

THE BOTANY FINAL

The Final is:

- Around 150 Multiple-choice questions
- 1 Draw and Label (One of the Cycles)
- 3 Poems (Haikus ... what else)
- 1 essay on Golden Rice and Smart Breeding.

The vocabulary and concepts on this sheet do not represent the entirety of the exam but come pretty darn close. The final was made directly from my class notes and there are no “surprise” questions. The exam is comprehensive, meaning everything we covered since the second day of class is fair game. (There are no questions on where I went to school or for how long have I had my beard) You need not memorize the articles but looking over your old quizzes would be a great study guide.

Special attention should be paid to the following topics:

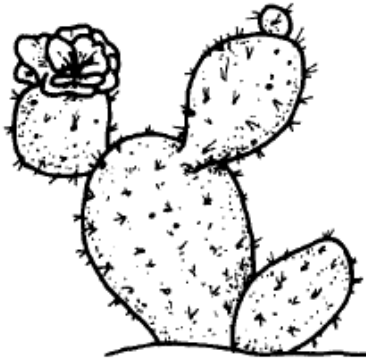
1. Structure, function and modifications of the: root, stem, leaf and flower
2. Osmosis/ Diffusion
3. Cycles: Water, Carbon and Nitrogen
4. Missing carbon lab
5. The parts of the cell (the organelles)
6. Use of dichotomous keys
7. Tree Ring lab
8. Nitrogen fixation lab (the Rhizobium Lab)

BOTANY FINAL VOCABULARY REVIEW SHEET

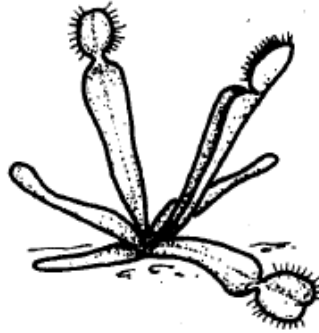
- | | | | |
|---------------------------|---------------------------|-------------------------|--------------------|
| 1. Abaxial Epidermis | 31. Fibers | 61. Parenchyma | 91. Taproot |
| 2. Anchorage | 32. Filament | 62. Peduncle | 92. Thigmotropism |
| 3. Angiosperms | 33. Flowers | 63. Pericycle | 93. Thorn |
| 4. Anther | 34. Golgi Apparatus | 64. Periderm | 94. Thylakoids |
| 5. Apical meristem | 35. Gravitropism | 65. Petal | 95. Tracheids |
| 6. Asexual reproduction | 36. Green algae | 66. Petiole | 96. Tuber |
| 7. Biome | 37. Guard cells | 67. Phloem | 97. Vacuole |
| 8. Bulbs | 38. Herbaceous stems | 68. Phospholipid | 98. Veins |
| 9. Casparian strip | 39. Hydrophilic | 69. Photosynthesis | 99. Vessel members |
| 10. Cell membrane | 40. Hydrophilic | 70. Phototropism | 100. Whorled |
| 11. Cell wall | 41. Hydrotropism | 71. Pistil | 101. Woody stems |
| 12. Cellulose | 42. Hypertonic | 72. Primary growth | 102. Xylem |
| 13. Chlorophyll | 43. Hypotonic | 73. Protein Synthesis | |
| 14. Chloroplasts | 44. Isotonic | 74. Rhizome | |
| 15. Chromosomes | 45. Large central vacuole | 75. Ribosomes | |
| 16. Collenchyma | 46. Leaf margin | 76. RNA | |
| 17. Companion cells | 47. Leaves | 77. Root Cap | |
| 18. Compound leaves | 48. Lichens | 78. Root hair Sepal | |
| 19. Convergent evolution | 49. Lobed | 79. Sexual reproduction | |
| 20. Cortex | 50. Lysosomes | 80. Sieve tubes | |
| 21. Cristae | 51. Meristem | 81. Spongy mesophyll | |
| 22. Cuticle | 52. Mitochondria | 82. Stamen | |
| 23. Dentate | 53. Mucigel | 83. Stigma | |
| 24. DNA | 54. Mycorrhizae | 84. Stolon | |
| 25. Endodermis | 55. Nodes | 85. Stomata | |
| 26. Endoplasmic Reticulum | 56. Nodules | 86. Style | |
| 27. Entire | 57. Nucleus | 87. Sclereids | |
| 28. Epidermal Cells | 58. Osmotic rupture | 88. Sclerenchyma | |
| 29. Epiphytes | 59. Ovary | 89. Secondary growth | |
| 30. Eukaryotes | 60. Palisade mesophyll | 90. Succulent | |

LEAF ADAPTATIONS

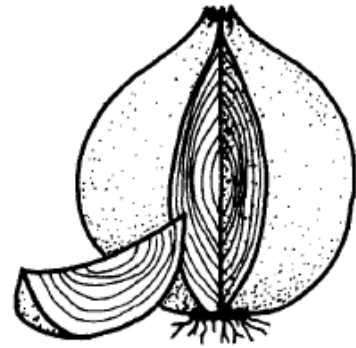
You may not recognize that the leaves of some plants are leaves. Leaves are adapted to do many different jobs. Some are modified into tendrils that support a plant as it climbs. Some leaves are sharp structures called spines. Others are thick with stored food. Leaves of plants called succulents store water. Below are diagrams of leaves that have adaptations for different purposes. Complete the table by filling in the kind of leaf shown and its function. Use an encyclopedia if needed.



Cactus



Venus's flytrap



Onion

	Cactus	Venus's flytrap	Onion
Kind of Leaf			
Function			



Pine



Pea

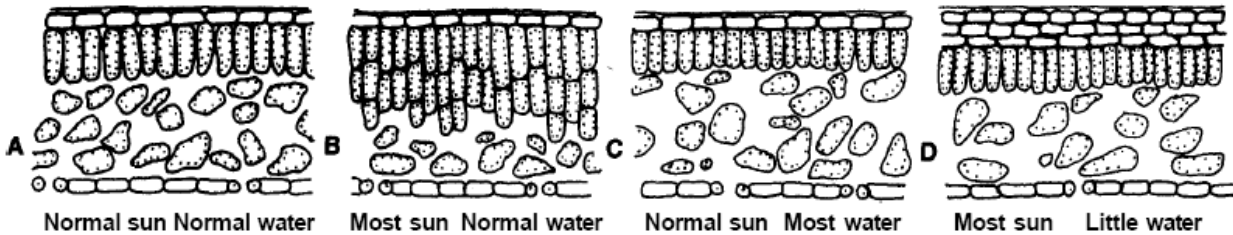


Jade

	Pine	Pea	Jade
Kind of Leaf			
Function			

THE EFFECT OF SUNLIGHT AND WATER ON LEAVES

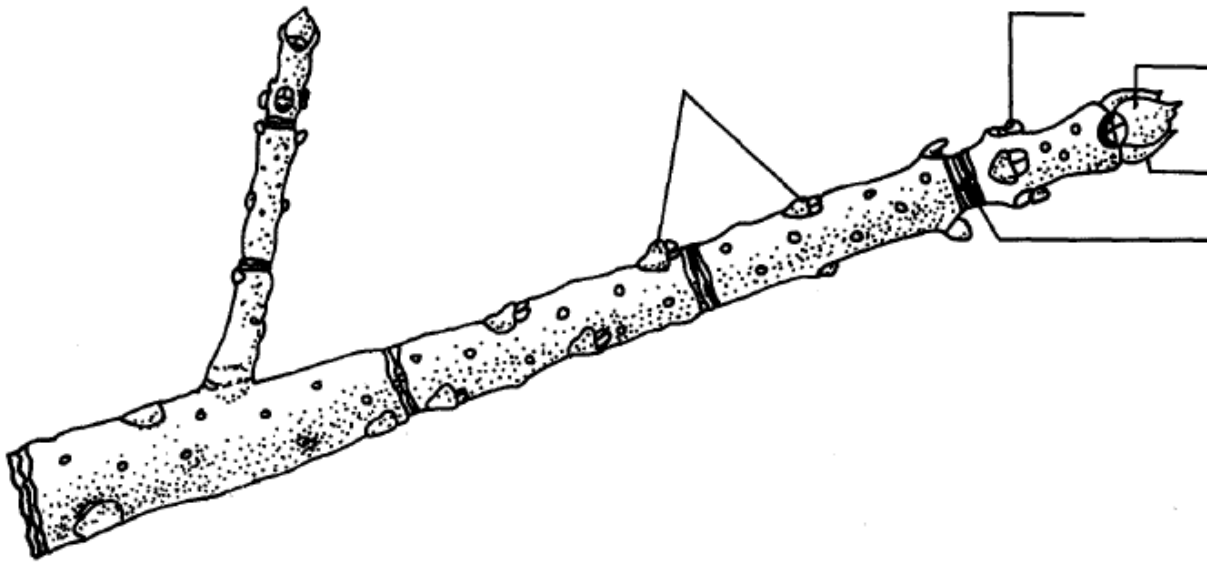
The amount of sunlight and water a plant gets affects the cells of its leaves. They may develop more layers of cells or fewer layers of cells depending on the amount of sunlight and water they receive. Study the drawings of leaf sections below. The levels of sunlight and water each leaf gets is given below each cross section. Compare the drawings of the leaf sections and then answer the questions that follow.



1. What type of cells cause Leaf B to be thicker than Leaf A?
2. Does Leaf B get more or less sun than the other leaves?
3. What cell layer is thickest in Leaf C? Is Leaf C getting more water than Leaf A?
4. What nutrient do the extra cells in Leaf C store?
5. What is this stored nutrient used for in Leaf C?
6. Leaf D gets little water but lives in very bright sunlight. What differences do you notice?
7. How is Leaf D helped by having these differences?
8. Where might you find a plant with leaves like Leaf D?

How a Twig Grows

The picture shows a twig that is several years old. At the tip of the twig is the terminal bud. The twig grows from the tip. The cells just behind the terminal bud elongate. Bud scales surround and protect the terminal bud. At the end of the year the twig stops growing; and the bud scales fall off. The bud scales leave a scar called a bud-scale scar. The bud-scale scar looks like a set of rings going all the way around the twig. Each year's growth is marked by the bud-scale scars. Leaves also make scars on the twig when they fall off in the autumn. These scars are called leaf scars. Lateral buds form on the sides of a twig. These buds show where new twigs will form. Label each of the structures mentioned above on the drawing of the twig. Then answer the questions that follow.



1. How many centimeters did the twig grow three years ago? Two years ago?
2. How many centimeters did it grow last year?
3. How old is the twig? How can you tell?
4. How many leaves grew on the twig last year?
5. How many leaves grew on the twig three years ago?
6. During which year did the twig have the most leaves? Explain how you know.
7. How old is the smaller twig that is growing from the base of the larger twig?
8. Will the larger twig sprout any new twigs this year? Explain.

Tolerance in Plants

If you hiked up a mountain that was several thousand kilometers high, you might notice that plants growing at the bottom of the mountain are not all the same as those growing on top. The air and soil on top of the mountain are cooler than at the bottom. Some plants can grow only in warm weather, some can grow only in cold weather, and others can grow in warm and cold weather. The ability of a plant to live and grow in an unfavorable environment is called tolerance. Look at the drawing on the next page. Then, fill in the table below. Use check marks to show in which zones the plants in the drawing grow. Use the table and a dictionary or encyclopedia to help you answer the questions that follow.

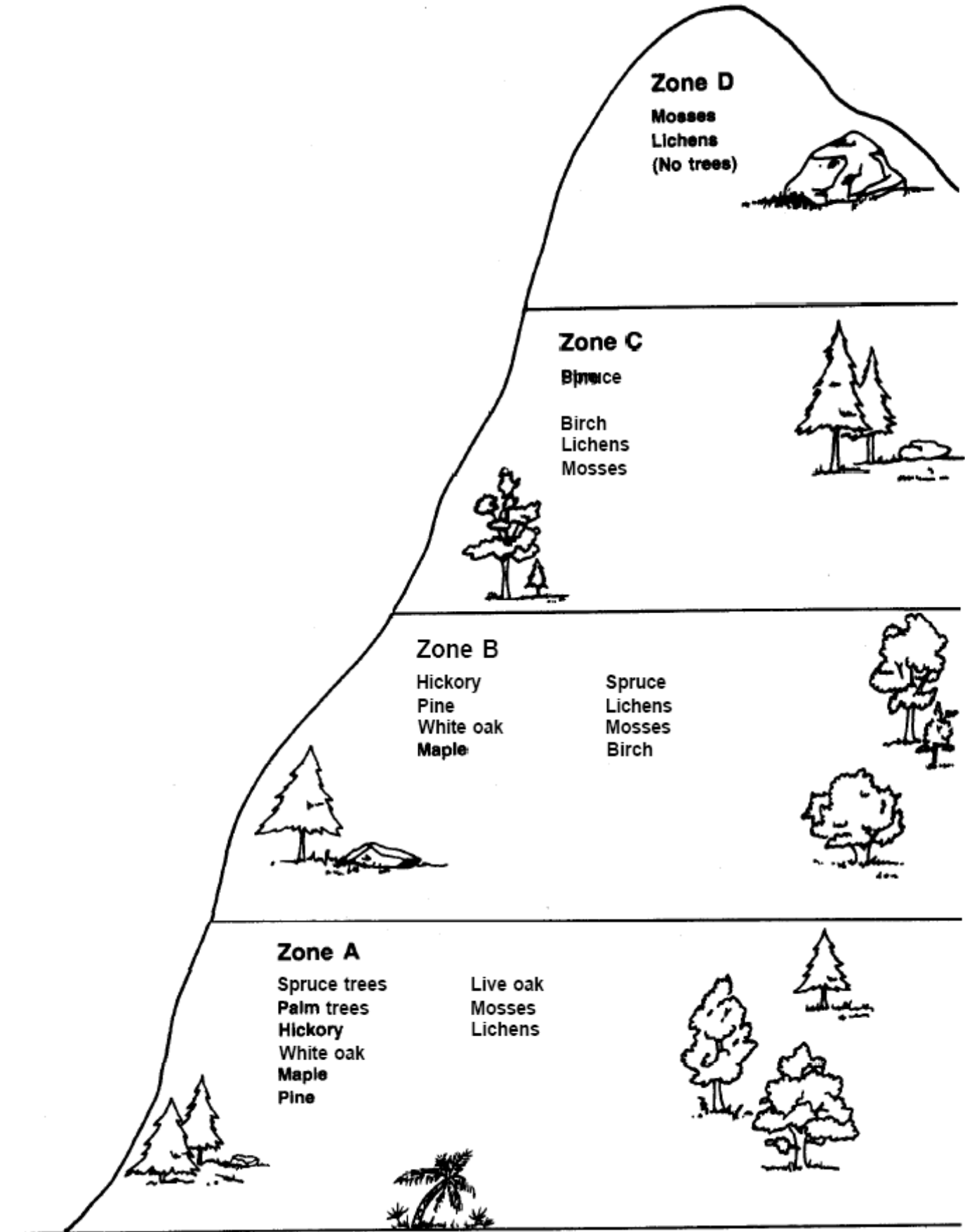
1. Which plant(s) grow in all four areas of the mountain? Explain your answer using the word tolerance.

2. Which plant(s) grow in only one of the four areas? Explain your answer using the word tolerance.

3. Do spruce trees have the same tolerance as white oaks? Explain your answer.

Plants	Zone A	Zone B	Zone C	Zone D
mosses				
white oak				
birch				
hickory				
pine				
live oak				
palm				
spruce				
maple				

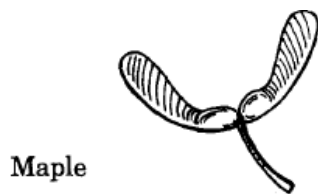
Name: _____



Name:

Identifying Different Types of Fruits

The key below tells about different types of fruits. Match the pictures with one of the types of fruits listed in the key. Write the name underneath each fruit along with one or two traits that helped you identify it



A. Fleshy Ovary is soft and juicy when ripe.	
Berry:	Entire ovary is soft with a thin soft skin on the outside and many seeds inside.
Drupe:	Entire ovary is soft with a thin soft skin on the outside and usually one very hard seed inside.
Hesperidium:	Entire ovary is soft with a thick, oily rind and many tough seeds inside.
B. Dry Ovary is dry and brittle when ripe.	
One or two seeds:	Schizocarp: Ovary is flat and has two "wings"; two seeds inside
	Caryopsis: Walls of ovary and seed are joined; fruit is a single, hard grain
Many seeds:	Follicle: Ovary splits along one side when ripe, releasing many fluffy seeds that float on the wind.
	Legume: Ovary splits along two sides when ripe, releasing many seeds.

Understanding Ideas

On the line to the left, write the letter of the best answer to the statement.

- ____ 1. The joining of sperm and egg is
 a. asexual reproduction. b. fertilization. c. photosynthesis.
- ____ 2. Conifers are
 a. flowering plants. b. called evergreens. c. nonvascular plants.
- ____ 3. Reproduction of a living thing from two parents is
 a. sexual reproduction. b. asexual reproduction. c. fission.
- ____ 4. Male reproductive cells are
 a. sperm. b. eggs. c. spores.
- ____ 5. Flowering plants
 a. produce seeds. b. produce spores. c. are nonvascular.
- ____ 6. Tubelike cells that carry food from leaves to other parts of a plant are
 a. xylem cells. b. chloroplasts. c. phloem cells.
- ____ 7. Turpentine, paper, and fuels are supplied by
 a. flowering plants. b. conifers. c. ferns.

B. Interpreting Ideas

Place check marks on the lines to show which kind of plants has the trait listed on the left.

Trait	Vascular Plants	Nonvascular Plants
reproduce by seeds		
tubelike cells in roots, stems, and leaves		
often grow tall		
lack roots		
do not have tubelike cells		
includes all flowering plants		
includes plants that produce pollen		

Vocabulary Check

Match the items in the right column with the phrases in the left column. On the line to the left, write the letter that matches each phrase.

- | | |
|---|-------------------|
| _____ 1. process by which a plant makes food | A. pollen |
| _____ 2. carries food in a vascular plant | B. xylem |
| _____ 3. carries water and minerals in a vascular plant | C. photosynthesis |
| _____ 4. tiny yellow grains in which sperm develop | D. seed |
| _____ 5. plant part that contains a small, new plant | E. flower |
| _____ 6. a green substance that helps a plant make food | F. chlorophyll |
| _____ 7. the reproductive part of some seed plants | G. egg |
| _____ 8. a female reproductive cell | H. phloem |

Understanding Plants

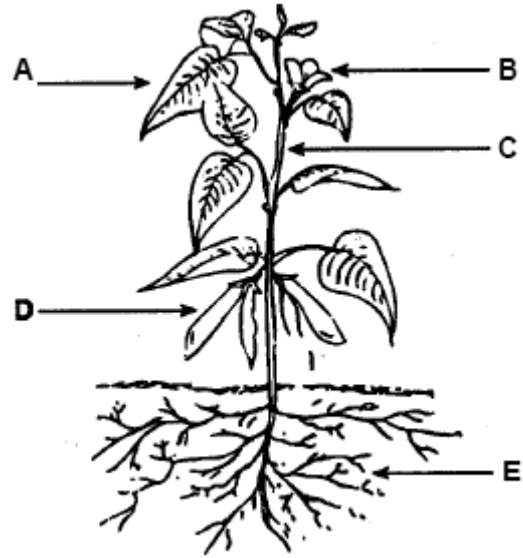
Write the letter of the term or phrase that correctly completes the statement.

- _____ 1. The process that best separates plants from animals is
 a. respiration. b. reproduction. c. photosynthesis. d. osmosis.
- _____ 2. Structures that anchor vascular plants and take in water and minerals are
 a. roots. b. stems. c. leaves. d. flowers.
- _____ 3. Reproduction of a living thing from two reproductive cells is
 a. sexual reproduction. c. budding.
 b. asexual reproduction. d. fission.
- _____ 4. Seed plants are divided into two groups called
 a. conifers and angiosperms. c. conifers and ferns.
 b. mosses and liverworts. d. ferns and mosses.
- _____ 5. Fir and pine trees are classified as
 a. conifers. b. flowering plants. c. shrubs. d. mosses.
- _____ 6. Grasses and rose bushes are classified as
 a. angiosperms. b. liverworts. c. conifers. d. evergreens.
- _____ 7. A small new plant is found inside a
 a. leaf. b. seed. c. spore. d. root.

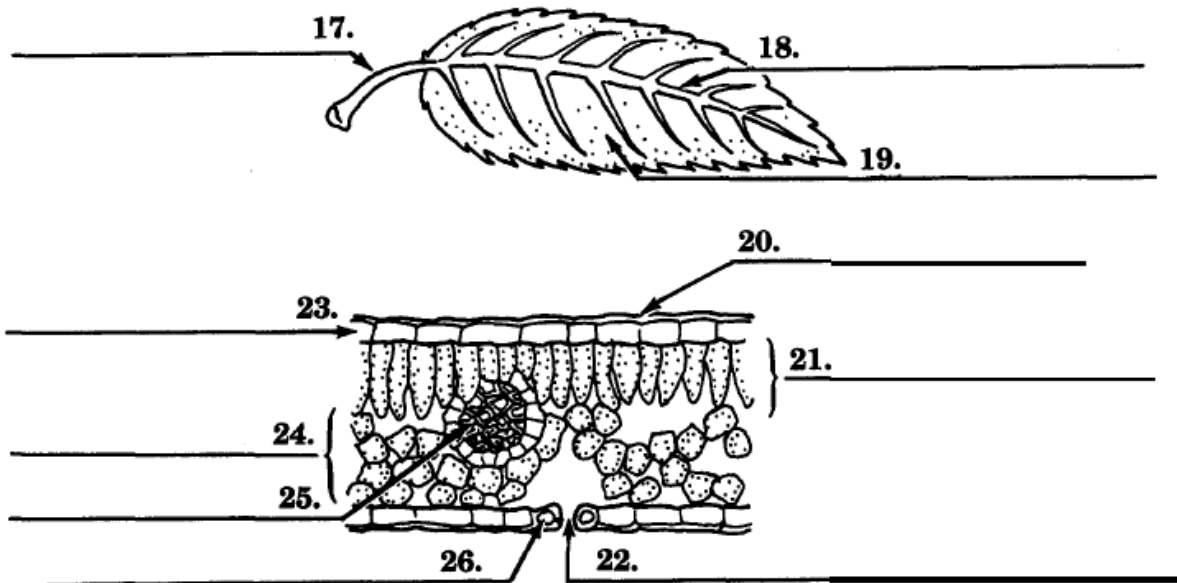
Name: _____

Match the parts of the plant with the functions below. A part may have more than one function.

- ___ 8. carries water to all parts of the plant
- ___ 9. anchors the plant
- ___ 10. supports the plant
- ___ 11. takes in water and minerals from the soil
- ___ 12. produces the egg cells and sperm cells
- ___ 13. holds the leaves up to the sunlight
- ___ 14. contains a small new plant
- ___ 15. makes food
- ___ 16. may form nodules

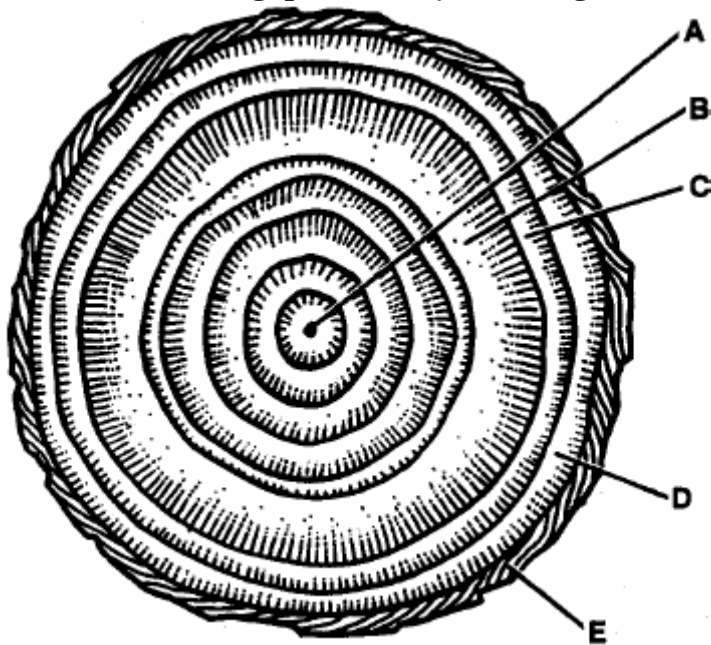


Label the outside and inside parts of the leaf on the diagrams below.



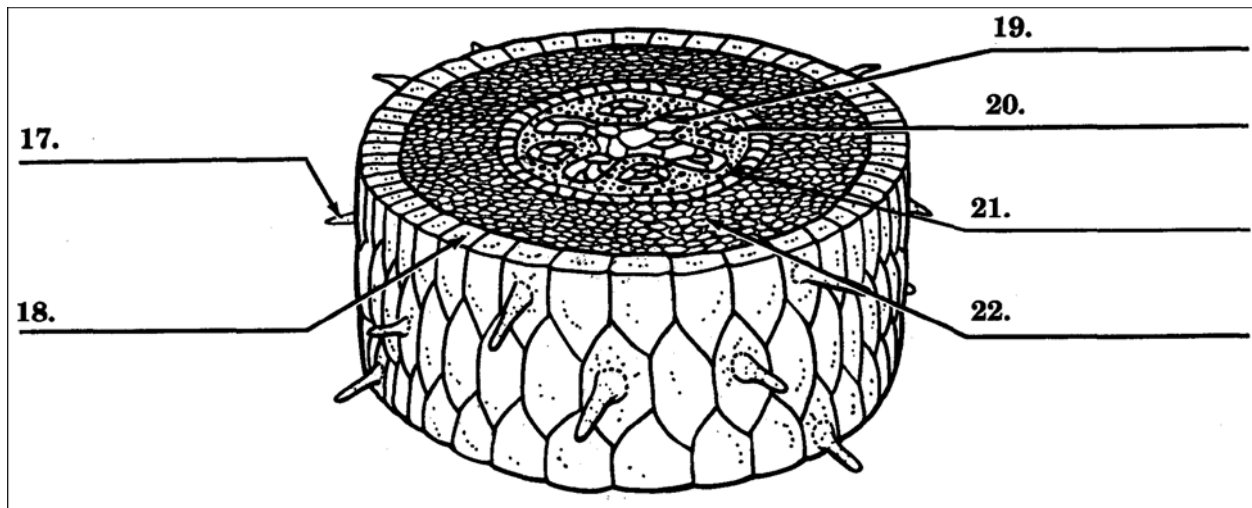
Name: _____

Answer the following questions by referring to the diagram. Use A, B, C, D, or E.



- ___ 1. Which ring was growing just before being cut?
- ___ 2. Which ring grew during the most rain?
- ___ 3. Which layer is bark?
- ___ 4. Between which two layers is growth taking place?
- ___ 5. Identify the pith

Roots - Label the numbered parts in the diagram below.



List three jobs that roots do for plants.

- 1.
- 2.
- 3.

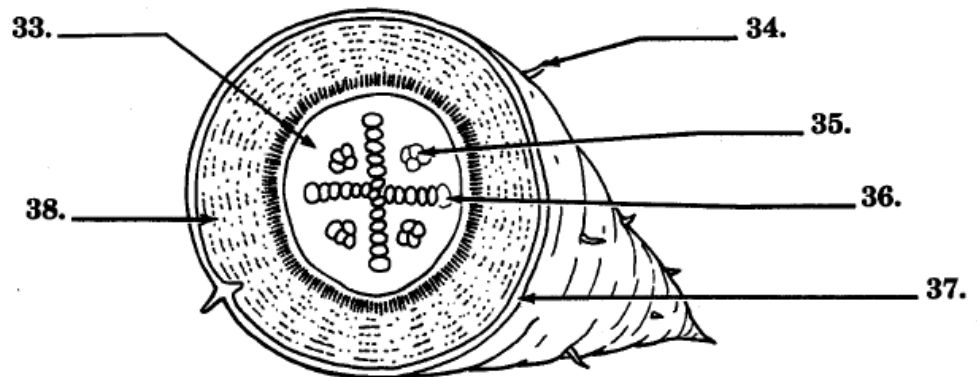
Match the phrases below with the type of root shown in the diagram to the right.
Write A or B on the line to the left.

- ___ 1. taproot
- ___ 2. fibrous root
- ___ 3. grass
- ___ 4. beet or carrot
- ___ 5. collects materials from a large area
- ___ 6. more likely to contain stored food
- ___ 7. found in oak and hickory trees
- ___ 8. easy to pull from the ground



Match the lettered root parts listed below with the numbered parts on the diagram.

- A. epidermis
- B. cortex
- C. xylem
- D. phloem
- E. root hair
- F. endodermis



Match the numbered root parts listed below with the lettered parts on the diagram.

___ 1. part that carries water	___ 4. carries food
___ 2. stores food	___ 5. protects root
___ 3. absorbs water	___ 6. retains water in root

Write the letter of the term or phrase that correctly completes the statement.

- ___ 1. Thigmotropism is a response to
a. contact. b. gravity. c. light. d. water.
- ___ 2. Which is not a job of stems?
a. transport of water c. support of leaves
b. transport of food d. anchorage
- ___ 3. Root hairs are part of which cell layer?
a. xylem b. cortex c. epidermis d. phloem
- ___ 4. Most photosynthesis takes place in which cells of a leaf?
a. palisade b. xylem c. epidermis d. phloem
- ___ 5. Cortex cells
a. produce food. b. store food. c. carry water. d. produce xylem and phloem.
- ___ 6. Tropisms in plants
a. occur at night only. c. occur during day only.
b. involve movement. d. involve roots only.
- ___ 7. Cambium cells
a. grow new root hairs. c. form a protective layer.
b. make xylem and phloem. d. make food for stems.
- ___ 8. The size of the stoma is changed by
a. epidermis. b. waxy layer. c. guard cells. d. palisade cells.
- ___ 9. The function of xylem in a woody stem is to
a. make food. b. carry water. c. carry food. d. protect all cells.

Answer the following questions in the spaces provided.

10. How does the order of the rungs in the DNA ladder determine the traits a living thing has?

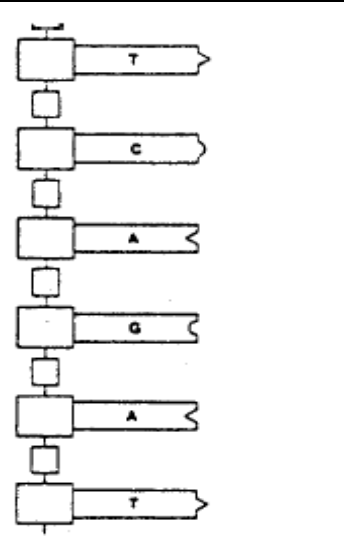
11. What can be accomplished by splicing genes?

12. How is recombinant DNA formed?

Write the letter of the term or phrase that correctly completes the statement.

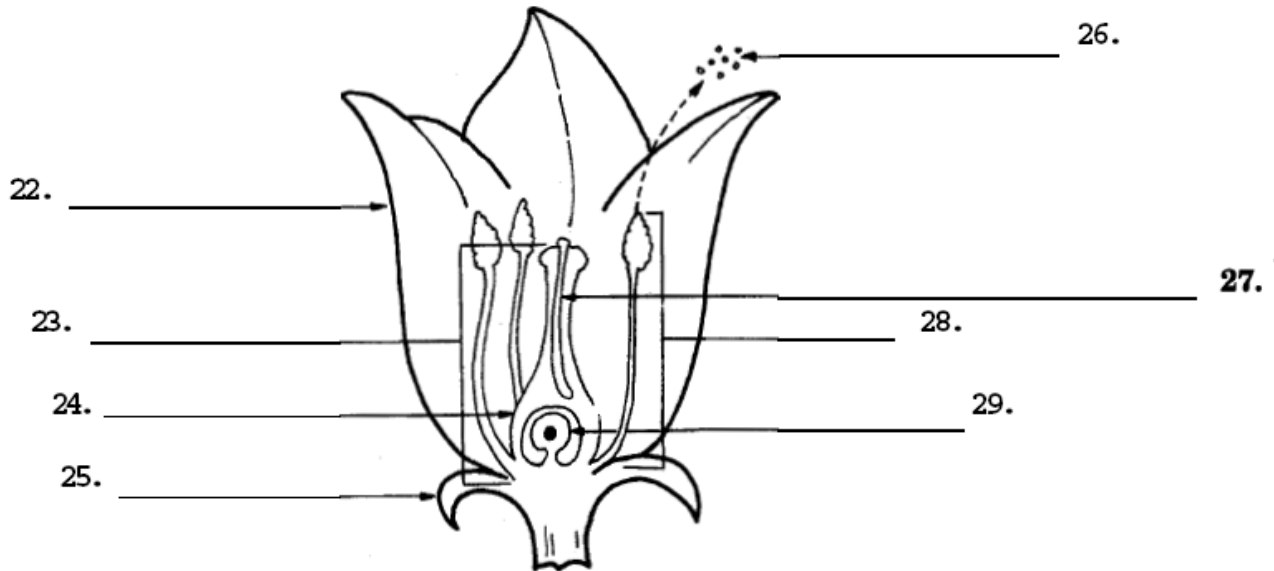
- ___ 1. The shape of a DNA molecule is
a. straight. b. circular. c. flat. d. spiral.
- ___ 2. DNA makes up parts of
a. proteins. b. chromosomes. c. sugars. d. Amino Acids
- ___ 3. The DNA message depends on the order of the
a. nitrogen bases. b. acids. c. sugars. d. genes.
- ___ 4. Besides the nitrogen bases, DNA contains sugar and
a. acid. b. protein. c. RNA. d. fat.
- ___ 5. DNA forms the code for the making of
a. proteins. b. genes. c. fats. d. chromosomes.
- ___ 6. _____ are cell parts where proteins are made.
a. Mitochondria b. Ribosomes c. Nuclei d. Chromosomes
- ___ 7. If a change is made when DNA copies itself, a _____ results.
a. clone b. death c. mutation d. base
- ___ 8. A short section of DNA that codes for a trait is a
a. protein. b. sugar. c. chromosome. d. gene.
- ___ 9. The messages of the genes of chromosomes are carried to ribosomes by
a. tRNA. b. protein. c. tRNA. d. mRNA.

Use the following diagram to answer the statements. Write the correct letter on the line.

	<p>___ 10. The diagram represents a portion of a(n) - molecule. a. RNA b. DNA c. phosphate d. protein.</p> <p>___ 11. The lettered parts of the diagram represent a. nitrogen bases. b. phosphate c. sugars. d. proteins.</p> <p>___ 12. The large squares represent a. bases. b. phosphate c. sugars. d. proteins.</p> <p>___ 13. The correct order of lettered parts in the missing half of this molecule from top to bottom, is a. TAGACT. b. AGTCTA. c. TCAGAT. d. GACTCG.</p> <p>___ 14. The sides of the DNA ladder are made up of a. nitrogen bases. b. phosphate and sugars. c. sugars only. d. proteins.</p>
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Name: _____

Label each of the numbered parts in the diagram below. Then beside each label write **M** if the part is male, **F** if the part is female or **N** if the part is neither male nor female.



The following choices are to be used with statements 30 through 39

Use choice A if the statement is true or helpful to plants with asexual reproduction.

Use choice B if the statement is true or helpful to plants with sexual reproduction.

Use choice C if the statement is true or helpful to plants with both asexual and sexual.

- ___ 30. This is a way for a plant to form offspring.
- ___ 31. Fertilization is not needed.
- ___ 32. Banana plants depend on this type of reproduction.
- ___ 33. The plant does not have to depend on fertilization or seed formation.
- ___ 34. Plants have features that are exactly the same as those of the parent.
- ___ 35. Two parents are needed.
- ___ 36. Meiosis must take place.
- ___ 37. Seeds can be kept alive for long periods of time.
- ___ 38. Offspring may have features that are better than those in either parent.
- ___ 39. Plants are exact copies of one another.