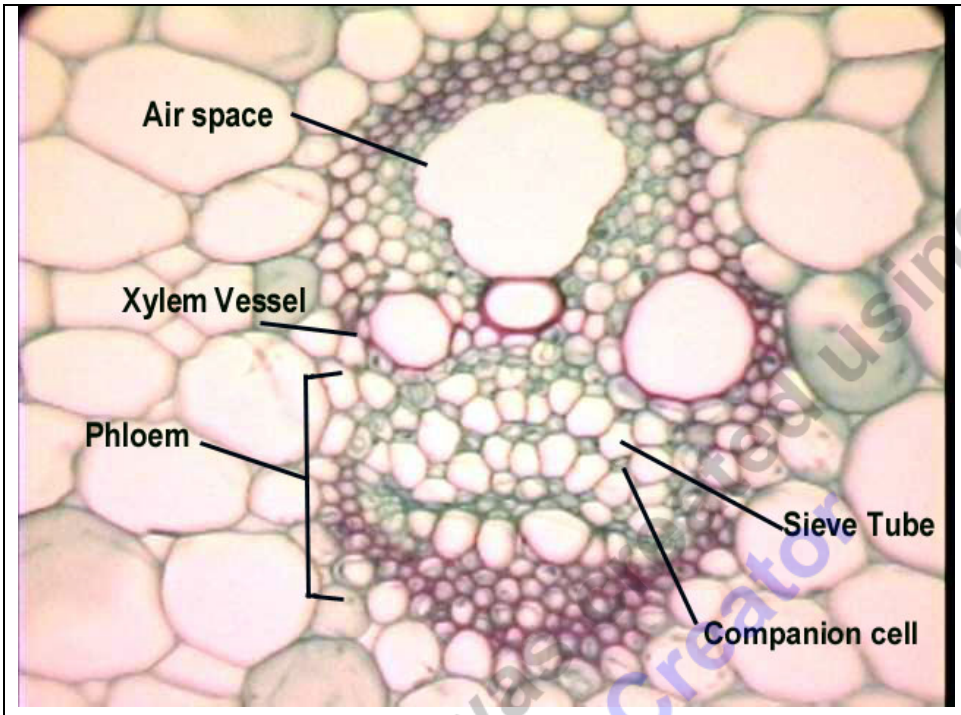




Monocot stem



Dicot stem



Please describe the roles of xylem and phloem using the picture below. Don't forget to discuss the bucket hanging off of the tree.

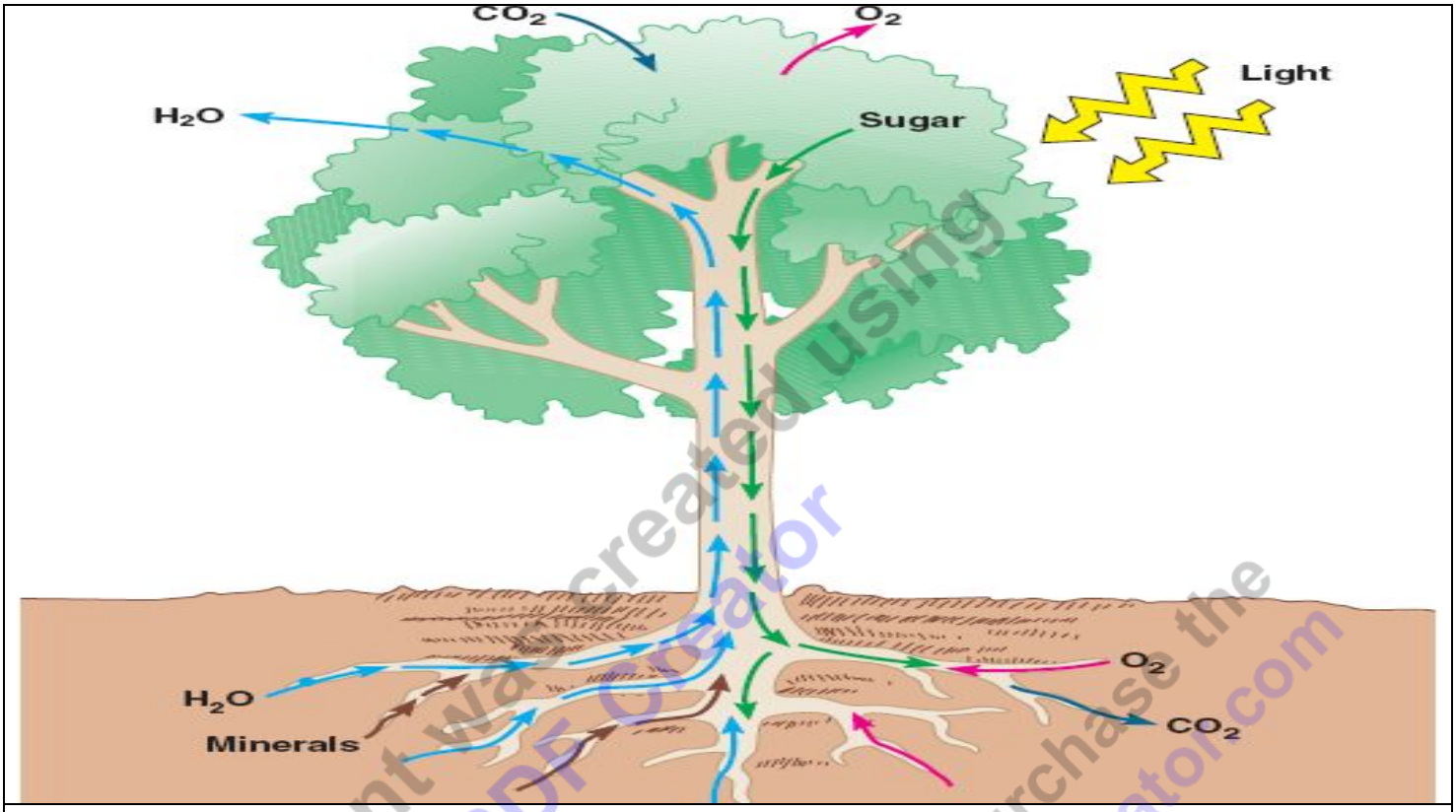
Vascular system: The vessels and tissue that carry or circulate fluids such as blood or lymph or sap through the body of a animal or plant.

Xylem: (Zi-lem).

- Tubes that water and minerals move through.
- Water travels up the tree from roots to leaves.
- Old xylem doesn't transport water but supports plant. (Xylem is wood).

Phloem: (Flow-em).

- Tubes in the plant that food (sugar) moves through. This phloem (sugar / sap) when boiled becomes maple syrup when the water evaporates.



Please cross off each diamond after that questions has been answered.

◊ Please label the cross-section of the tree below with the correct terms.

◊ Cambium ◊ Pith ◊ Sapwood ◊ Heartwood ◊ Inner bark ◊ Outer bark

◊ Please calculate the trees age by adding the years from the outside in. The tree was just cut.

The tree is 12 years old

◊ Assume the tree was just cut, What year showed the most growth3 and 4 years ago showed a lot of growth.

◊ Assume the tree was just cut, What year showed the least growth Years 4 and 6 showed less growth.

◊ What is the science of dating past events by using annual tree rings called?

Dendrochronology

◊ Please put a Θ symbol on the non-living part of the tree. (old xylem).

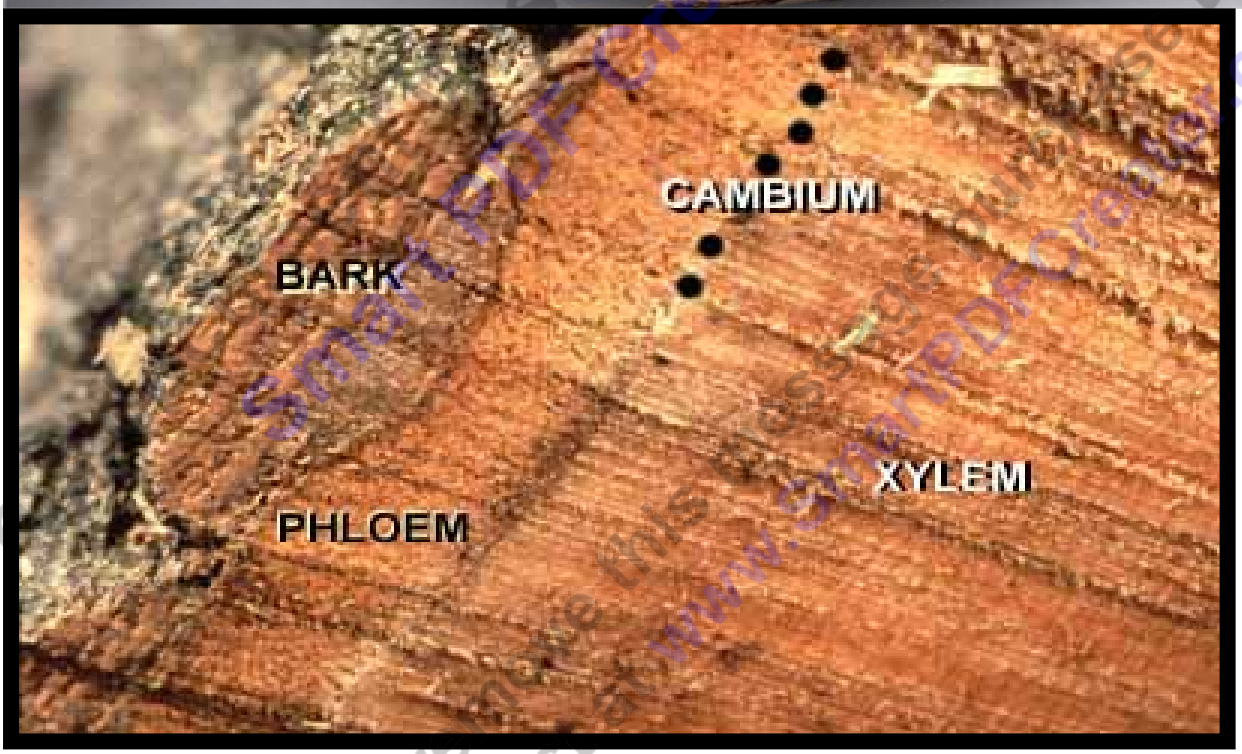
◊ Put a large Δ symbol on the tree where wood formation begins in a young tree.

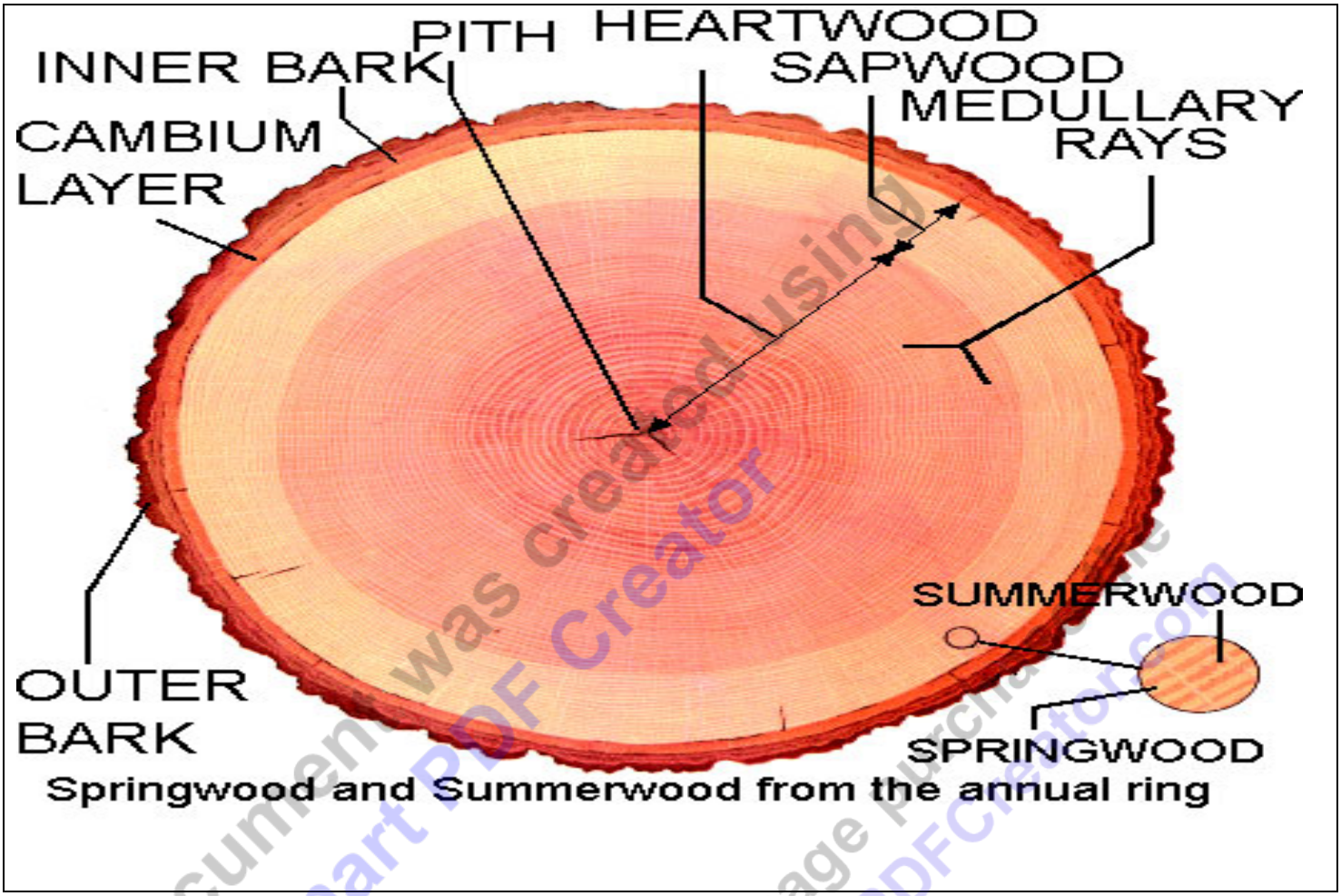
◊ Put a large ☺ symbol on the part of the tree that provides protection.

◊ Put a large * symbol on the part of the tree that makes new tissues.

◊ Put a large X symbol on the living wood that conducts water with xylem.

◊ Put a large # symbol on the part of the tree made of living tissue that contains the phloem.





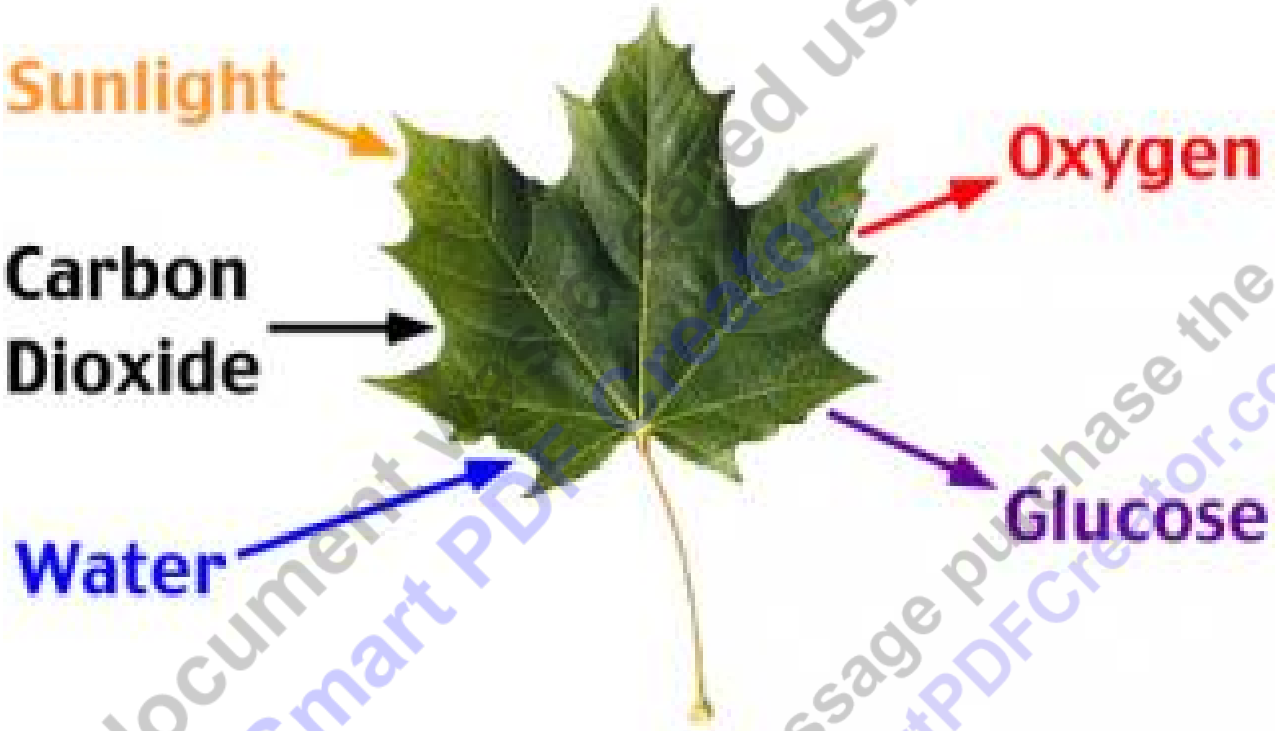
Springwood and Summerwood from the annual ring

Define a leaf in the space below. You are only allowed to write on the leaves veins.

A leaf is a plant organ, that is photosynthetic, contains chloroplasts, and is usually thin so light can penetrate.

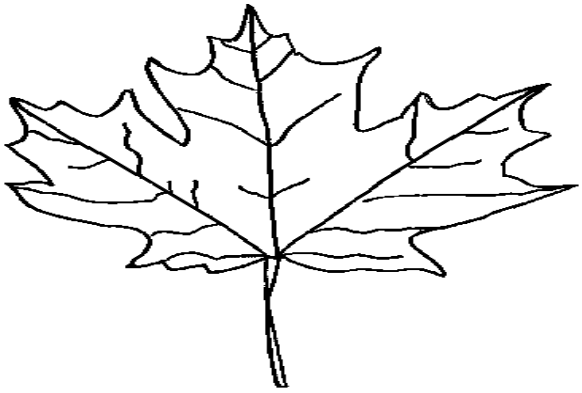
◊ Please add the correct terms next to the arrows to show what goes into and out of a plant when it does photosynthesis.
◊ A strong answer will provide parts of the photosynthesis equation.
◊ Make a reference to which arrow best represents the process of transpiration in plants.

Water comes out during cellular respiration



When the plant does cellular respiration, water is released as a by product.

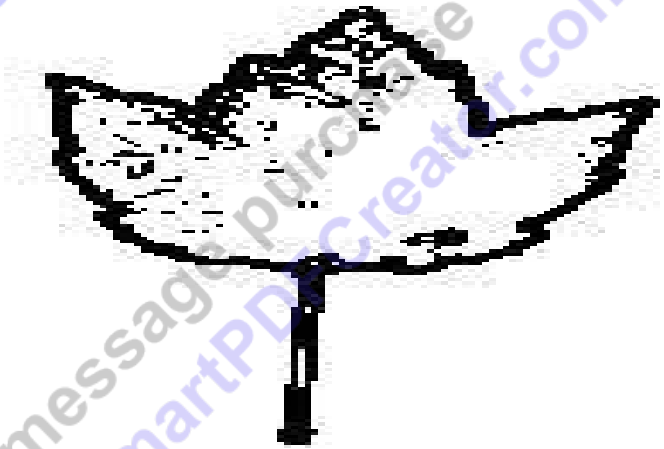
Please identify the tree based on the leaves/needles below. Sizes are not to scale!



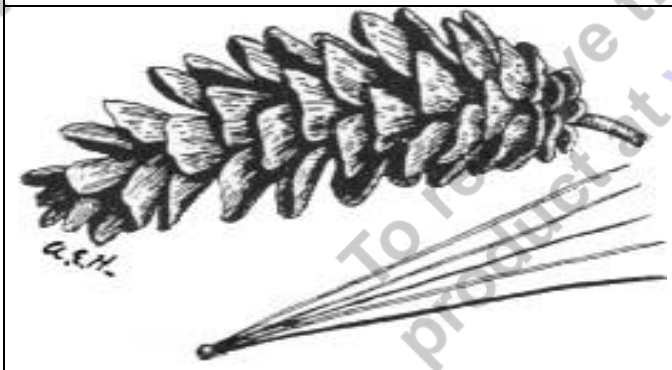
This is a sugar Maple

This is a hemlock

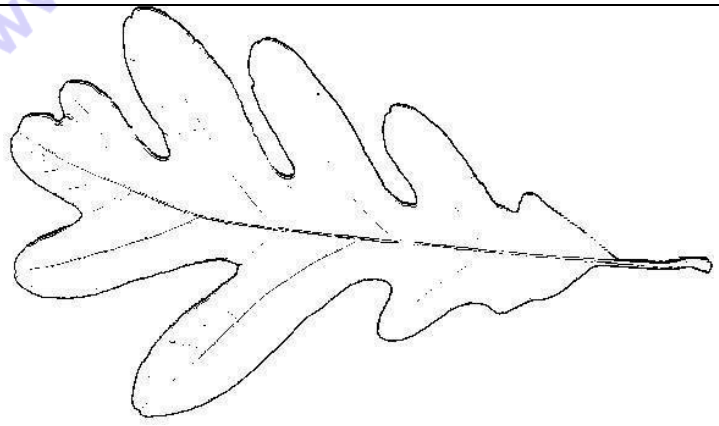
This is a cedar



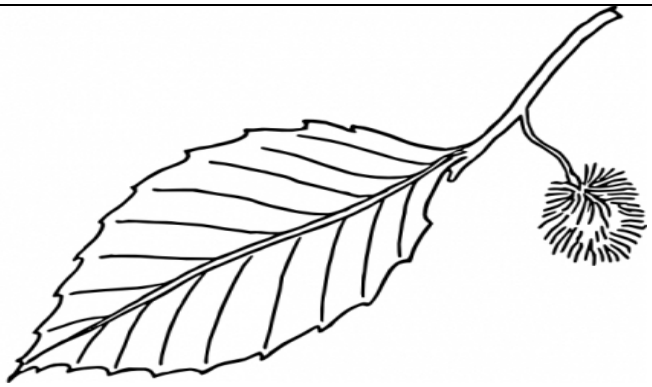
This is a red maple



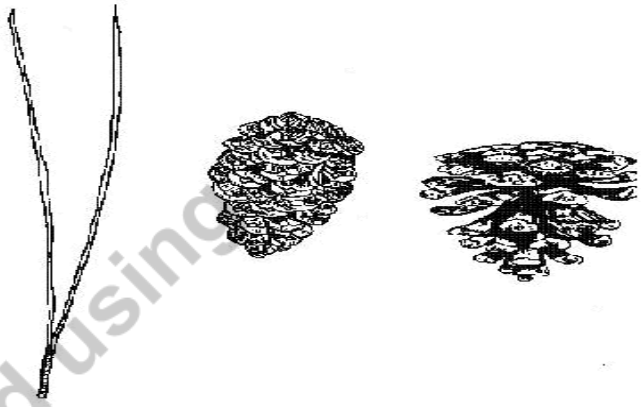
This is a white pine



This is a white oak



This is a Beech Tree

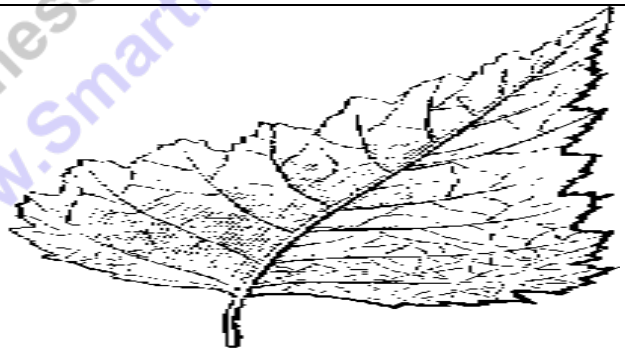


This is a red pine

This is a red oak

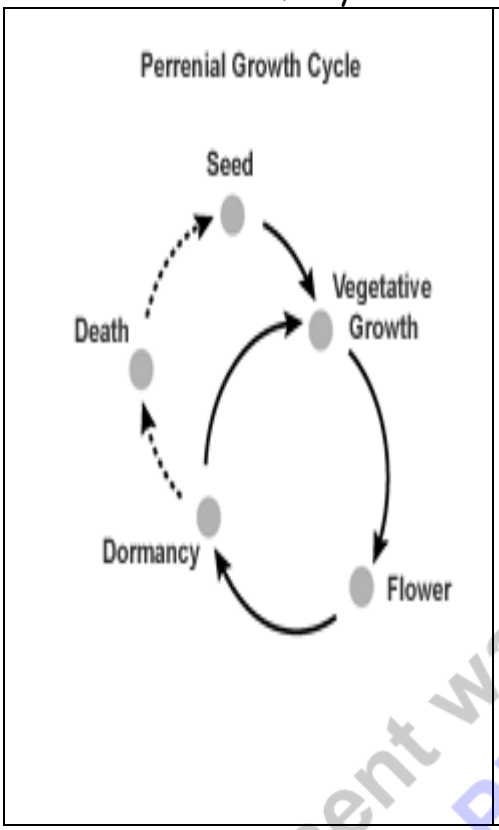
This is a fir

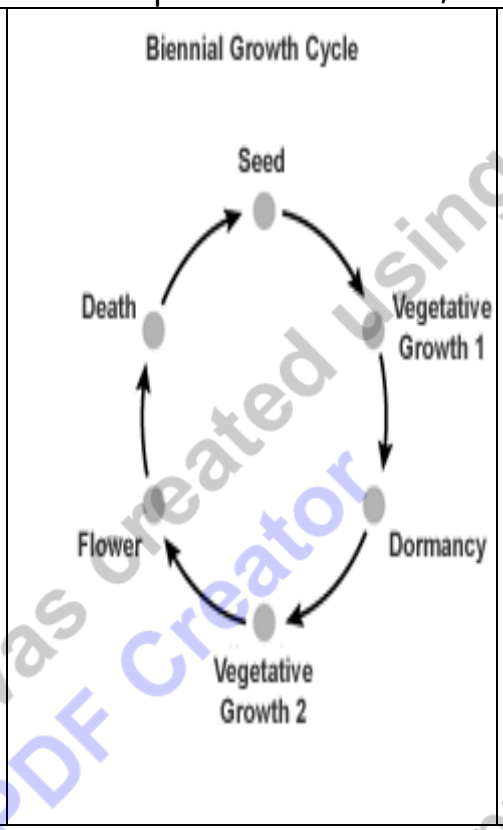
This is a spruce

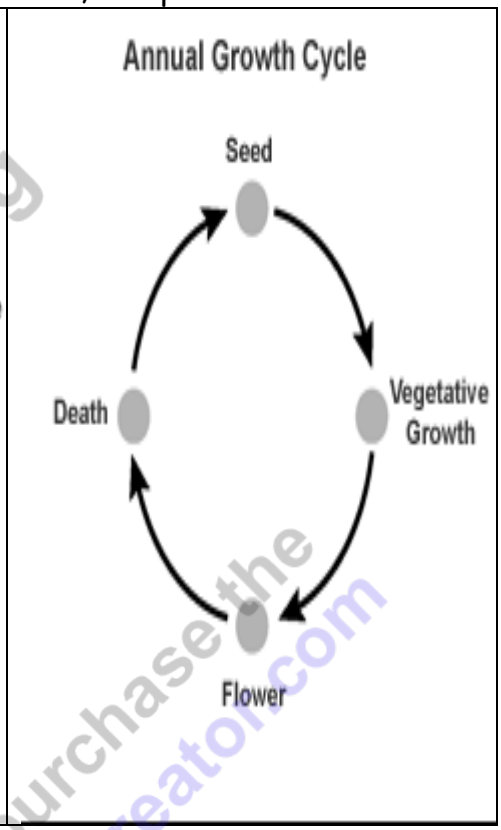


This is a birch

Please label the life cycles below. Which picture is an annual, biennial, and perennial?



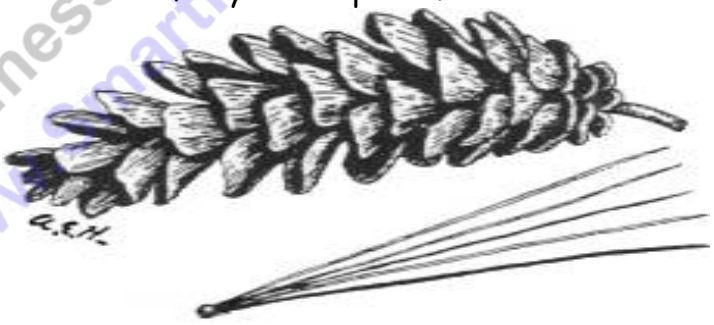




Am I an Angiosperm or a Gymnosperm? Provide a rationale for your response.

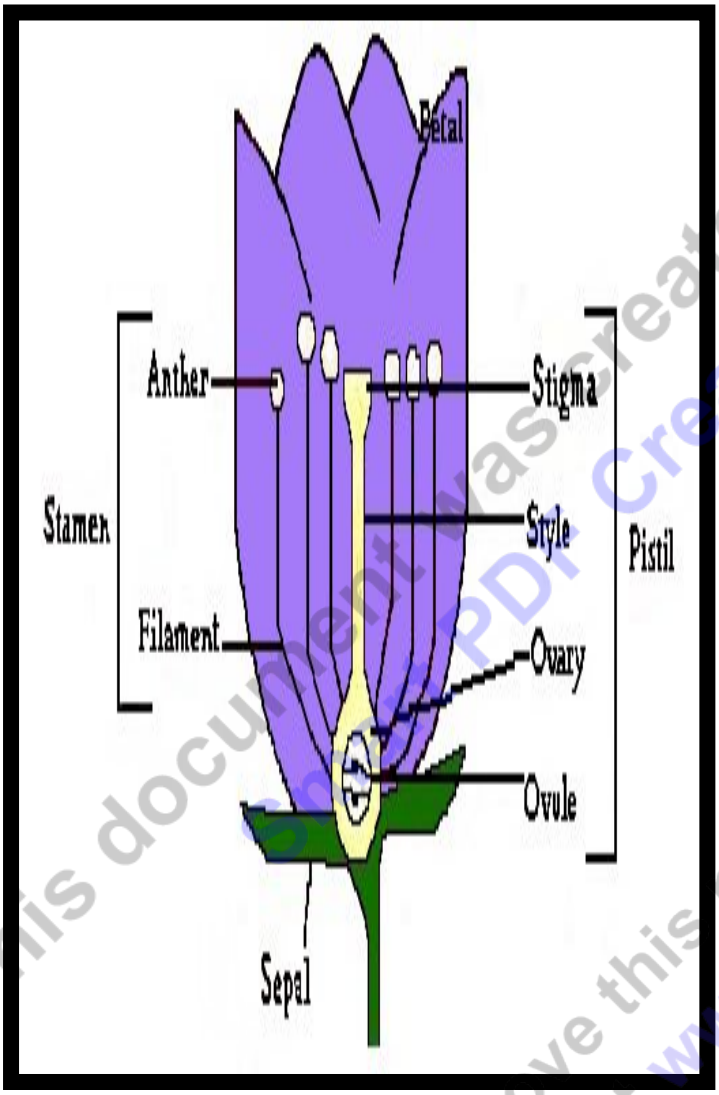
Angiosperm: Flowering, covered seed, produce seeds enclosed in a fruit /ovary.

Am I an Angiosperm or a Gymnosperm? Provide a rationale for your response.



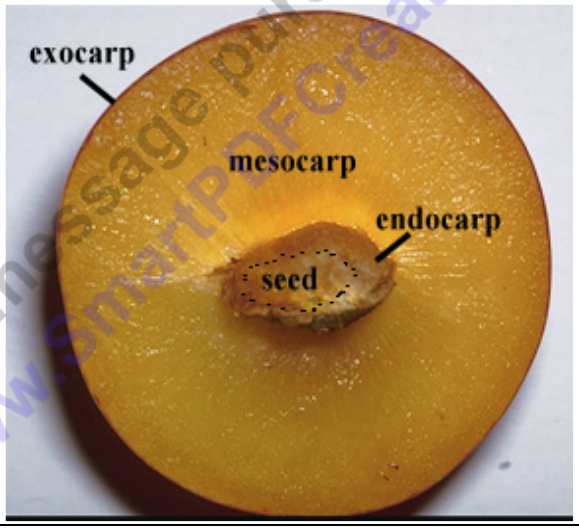
Gymnosperm: Non-flowering, seeds usually arranged on a cone.

Please label the following parts of a flower using the template below. Make a reference to the male and female portions of the flower.



Please label the parts of the fruit using the picture below.

◊ Endocarp
◊ Mesocarp
◊ Exocarp
◊ What type of fruit is this apple? Why?



GREAT WORK! THIS WAS A DIFFICULT OFE. DO NOT LOSE! PUT IN A SAFE PLACE!