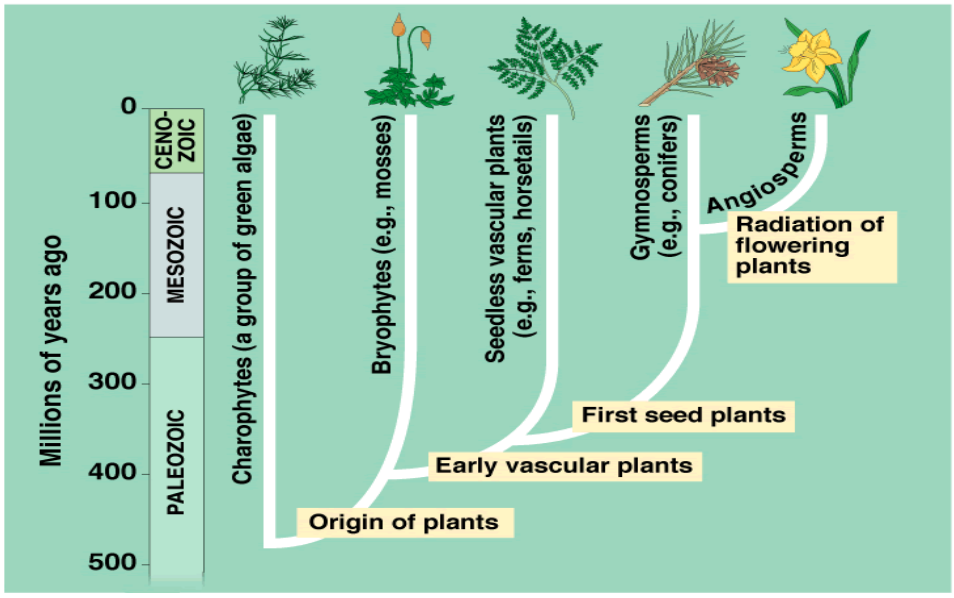
Seed Plants: Gymnosperms and Angiosperms

Answer the questions as you go through the power point, there are also paragraphs to read where you will need to hi-lite or underline as you read.

1. **What are the two divisions of seed plants?**
2. **What were the ancestors for land plants and where did they live?**
3. **Were the earliest land plants vascular or nonvascular?**
4. **What's the name of this group of plants?**
5. **How do they reproduce?**
6. **What was the first type of vascular plants and how do they reproduce?**
7. **What are the two main groups of vascular seeded plants?**
8. **Study the cladogram—underline the derived characteristics and circle the organisms that developed from them.**



9. List 6 characteristics of seed plants.

10.List 5 reasons seed plants were successful living on land.

11.Seeds contain a young developing _____ _____. They will stay dormant until triggered to germinate.
12.Seeds are covered with a protective seed coat called a _____.
13.Inside the plant food is stored as _____ so the young plant can use it to _____. This endosperm has been "fertilized" too but does not contain genetic material. It is now triploid (3n).
14.Seeds form from ripened _____ after they are _____.
15.Another name for the primary root is the _____.
16.Seed plants can have 1 or 2 embryonic leaves called _____.
17.The _____ becomes the shoot.
18.The stem like portion below the cotyledons is called the _____.
19.The stem like portion above the cotyledons is called the _____.

20.Draw and label the parts of the seed.

21.Draw and label the parts of a corn seed by using the above picture and following word bank to fill in the blanks: endosperm(3n), plumule, epicotyl, radical, hypocotyl, seed coat, cotyledon.

22. Seeds can lay dormant for many years. Explain why a seed coat is important for a seed.

23.Seeds need to be dispersed/scattered away from the parent plant to prevent competition between the same plants. Name 3 methods used to disperse seeds. Name an organism that uses that method.

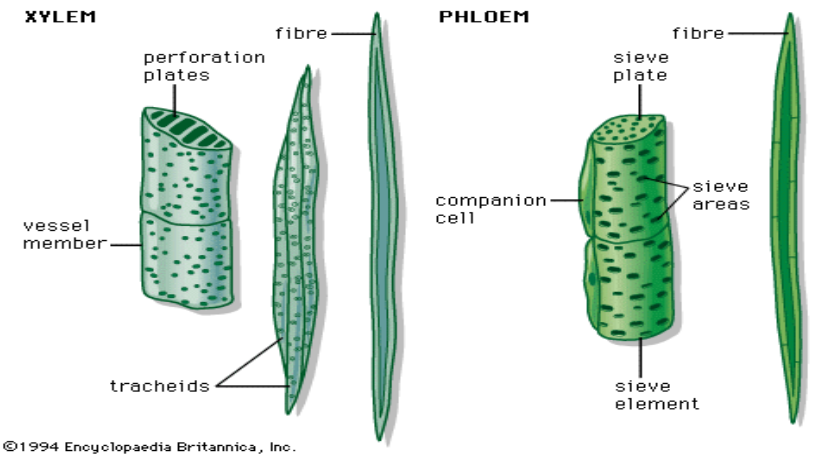
24.Germination is the _____ _____ of a plant embryo.
25.What happens to cause a seed to begin to germinate?

26.Where does a germinating seed get the energy to begin growing?

27.When does a fruit form?

28.Name 3 types of fruit, how they form, and an example of each type.

29.These two types of tissue make up what is called the vascular cylinder. What are the 2 types of vascular tissue?
30. Water can travel up long distances in xylem due to adhesion when water sticks to the sides of the vascular vessels, and due to cohesion when water molecules stick to each other. These two types of attraction are part of capillary action. In the phloem, "when nutrients are pumped into or removed from the phloem system, the change in concentration causes a movement of fluid in that same direction. So, phloem is able to move nutrients in either direction to meet the nutritional needs of the plant."(text, p. 602)
****Hi-lite the structures in vascular tissue in the diagrams. Write a brief description of the function of each part.**



Ground tissue are cells that lie between the dermal (skin) of the plant and the vascular tissue. There are three types—parenchyma, collenchyma, and sclerenchyma. (text, p. 582)
31.List the 2 types of seed plants. Then list the classification phyla for each type.
Give an example plant for each phyla.

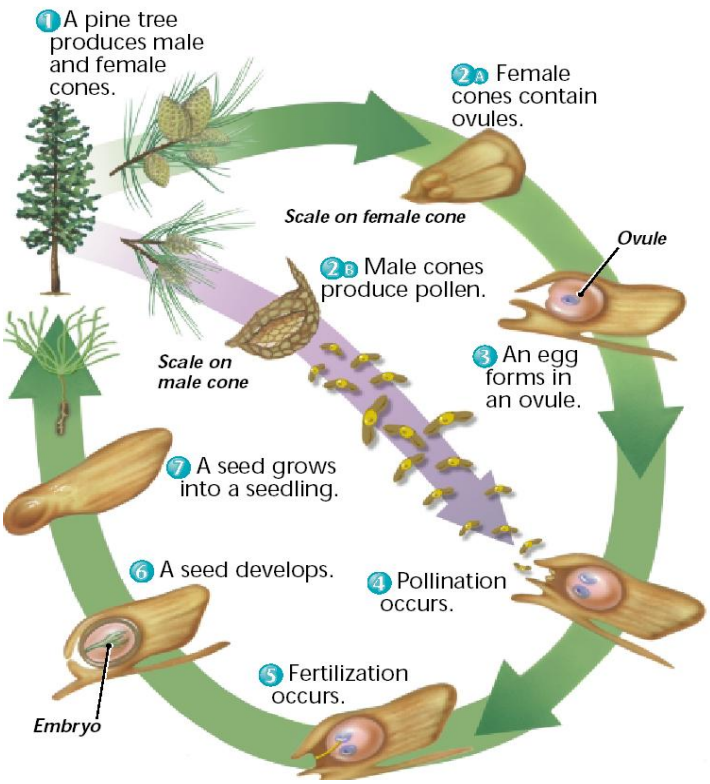
32. In the sporophyte, the microsporangium produces_____ which develop into _____ which produces _____ which produce _____.
33.In the sporophyte, the megasporangium produces _____ which develop into _____ which produces _____ which produce _____.
(SKIP SLIDES 23, 24, and 25.)
GYMNOSPERMS
34.What does "gymnosperm" mean?

35.Gymnosperms are more advanced than what type of plants?

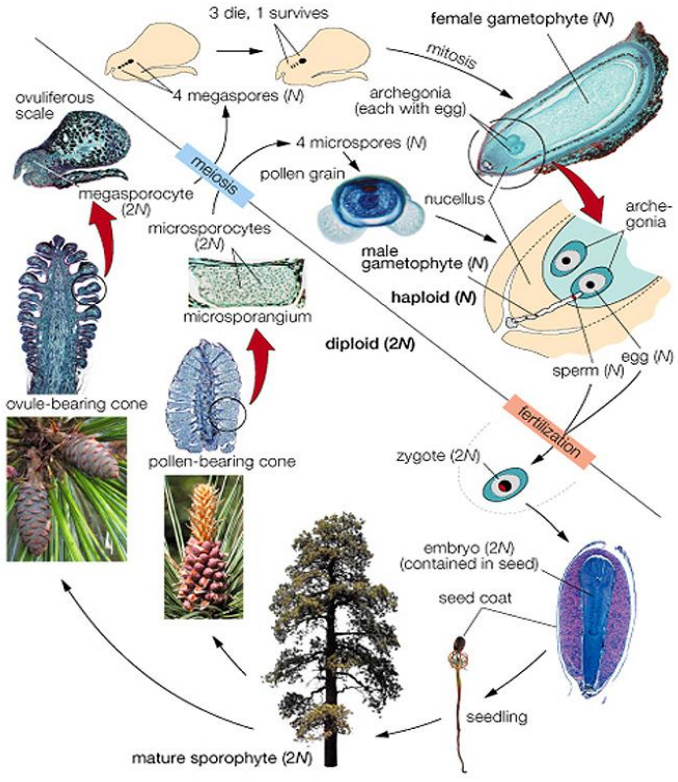
36.What do seeds of gymnosperms lack?

37.List examples of gymnosperms.

<u>The pine life cycle summary:</u> Reproduction takes place in cones on the tree (sporophyte). There are two types—a larger female (mega) seed cone and a smaller male (micro) pollen cone. The female has two ovules at the base of the scale in an archegonia. Meiosis has occurred to produce haploid cells that will become the gametophyte. This life cycle usually takes two years to complete. In spring male cones have produced pollen in the antheridia and release it. The pollen is carried by wind and is trapped by a sticky substance on the female cone. If the pollen lands near the ovary, a pollen tube will form which has two sperm nuclei. Once the tube reaches the ovule, one sperm will fertilize the ovule and the other breaks apart as it is not needed. More than one pollen may be growing a pollen tube to the same ovule but only one embryo will be formed. The new diploid embryo will develop into a seed. This seed can then leave the cone and be blown away in the wind. If it lands in soil it can germinate into a new pine tree (sporophyte).
38.Study and hi-lite/underline the stages of the diagram of the Pine Life Cycle. (see slides 28, 29, 109)



View 1



View 2

39.In the gymnosperms, how many types of spores are produced?
40.Are gymnosperms heterosporous or homosporus?
41.List the 2 types of sporangium and describe what happens in each?

42.Cones produce a sticky substance that traps pollen when it falls on the scales of the cone. What is the most common method for pollination and seed dispersal in gymnosperms?

43.Gymnosperm have a very _____ and _____ vascular system.
44.Wood is produced by "woody" plants. Wood is the vascular tissue of the plant. _____ is the wood of the tree where water and minerals are transported. _____ is the bark of the tree where food is carried.
45.Primary growth is when the plant grows in height. Secondary growth is when the plant grows larger in circumference. Wood is formed by _____ growth.
46.In what tissue does primary growth occur? What is the result?

47.In what tissue does secondary growth occur? What is the result?

48.The _____ cambium forms secondary xylem and secondary phloem. W_____ is secondary xylem in which the cells are dead at maturity and only the cell walls remain. Bark is secondary _____ (conducts _____).
49.How is the annual ring formed?

50.Describe the difference between early spring wood and late summer wood. (also slide 98)

51. Why don't tropical trees have annual rings?
52.Draw and label the layers of vascular tissue in a tree.

53.What is the most important group of gymnosperms? Why?

54.Where do they bear/produce their seeds?

55. What are the 2 types of cones called? Sketch each kind.

56.Do gymnosperms produce flowers or fruit?
57.What is the oldest living tree?
What is its estimated age?
58.What is the largest type of tree?
What is an example of its dimensions?
59.The tallest trees are _____.
60.Where are conifers adapted to grow?
61. They have _____ leaves (needles) that help _____ water.
62.They are covered by _____ to help protect from _____&_____.
63. List several other gymnosperms and describe them.

64.List 3 reasons why gymnosperms are ecologically important.

65.List 4 reasons why gymnosperms are economically and commercially important.

ANGIOSPERMS

66.What does "angiosperm" mean?

67.List 3 characteristics of angiosperms.

68.There are estimated to be _____ species which makes up ____% of the plant kingdom.

69.Angiosperms are the most _____&_____ plants on Earth.

70._____&_____ are adapted for dispersal.

71._____ fertilization of the _____ occurs in the seed. Endosperm is used for food for the growing embryo plant.

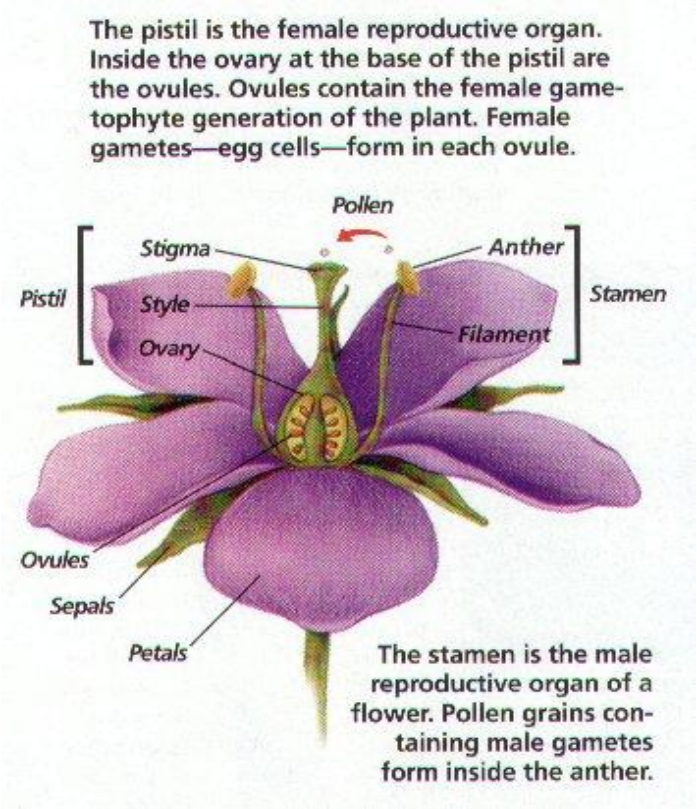
72.Sometimes a flower has _____&_____ sex structures. Sometimes they only have one type of sex structures in a flower so there have to be two types of flowers.

73.Name and describe the male sex structures.

74.Name and describe the female sex structures.

75.List 2 non-reproductive structures in flowers and describe them.

76.This flower has both male and female parts. Some flowers have only one type of sex structures. Hi-lite/underline parts of the flower. Write a short description of the function of each structure next to each part of the flower. (see slides 45, 46, 113, 114 too)



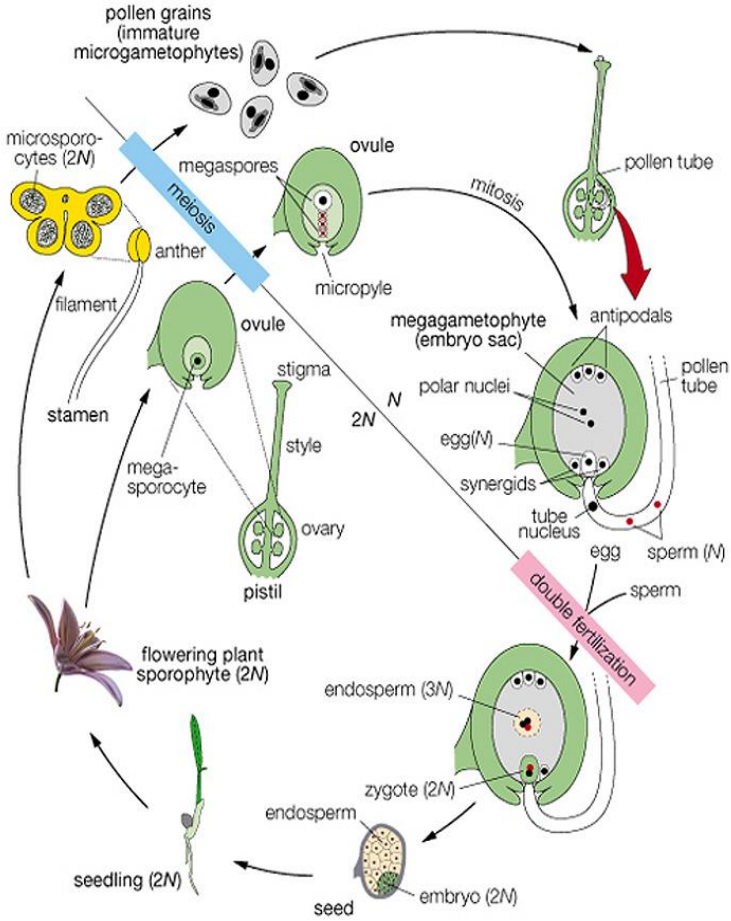
77.Angiosperms are _____sporus. They have _____ type(s) of spores. Name them.

78.Describe the male spore.

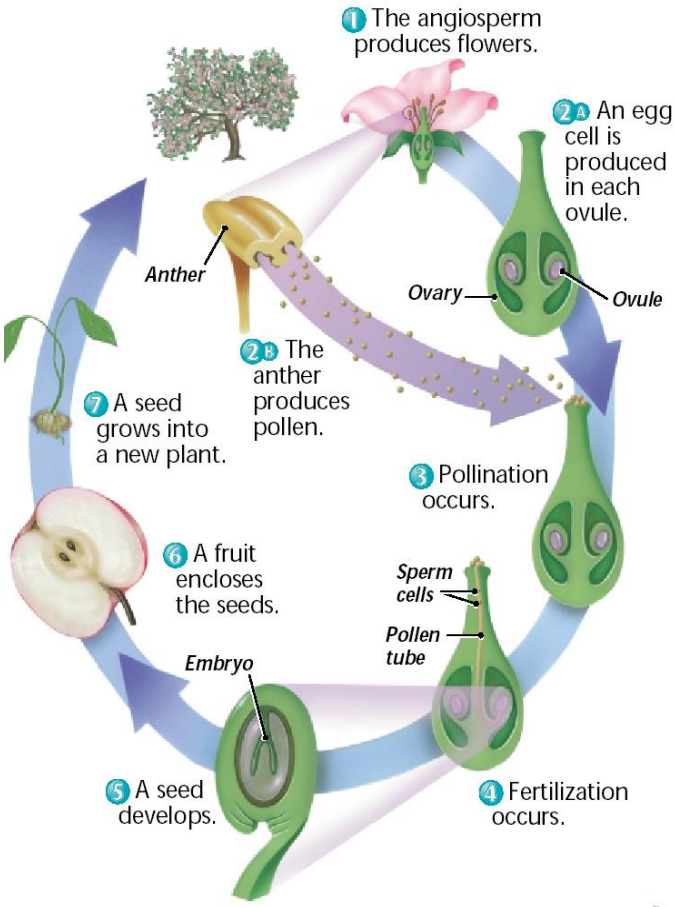
79.Describe the female spore.

<u>Angiosperm life cycle summary:</u> Reproduction in angiosperms takes place in the flower on the sporophyte. Some flowers have both male and female parts, some only have one type. The male's pollen (male gametophyte) must reach the female's ovary for fertilization to occur. Pollen is most often moved by wind, insects, animals. The pollen (haploid) is formed by meiosis (makes 4 pollen grains) in the anther which is attached to the filament. Both of these make the stamen. When the pollen is released it must reach the stigma (landing platform). Once there the pollen (now contains 2 nuclei) will form a pollen tube which travels down the long, narrow style into the ovary. The stigma, style, and ovary all make up what is called the carpel. Inside the ovary are several ovules. Each ovule (female gametophyte) has gone through meiosis to make 1haploid cell and the other 3 will break apart. The 1 left will divide to create 8 nuclei within the one egg cell. The nucleus closest to the opening will become the embryo once fertilized by the pollen. Once fertilization occurs a seed will form around the new embryo. Inside the seed will be the embryo and endosperm protected by the seed coat. The seed may be a nut or fruit covered by a fleshy covering. These may be sweet (apple), sometimes not (tomato). The seed can then be dispersed/scattered from the parent plant and germinate to create a new (sporophyte) plant.

80. Hi-lite/underline the stages of the angiosperm life cycle.(see slides 44, 48, 116)Be able to describe what happens at each one.



View 1



View 2

****Angiosperms are important for food, clothing, medicines, and more.**

81.Flowering plants exhibit _____ of _____. The large, flowering plant is the _____ _____, while the _____ _____ stages are microscopic.

82.Angiosperm life cycles have a unique _____ fertilization. What 2 things does this produce?

83.Explain the steps that occur in double fertilization.

84.A fertilized egg grows into a _____, which grows into a plant _____.

85. _____ is stored food which the embryo uses to grow.

86.The mature _____becomes the _____ _____ and/or _____.

87.Angiosperms are divided into _____&_____.

88.As the _____ grows into the _____, the first_____ of the young _____ develop and are called_____(seed leaves).

89.Monocots have _____ cotyledon(s), such as_____,_____.

90.Dicits have _____cotyledon(s), such as _____, _____.

91.Fill in the table to compare monocots and dicots. Study slides 53-59 and illustrate each of these features in the table.

FEATURE	Monocot description	Monocot illustration	Dicot description	Dicot illustration
Cotyledons				
Leaf venation (pattern in leaves)				
Root system				
Number of floral parts				
Vascular bundle position				
Stems-woody or herbaceous				

(SKIP SLIDES 60-87)

LEAVES

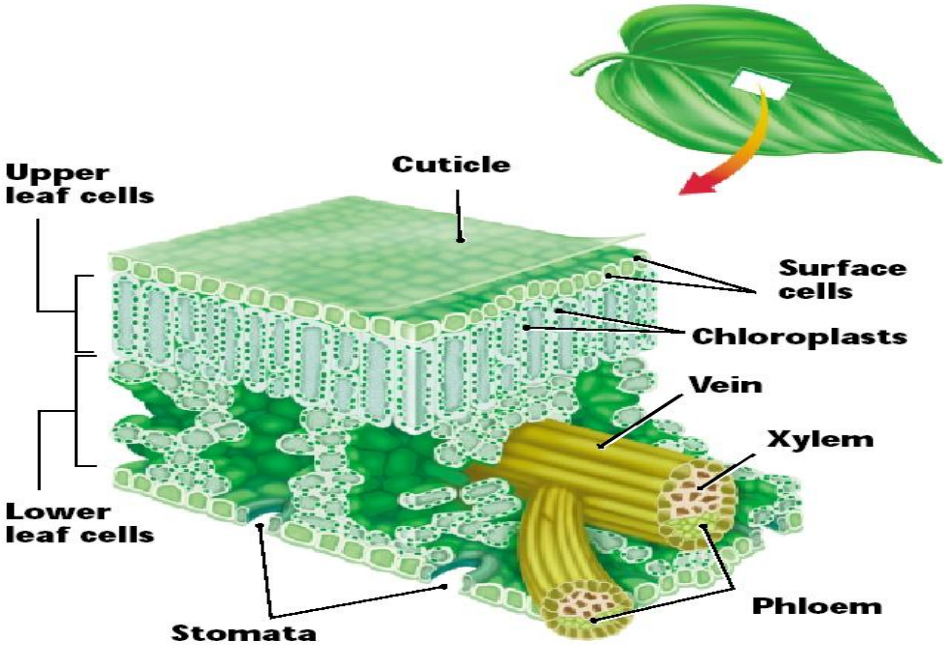
92.Leaves come in many different _____&_____, such as pine_____, _____ & _____.

93. Leaves capture the _____'s _____ for _____.

94. What does "stoma" mean? What is stomata?

95.The leaf is covered with a waxy cuticle to help protect it and prevent water loss. The leaf has an upper and lower layer of dermis (skin) cells. CO2 and O2 are gases that have to be exchanged. CO2 enters through stoma and O2 leave through them. This has to happen for photosynthesis to occur. Leaves contain two types of mesophyll cells (column like palisade and spongy).The air spaces in the spongy mesophyll allow for the gas exchange. Leaves are only a few cells thick. All cells in a leaf, except for the xylem and phloem in the veins, contain chlorophyll where photosynthesis occurs. The petiole is the small stem that attaches the leaf to the larger stem or branch.

****Write a short description of the function next to each part of the leaf.**



96.Fill in the blanks and make a small sketch to illustrate each statement.
Dicot leaf veins are usually _____.

Monocot leaf veins are usually _____.

Leaflets of plamate leaves_____from
a _____ _____.

Leaflets of pinnate leaves resemble _____,
branching off a _____ _____.

The leaves of conifers have a _____shape that
helps the plant _____ _____.
97. Water travels in one direction in the xylem from the roots to the leaves. Water is pulled up in the plant by capillary action (adhesion/cohesion and by transpiration). Water is pushed into the plant by root pressure. Plants can lose water through _____ which is the process of _____ from leaves. Food can travel in any direction in the phloem. It travels from the leaves where it is made to the roots for storage or anywhere it needs to be used.
98. Too much evaporation and the plant _____& may_____.
99. Closing the _____ helps _____ transpiration.
100.The stoma are _____ in the leaf. They are surrounded by two _____ _____. Water leaves the guard cells and they _____. Water enters the guard cells and they_____.
101.The stoma are openings in the leaf that allow for CO_2 to enter and O_2 to leave. The CO_2 is used in photosynthesis. Sketch and label a stoma with the guard cells.

Vascular tissue is important for many reasons including transport of materials, and supporting the plant. The stem is where a majority of the vascular tissue is found. The stem also contains vascular cambium which has the lateral meristem tissue. Here there are cells that divide to increase a plant thickness or circumference.

102.Name three purposes of stems.

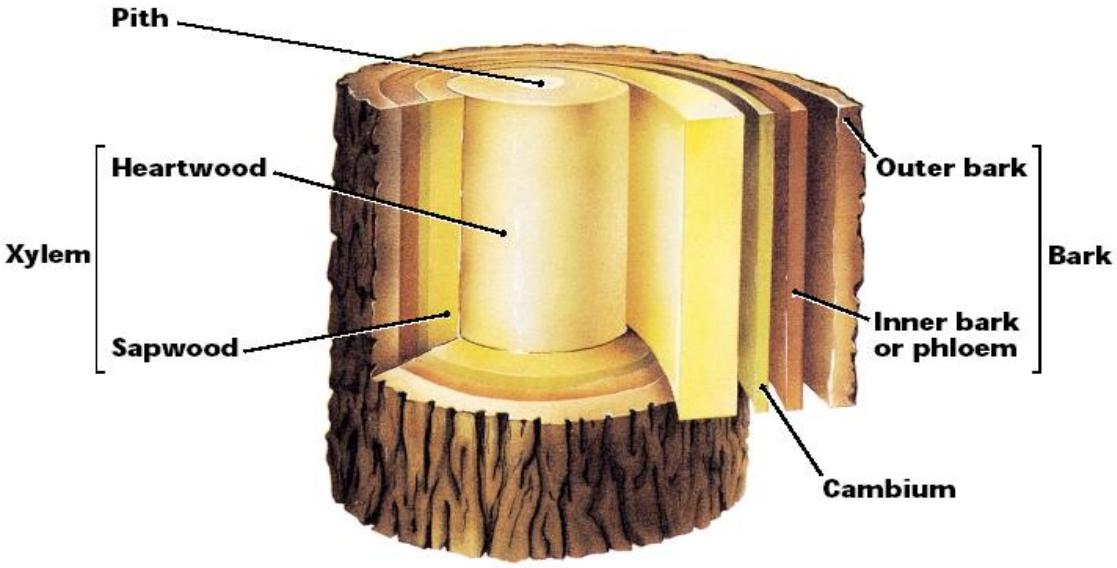
103. Apical meristems are the only parts in the plant where plants have cells dividing to create new cells which leads to an increase in length. There are apical meristems at the tips of roots and shoots. Label the parts of the plant.

104.List 2 types of stems. Describe them in one word each and give two examples of each.

105.What are the layers they both have?

106.List the layers a woody stem has that a herbaceous stem doesn't. Describe each layer.

107. Write a brief description of the function of each of the parts of a woody stem.



ROOTS

108. List 2 main purposes of roots.

109.List and describe 2 main types of roots.

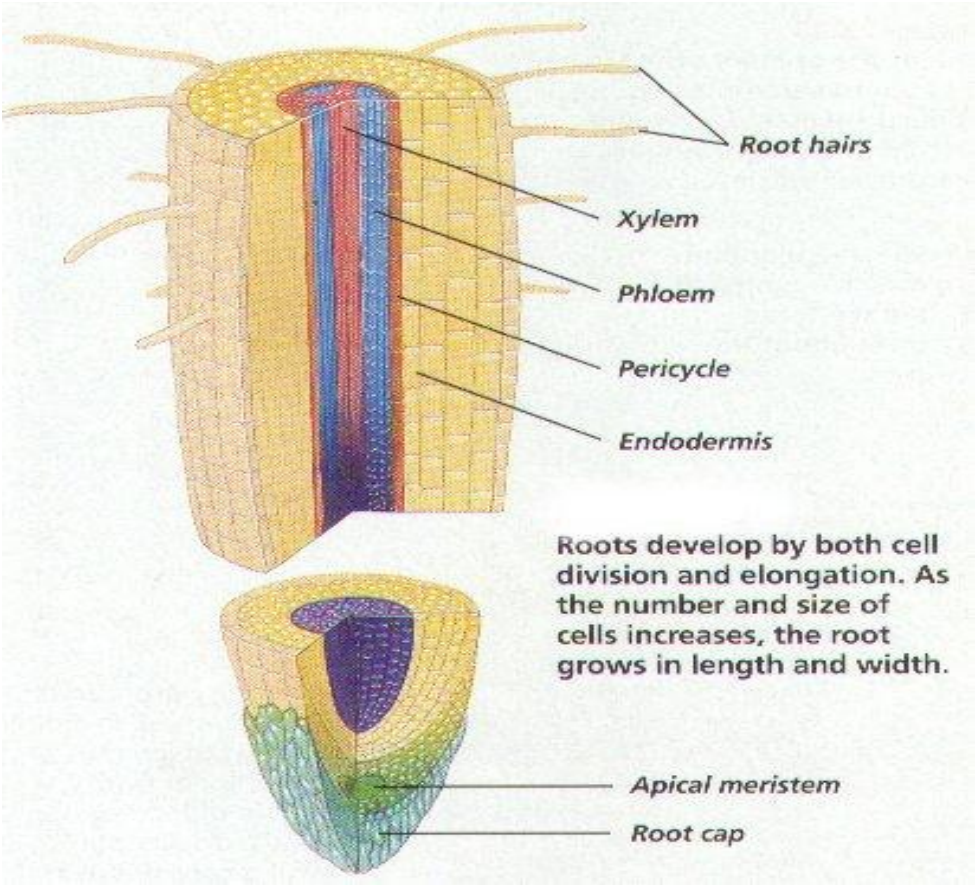
110.How does the root cap protect the growing root?

111.Why are root hairs important?

112. Roots develop by both _____ _____ & _____. As the _____ & _____ of cells increase, the root grows in _____ & _____.

Water moves into the root by osmosis. Plants need minerals such as nitrogen, phosphorus, potassium magnesium, and calcium to stay healthy. Minerals enter the root cells by active transport. A root pressure is created by active transport which pushes the water up into the plant. The movement into roots is one way once it reaches the vascular tissue because there is a waterproof barrier called the casparian strip which prevents water loss.

113. Write a brief description of the function of each of the parts of the root.



114. What do root hairs absorb?

115. Describe the 2 pathways (not methods) water and minerals move into the root.

(slide 123) 116. Annuals complete their life cycle in _____ _____, such as _____, _____, _____, _____.
117. Biennials complete their life cycles in _____ _____, such as _____, _____.
118. Perrenials live for _____ _____, such as _____ & _____ because their _____ & _____ survive the winter.

Additional Notes: