Cell Organization

How well do you think your body would work if all the different cell types were mixed together in no particular pattern? Could you walk if your leg muscle cells were scattered here and there, each doing its own thing, instead of being grouped together in your legs? How could you think if your brain cells weren't close enough together to communicate with each other? Many-celled organisms are not just mixed-up collections of different types of cells. Cells are organized into systems that, together, perform functions that keep the organism healthy and alive.

Applying Math — Solve One-Step Equations

RED BLOOD CELLS Each milliliter of blood contains 5 million red blood cells (RBCs). On average, an adolescent has about 3.5 L of blood. On average, how many RBCs are in an adolescent's body?

Solution

1 *This is what you know:*

- number of RBCs per 1 mL = 5,000,000
- 1,000 mL = 1 L
- average volume of blood in an adolescent's body = 3.5 L

2 *This is what you need to find out:*

On average, how many RBCs are in an adolescent's body, *N*?

3 *This is the procedure you need to use:*

- Use the following equation:
  N = (number of RBCs/1mL) (1,000 mL/1 L) (3.5 L of blood)
- Substitute the known values
  N = (5,000,000 RBCs/1 mL) (1,000 mL/1 L) (3.5 L of blood)
  N = 17,500,000,000 RBCs
- On average, there are 17.5 billion red blood cells in an adolescent's body.

4 *Check your answer:*

Divide 17,500,000,000 RBCs by 1,000 mL/1 L then divide that answer by 3.5 L, and you should get 5,000,000 RBCs/1 mL.

Practice Problems

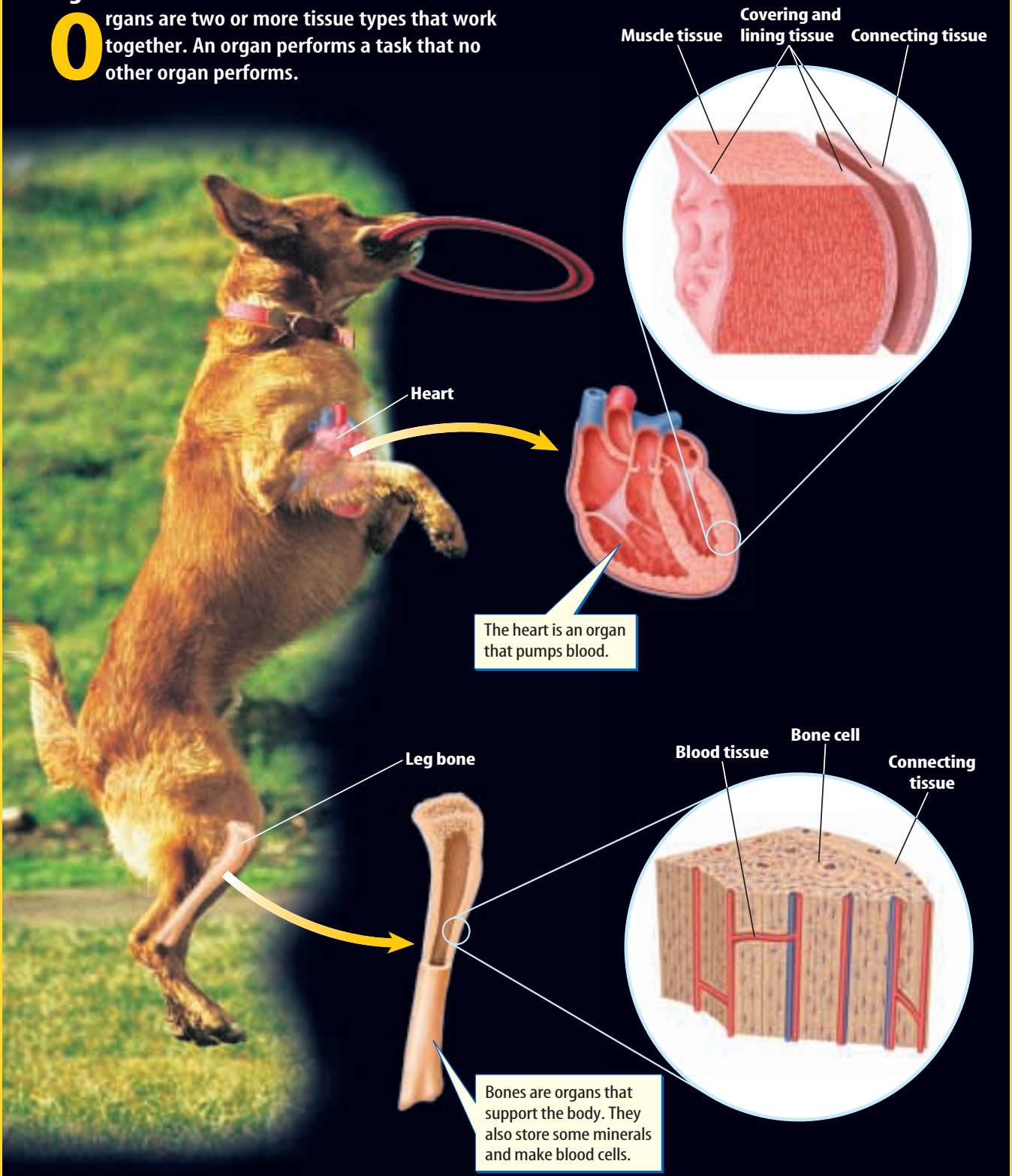
1. Each milliliter of blood contains approximately 7,500 white blood cells. How many white blood cells are in the average adolescent's body? MA.A.3.3.2
2. There are approximately 250,000 platelets in each milliliter of blood. How many platelets are in the average adolescent's body? MA.A.3.3.2

Math Practice For more practice, visit fl6.msscience.com

NATIONAL GEOGRAPHIC **VISUALIZING LIFE'S ORGANIZATION**

Figure 9

Organs are two or more tissue types that work together. An organ performs a task that no other organ performs.



LA.B.2.3.1

Tissues and Organs

Cells that are alike are organized into tissues (TIH shewz). **Tissues** are groups of similar cells that all do the same sort of work. For example, bone tissue is made of bone cells, and nerve tissue is made of nerve cells. Blood, a liquid tissue, includes different types of blood cells.

As important as individual tissues are, they do not work alone. Different types of tissues working together can form a structure called an **organ** (OR gun). For example, the stomach is an organ that includes muscle tissue, nerve tissue, and blood tissue. All of these tissues work together and enable the stomach to perform its digestive functions. Other human organs include the heart and the kidneys.

Reading Check *Which term means "two or more tissue types that work together"?*

Organ Systems

A group of organs that work together to do a certain job is called an **organ system.** The stomach, mouth, intestines, and liver are involved in digestion. Together, these and several other organs make up the digestive system. Other organ systems found in your body include the respiratory system, the circulatory system, the reproductive system, and the nervous system.

Organ systems also work together, as shown in **Figure 9.** For example, the muscular system has more than 600 muscles that are attached to bones. The contracting cells of muscle tissue cause your bones, which are part of the skeletal system, to move.

LA.B.2.3.4

Science Online

Topic: One-Celled Organisms

Visit fl6.msscience.com for Web links to information about what types of organisms are made of only one cell.

Activity Create a table that includes images and information about five of these organisms.

section 2 review

Summary

Special Cells for Special Jobs

- Plant and animal cells come in a variety of sizes and shapes.
- The function of an animal cell can be related to its shape and size.
- The leaves, roots, and stems of plants are made of different types of cells to perform different functions.

Cell Organization

- Many-celled organisms are organized into tissues, organs, and organ systems.
- Each organ system performs a specific function that, together with other systems, keeps an organism healthy and alive.

Self Check

1. **Describe** three types of cells that are found in the human body. SC.F.1.3.6
2. **Compare and contrast** the cells found in a plant's roots, stems, and leaves. SC.F.1.3.6
3. **Explain** the difference between a cell and a tissue and between a tissue and an organ. SC.F.1.3.4
4. **Think Critically** Why must specialized cells work together as a team? SC.F.1.3.5

Applying Skills

5. **Concept Map** Make an events-chain concept map of the different levels of cell organization from cell to organ system. Provide an example for each level of organization. SC.F.1.3.4