Name _____ Date _____

Levels of Organization: Cells, Tissues, Organs and Systems

Directions: For the questions about the bean plant, use the passage and the table. Answer the other questions using what you know about levels of organization.

A Bean Plant, Level by Level

Use the passage and the table to answer these questions.

Think of a bean plant as a set of building blocks that stack up in levels. The first block is the cell, the smallest unit that is alive. Cells can team up to share a job, and that team is a tissue. When a few different tissues join forces on a bigger job, they make an organ. A group of organs that cooperate is an organ system. Put all the systems together, and you have an organism: one whole living thing.

Here is how that works in a leaf. Guard cells are specialized cells. They are curved and come in pairs, and each pair opens and closes a tiny pore called a stoma (plural: stomata). Their shape suits that one job. Carbon dioxide gets into the leaf through these pores.

The guard cells sit in the epidermis, the leaf's thin outer skin. Most of its cells are flat and fit together like puzzle pieces, and together they cover and protect the leaf. Under the epidermis are cells packed with chloroplasts, plus veins that carry water and sugar. All these parts work together so the leaf can make food. The leaves, stems and flowers belong to the plant's shoot system, and the roots belong to its root system. The two systems together make up the whole bean plant.

A class compared the top and bottom sides of bean leaves. They brushed clear nail polish on both sides of four leaves. When the polish dried, they peeled it off with clear tape, and each peel held a print of the epidermis. Using a microscope at 400 times, they counted the stomata in one view of each print.

Stomata counted in one microscope view (400 times) of each nail polish print

Leaf	Top side (stomata counted)	Bottom side (stomata counted)
1	5	22
2	3	18
3	6	25
4	2	19

1. Match each level of organization to its meaning.

Write the letter of the matching answer on each line.

1. _____ Cell
2. _____ Tissue
3. _____ Organ
4. _____ Organ system
5. _____ Organism

A. A team of cells that share one job
B. The smallest unit that is itself alive
C. A group of organs that cooperate
D. A tiny part inside a cell with its own job
E. A structure built from a few different tissues working on a bigger job
F. One whole living thing

2. As the passage uses the word, what does it mean for a cell to be "specialized"?

A. It is found only in plants.
B. It can do every job the plant needs.
C. It is larger than the cells around it.
D. Its shape and parts suit one particular job.

3. Which level of organization best describes the epidermis of a bean leaf?

A. An organ
B. An organ system
C. A tissue
D. A cell

4. Which list goes from the smallest level of organization to the largest?

A. Guard cell, epidermis, shoot system, leaf, bean plant
B. Epidermis, guard cell, leaf, shoot system, bean plant
C. Guard cell, epidermis, leaf, shoot system, bean plant
D. Guard cell, leaf, epidermis, shoot system, bean plant

5. Each leaf gave two prints. What did the class change on purpose between the two prints from the same leaf?

A. The kind of plant the leaf came from
B. The magnification of the microscope
C. The number of stomata they counted
D. The side of the leaf the print came from

6. What was the mean number of stomata counted on the bottom side of leaves 1 to 4?

_____ stomata

7. Which claim does the evidence from the four leaves support?

A. On these bean leaves, the bottom side had more stomata than the top side.
B. The top side of these leaves had no stomata.
C. Leaves with more stomata make more food than leaves with fewer stomata.
D. All plants have more stomata on the bottom of their leaves than on the top.

8. The heart has muscle tissue that squeezes, nerve tissue that carries signals and connective tissue that holds it together. Which level of organization is the heart?

A. An organ system
B. A tissue
C. An organism
D. An organ

9. Which example describes an organ system?

A. The heart, blood vessels and blood moving materials around the body
B. The stomach churning food
C. One red blood cell carrying oxygen
D. A sheet of muscle cells that squeeze together

10. An elephant is much larger than a mouse. Which statement about their cells is most accurate?

A. Each elephant cell is so large that it works like a whole organ.
B. Elephants and mice have about the same number of cells, but elephant cells are much bigger.
C. The elephant is bigger mainly because it has far more cells, not because its cells are much bigger.
D. An elephant has more organ systems than a mouse, but about the same number of cells.