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2019/2020

Science Eight

Unit Two:

Cells & Systems

Name:

Date Received:

Date In:

Unit B: Cells and Systems

Outcome # 1- Investigate living things; and identify and apply scientific ideas used to interpret their general structure, function and organization

| Essential Outcomes (Ideas I must understand) | My Understanding |
|--|------------------|
| <ul style="list-style-type: none"> investigate and describe example scientific studies of the characteristics of living things (<i>e.g., investigate and describe an ongoing scientific study of a locally-found organism</i>) | 1 2 3 4 |
| <ul style="list-style-type: none"> apply the concept of system in describing familiar organisms and analyzing their general structure and function | 1 2 3 4 |
| <ul style="list-style-type: none"> illustrate and explain how different organisms have similar functions that are met in a variety of ways (<i>e.g., recognize food gathering as a common function of animals, and note a variety of food-gathering structures</i>) | 1 2 3 4 |

Outcome # 2- Investigate and describe the role of cells within living things

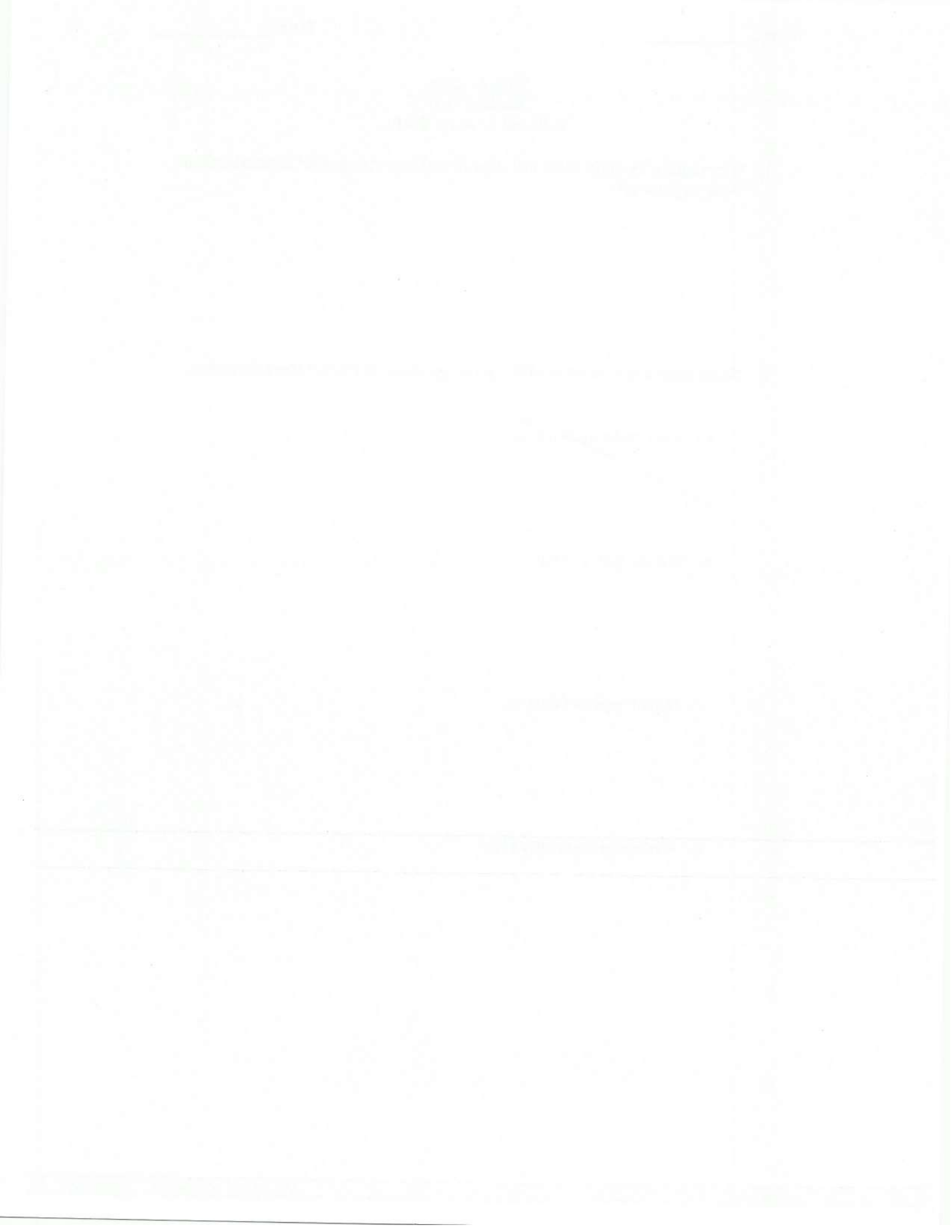
| Essential Outcomes (Ideas I must understand) | My Understanding |
|---|------------------|
| <ul style="list-style-type: none"> describe the role of cells as a basic unit of life | 1 2 3 4 |
| <ul style="list-style-type: none"> analyze similarities and differences between single-celled and multicelled organisms (<i>e.g., compare, in general terms, an amoeba and a grizzly bear, a single-celled alga and a poplar tree</i>) | 1 2 3 4 |
| <ul style="list-style-type: none"> distinguish between plant and animal cells (<i>e.g., distinguish between cell walls and cell membranes</i>) | 1 2 3 4 |
| <ul style="list-style-type: none"> describe the movement of gases and liquids into and out of cells during diffusion and osmosis, based on concentration differences | 1 2 3 4 |
| <ul style="list-style-type: none"> examine plant and animal structures; and identify contributing roles of cells, tissues and organs | 1 2 3 4 |

Outcome # 3- Interpret the healthy function of human body systems, and illustrate ways the body reacts to internal and external stimuli

| Essential Outcomes (Ideas I must understand) | My Understanding | | | |
|---|------------------|---|---|---|
| <ul style="list-style-type: none"> describe, in general terms, body systems for respiration, circulation, digestion, excretion and sensory awareness (e.g., describe how blood is circulated throughout the body to carry oxygen and nutrients to the body's various tissues and organs) | 1 | 2 | 3 | 4 |
| <ul style="list-style-type: none"> describe, in general terms, the role of individual organs and tissues in supporting the healthy functioning of the human body (e.g., the role of lungs in exchanging oxygen and carbon dioxide, the role of bronchia in providing a passageway for air) | 1 | 2 | 3 | 4 |
| <ul style="list-style-type: none"> describe ways in which various types of cells contribute to the healthy functioning of the human body (e.g., describe the roles of individual cells in nerves, muscle, blood, skin and bone) | 1 | 2 | 3 | 4 |
| <ul style="list-style-type: none"> describe changes in body functions in response to changing conditions (e.g., changes in heart rate in response to exercise, change in metabolism in response to lower temperature, reflex responses to stimuli) | | | | |

Outcome # 4- Describe areas of scientific investigation leading to new knowledge about body systems and to new medical applications

| Essential Outcomes (Ideas I must understand) | My Understanding | | | |
|---|------------------|---|---|---|
| <ul style="list-style-type: none"> identify examples of research into functions and dysfunctions of human cells, organs or body systems | 1 | 2 | 3 | 4 |
| <ul style="list-style-type: none"> describe ways in which research about cells, organs and systems has brought about improvements in human health and nutrition (e.g., development of medicines; immunization procedures; diets based on the needs of organs, such as the heart) | 1 | 2 | 3 | 4 |
| <ul style="list-style-type: none"> investigate and describe factors that affect the healthy function of the human respiratory, circulatory and digestive systems (e.g., investigate the effect of illness, aging or air quality on the function of the respiratory system) | 1 | 2 | 3 | 4 |



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Science Eight
Module Two
Cells and Systems Ws #1

1. Why might a biologist think that the cell is the most important characteristic of living organisms?

2. Name some characteristics of living things shown in each of these examples:

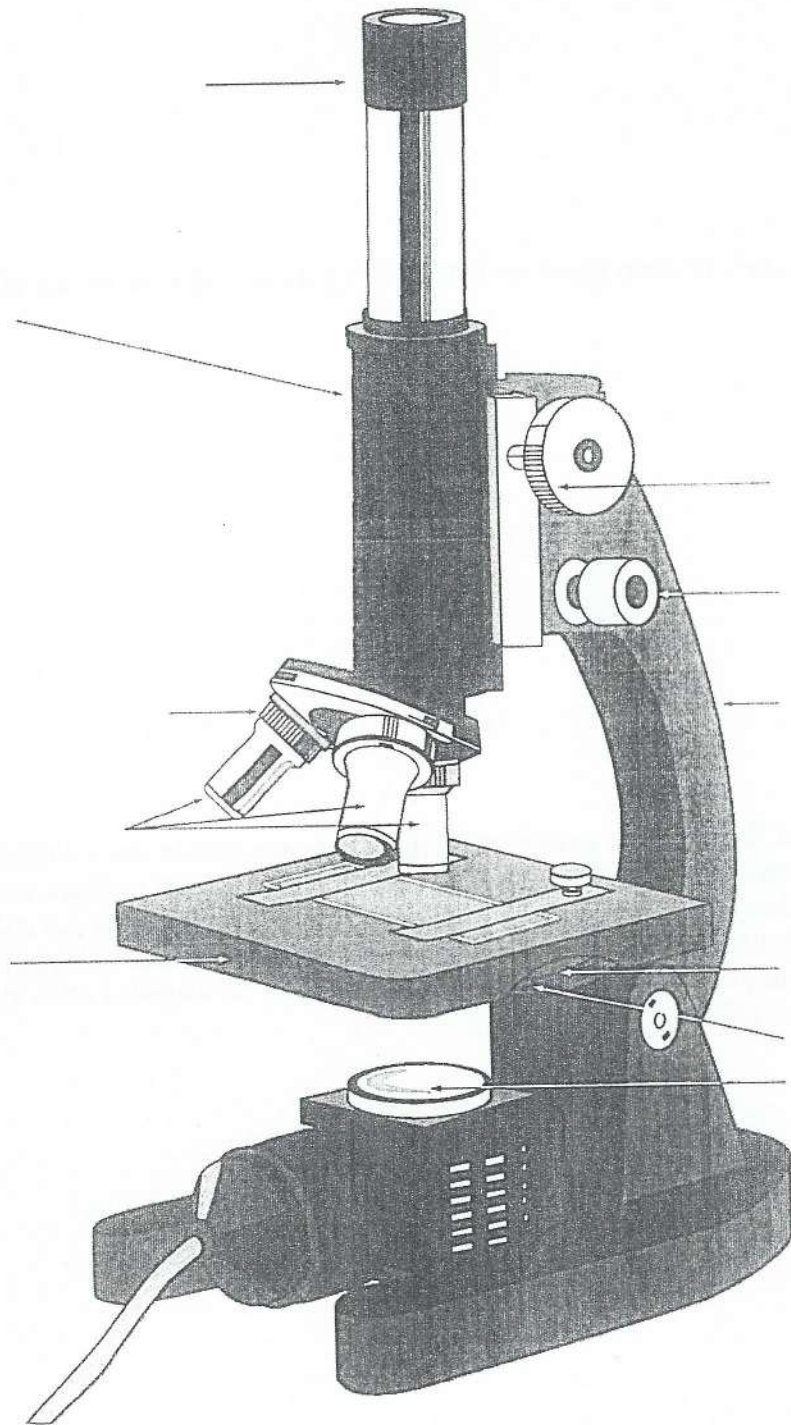
~~• A cat purrs when petted~~

• A robin eats a worm

• A plant gives off oxygen

• A runner sweats after a race

Parts of a Compound Light Microscope



The Compound Light Microscope

Goal • Use this page to review the function of each part of the compound light microscope.

What to Do

- Each part of the compound light microscope is listed in the left column of the table below. In the right column, describe the function of each microscope part. For assistance, refer to pages 106–107 of *SCIENCEFOCUS™ 8*.

| Microscope part | Function |
|------------------------|----------|
| eyepiece | |
| tube | |
| revolving nosepiece | |
| objective lens | |
| fine-adjustment knob | |
| coarse-adjustment knob | |
| stage | |
| condenser lens | |
| diaphragm | |
| light source | |

Calculate Magnification

Goal • Practise calculating different magnifications of a microscope.

Think About It

- A magnifying lens that magnifies the size of an image by ten times has a magnification of $10\times$. A **compound microscope**, like the ones in your classroom, uses two lenses — an ocular lens and an objective lens. Combining two lenses creates higher magnifications.

What to Do

- On this page, or on a separate sheet, answer questions 1–4 in full sentence form. You must also show your mathematical calculations for each question.
- To calculate the total magnification of a compound microscope, you must multiply the magnification of the ocular lens by the magnification of the objective lens.

1. What would be the magnification of a microscope with two lenses that each enlarges an image by $10\times$?

2. An ocular lens on a microscope has a magnification of $10\times$. The objective lenses on the microscope have magnifications of $4\times$ at low power, $10\times$ at medium power, and $40\times$ at high power.

(a) Using the information above, how would you combine lenses on a microscope if you wanted to magnify an object $40\times$?

(b) How would you combine lenses if you wanted to magnify an object $100\times$?

(c) How would you combine lenses if you wanted to magnify an object $400\times$?

3. If a compound microscope has an ocular lens of $15\times$ magnification and a scientist selects an objective lens with a power of $40\times$, what is the total magnification of the object in view?

4. Fill in the blanks within the brackets to express total magnification as a word equation.
 Total magnification = (_____) \times (_____)

Estimating the Size of Microscopic Objects

Goal • This page helps you develop your skills at estimating the size of objects under the microscope.

Think About It

- Once you know the diameter of a microscope's field of view, how do you estimate the size of the object you are viewing?

What to Do

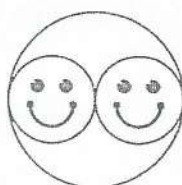
- Read the information below and answer the questions. You may also refer to pages 110–111 of *SCIENCEFOCUS™ 8* for additional information.

Part A: Estimating Object Size

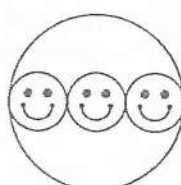
- Look at the four circles below. Assume that each circle has a diameter of 2.5 cm. (Diameter is the distance across a circle.) You do not know the size of the happy faces within the circles. Try to estimate the size of one happy face inside each of the four circles. Write your answer in the blank space under each circle. Leave some space to write the answers that you will calculate in question 2.



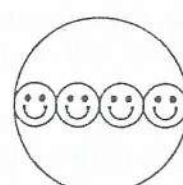
_____ cm



_____ cm



_____ cm



_____ cm

- Use the following formula to calculate the exact size of one happy face in each of the circles:

Size of one happy face = Diameter of circle ÷ Number of happy faces

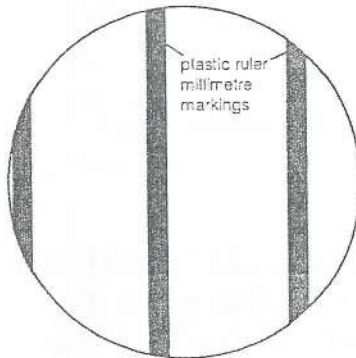
Write your answers in the blank space beside your estimates from question 1.

Compare the exact size of the smiling faces with your original estimates.

Estimating the Size of Microscopic Objects (continued)

Part B: Estimating Size Under the Microscope

- Once you know the diameter of the field of view of a microscope, you can estimate the size of the objects you are viewing. The **field of view** is what you see when you look through the microscope. To find the **diameter of the field of view**, use a ruler to measure the distance across its centre. The diagram below represents a field of view when looking at millimetre markings on a ruler.



The diameter of the field of view represented on the left is 2.5 mm.

- Most objects under the microscope are much smaller than a millimetre. Try using a smaller unit, the **micrometre** (μm). Multiply the field diameter by 1000 to convert it from millimetres (mm) to micrometres (μm).

Convert the field of view represented above (2.5 mm) to micrometres:
 The diameter of the field of view is _____ μm .

Goal • This page tests your ability to estimate the size of cells in a field of view.

What to Do

- Read the information given for each question. Answer the questions in the space provided.

1. As scientists, we must determine how small cells really are. To do this, we need to measure the diameter of the field of view.

(a) What is a field of view? (1 mark)

(b) What is a diameter? (1 mark)

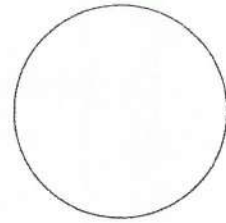
2. When Molly looks under a microscope, before placing her specimen on the stage, she observes an empty field of view.

(a) Use your ruler to draw in the diameter of the field of view; that is, draw a line that cuts the circle exactly in half. (1 mark)

(b) What is the measurement of the circle's diameter? (2 marks)

in centimetres _____

in millimetres _____



3. Imagine that ten cells of equal size fit across the diameter of the circle below.

(a) Measure the diameter of the circle. _____ (1 mark)

(b) What is the span of the ten cells? _____ (1 mark)

(c) What is the span of one cell? _____ (1 mark)

(d) Explain how you arrived at your answer for question (c). (1 mark)

4. If ten cells fit across a field diameter of 40 mm, what is the length of one cell? Show your work. (3 marks)

Total: /12 marks

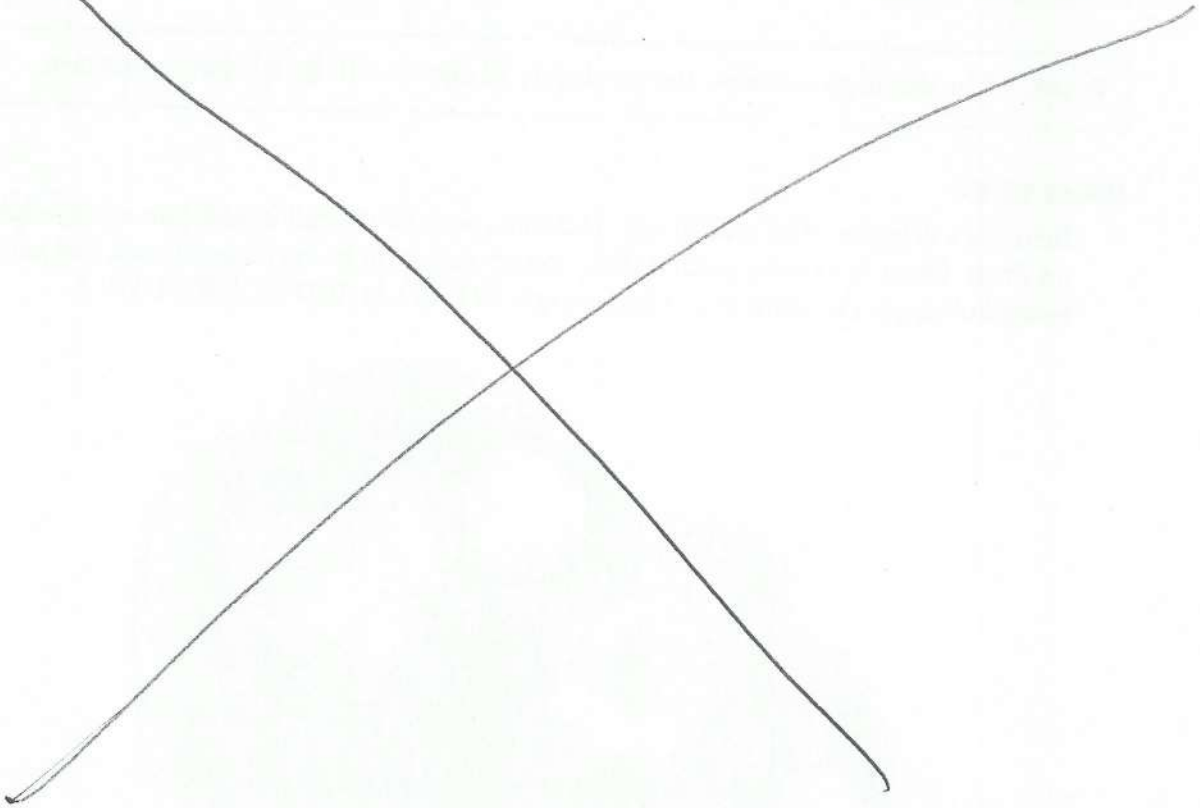
Name: _____

Date: _____

Science Eight
Module Two
Cells and Systems Ws #2

1. How do the specialized cells of the pika help it digest difficult plant tissue? (Page 102)
2. Contrast between multicellular and unicellular. (Page 115)
3. Label the attached diagrams of the plant and animals cell:
4. What is an organelle?
5. Can you think of any reasons for differences between an animals and plant cell?

6. List the major parts of the cell on page 122 and what they do.



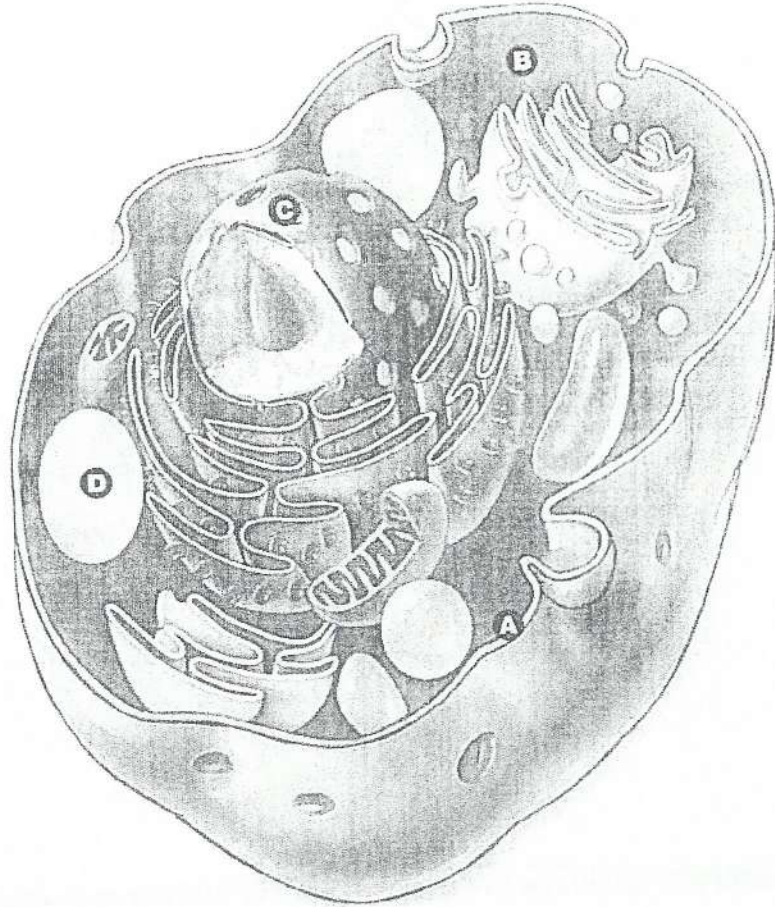
~~7. Why are cells of small in size? What would be some difficulties if cells were larger?~~

The Parts of an Animal Cell

Goal • Use this page to review the vocabulary of animal cells by labelling a diagram.

What to Do

- Below is a diagram of an animal cell. Different parts of the cell have letters of the alphabet on them. Draw lines from each of these letters and write in the name of each cell part being indicated. For assistance, turn to pages 122–123 in *SCIENCEFOCUS*™ 8.

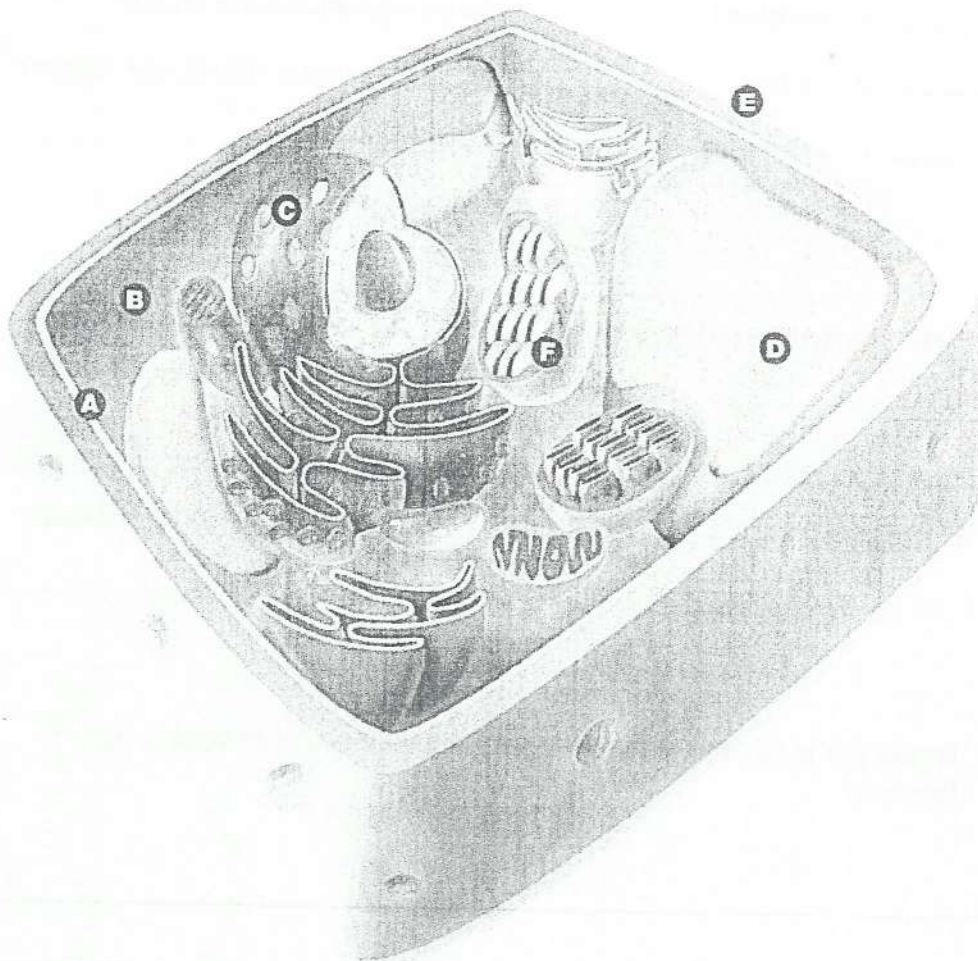


The Parts of a Plant Cell

Goal • Use this page to review the vocabulary of plant cells by labelling a diagram.

What to Do

- Below is a diagram of a plant cell. Different parts of the cell have letters of the alphabet on them. Draw lines from each of these letters and write in the name of each cell part being indicated. For assistance, turn to pages 122–123 in *SCIENCEFOCUS™ 8*.



Name: _____

Date: _____

Science Eight
Module Two
Cells and Systems Ws #3

1. Match the following cell organelles in the left column with their function in the right column. Fill in the answer blanks to the left of the cell organelles.

| | |
|------------------------|--|
| _____ a. mitochondria | A. converts food into energy the cell can use |
| _____ b. cell membrane | B. controls most of the activities within the cell |
| _____ c. cytoplasm | C. moves substances within the cell |
| _____ d. nucleus | D. provides protection from the environment |
| _____ e. chloroplast | E. stores food and wastes |
| | F. uses light energy to make food |

2.

Unicellular organisms and multicellular organisms have structures with similar functions.

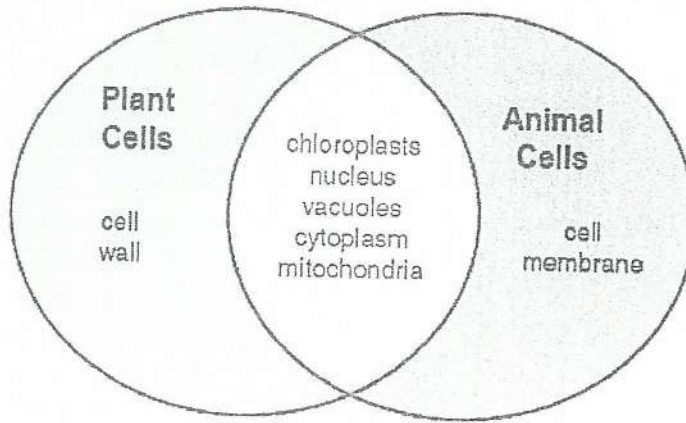
- a. Which parts of an amoeba have similar functions to the feet of bears?

- b. Which parts of a cell have similar functions to the organs of multicellular organisms?

3. Where would you find the substance chlorophyll in a cell? What is its function?

4.

A student made the following Venn diagram to compare plant and animal cells.



Find two terms that the student placed in the wrong position. Give reasons for your answers.

~~5~~ Do organisms grow larger in size by (a) increasing the size of their cells, or (b) adding more cells? Explain your reasons:

~~6~~ Why would you not expect to see chloroplasts in cells from an onion root?

Name: _____

Date: _____

7. Is an earthworm unicellular or multicultural? Explain your answer.



Goal • Assess your understanding of terms and concepts in Topics 1-3.

What to Do

Carefully read the instructions before answering each set of questions.

Fill in the Blanks

Use the terms below to complete the sentences that follow. You will not use all the terms.

cell

nucleus

compound light microscope

multicellular

chlorophyll

electron microscope

cell membrane

wet mount

1. Scientists consider the _____ the smallest unit of life.
2. The green color in plant cells comes from the pigment _____.
3. The _____ is often called the gatekeeper of the cell because it regulates what enters and leaves the cell.
4. To view a specimen enlarged 1 000 000 \times , you should use a/an _____.
5. An amoeba is a single-celled organism. An earthworm is a _____ organism.

From the list of cell organelles listed below, identify which organelles are found in plant cells only, animal cells only, or both plant and animal cells. Write "P" for plants only, "A" for animal cells only, and "B" for both plant and animal cells.

6. _____ cell membrane
7. _____ cell wall
8. _____ nucleus
9. _____ vacuole
10. _____ chloroplast
11. _____ cytoplasm

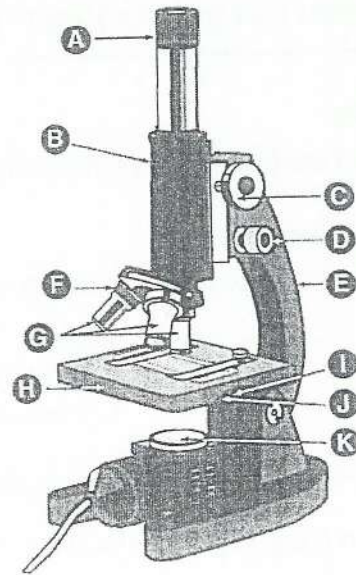
Topics 1-3 Test

(continued)

Diagram

Use the diagram of the microscope below and your knowledge of how to use a microscope to answer the following questions.

12. Complete the following chart by writing the name of the part and the letter on the microscope that matches each description.



| Description | Name | Letter |
|---|------|--------|
| Used for focusing at low power. | | |
| Allows you to switch magnification. | | |
| Supports microscope slides. | | |
| Lens closest to the eye. | | |
| Controls the amount of light reaching the object. | | |

13. Place the following steps for focusing a microscope in order, with 1 being the first step.

- ___ Use the fine adjustment knob to sharpen the focus.
- ___ Place the slide on the stage with the object to be viewed over the opening in the stage.
- ___ Bring the object into focus by looking through the eyepiece and using the coarse adjustment knob.
- ___ Turn the revolving nosepiece until the lowest power objective is in place.
- ___ Looking from the side, use the coarse adjustment knob to bring the stage and objective lens about 1 cm apart.

14. Complete the following chart.

Magnification of a Microscope

| Eyepiece magnification | Objective magnification | Total magnification |
|------------------------|-------------------------|---------------------|
| 10× | 4× | |
| | 10× | 100× |
| 10× | | 400× |

(continued)

Short Answer

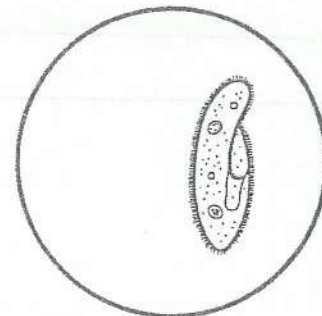
Answer the following questions in the space provided.

~~15. Give 2 reasons to explain why a car is not living even though it uses food (gasoline), it moves, and it responds to red lights.~~

16. (a) All living things carry out certain functions to stay alive. Name 3 of these functions.

~~(b) In class you studied how organisms carry out life functions. Choose one function, then choose any two organisms and explain what structures they have to carry out this function.~~

17. If the paramecium pictured below is viewed under $100\times$ magnification, and the size of the field of view is 1.5 mm, how wide is the paramecium? Explain how you arrived at your answer.



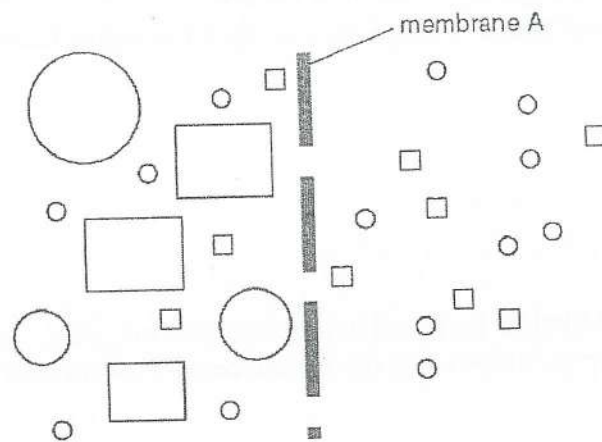
Science Eight
Module Two
Cells and Systems Ws #4

1. Contrast between selective permeability, permeable, and impermeable:

2.

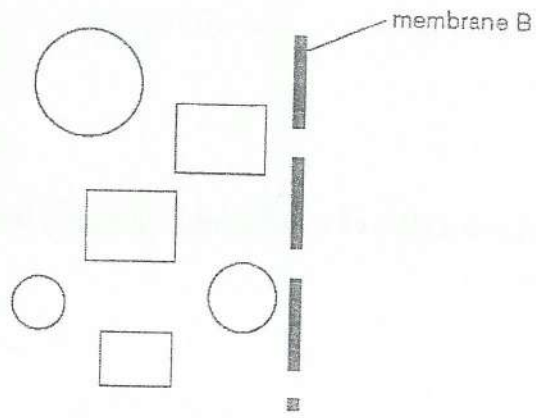
Membranes can be classified as impermeable, permeable, or selectively permeable. This classification indicates how well particles are able to flow through the membranes. Use the diagrams to complete the question parts.

a.



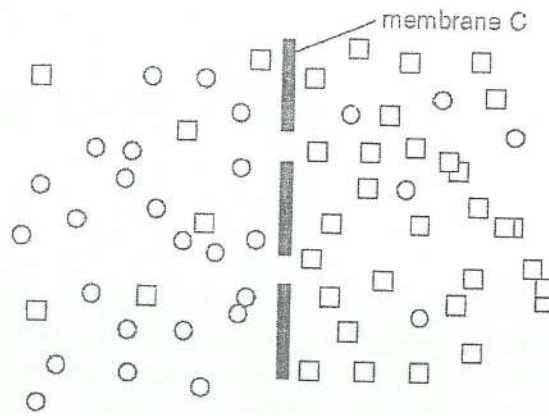
Classify membrane A in terms of how well these particles are able to flow through it.

b.



Classify membrane B in terms of how well these particles are able to flow through it.

c.



Classify membrane C in terms of how well these particles are able to flow through it.

Name: _____

Date: _____

3 .Define diffusion:

4 Why does ink dropped into a glass of water spread out evenly throughout? (Hint, read page 129)

~~5~~ Once the ink particles have spread throughout the glass, do they stop moving?
Explain your answer.

~~6~~ Two people are in a square room. The room is completely sealed. The two people stand at opposite ends of the room. Person A peels an orange, but does not leave his spot. Person B also stands still. Three minutes later, she claims that she can smell the orange. In regards to the particle theory of matter... Why can person B smell the orange?

- 7 An amoeba is placed into a glass of water that contains NO carbon dioxide. The amoeba is left for one hour, producing waste the entire time. How will the amount of carbon dioxide be different one hour later in the glass of water? Explain why...

- 8 In the following boxes, draw a situation that satisfies the condition:

- Carbon dioxide moving out of the amoeba and into the water
- Carbon dioxide moving into the amoeba and out of the water
- No movement of carbon dioxide between the amoeba and water

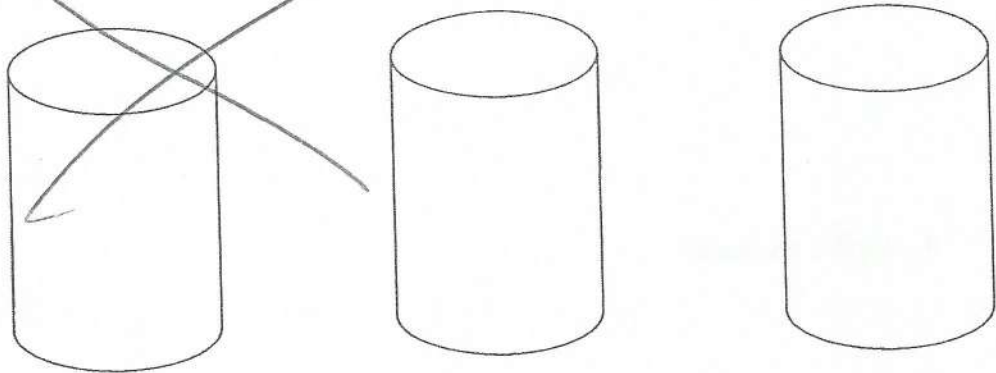
- 9 Define Osmosis:

Name: _____

Date: _____

~~10 Draw out the diagram on page 131. Explain why the water is higher on the left side of the beaker after osmosis.~~

11 Look at the following diagrams, and tell me which way the water will flow due to osmosis: **AND... DRAW ME WHAT THE CUPS WILL LOOK LIKE LATER**



Designing a Cell Membrane

Goal • Use this page to design cells with membranes that are permeable, impermeable, and selectively permeable.

What to Do

1. Read page 128 of *SCIENCEFOCUS™ 8*.
2. For Part A, write answers to the questions in the spaces provided.
3. For Part B, read the instructions to draw three different cells with different types of membranes, then answer the question that follows.

Part A

1. What does the term “permeable membrane” mean?

2. What does the term “selectively permeable” mean?

3. Why do you think it is important for a cell to be selective?

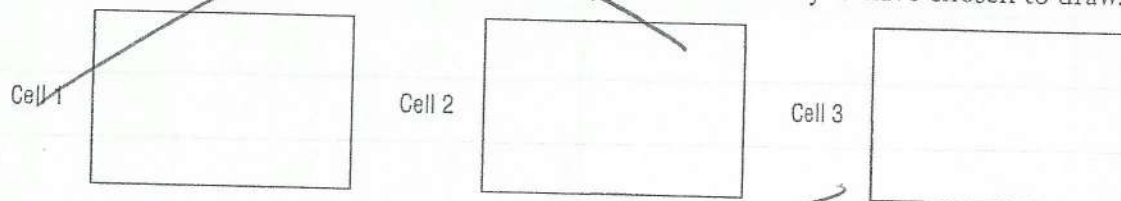
Part B

You are a cell architect and you have been asked to draw three types of cells. Most architects must follow “specification” or detailed instructions in their design process. For your diagrams, use different shapes, like a square or triangle, to represent different types of molecules that can or cannot move freely in and out of cells. Here are your cell specifications:

Cell 1: Must be impermeable to the type of molecules you have chosen to draw.

Cell 2: Must be permeable to the type of molecules you have chosen to draw.

Cell 3: Must be selectively permeable to the type of molecules you have chosen to draw.



Analyze

4. What do you think is the best type of membrane for a cell to have?

Relating Diffusion to the Particle Theory

Goal • Use this page to review your knowledge of diffusion.

What to Do

- Answer the questions as instructed in Parts A and B.

Part A

Use the word list to fill in the blanks in the sentences below.

Word List

particles high moving slowly
 vibrate faster low

- All matter is made up of _____.
- Particles that make up matter are never still. They are always _____.
- In a solid substance, particles may _____ but remain in a fixed position.
- Particles in a liquid move _____ than the particles in a solid.
- When a liquid is cooled, its particles move more _____.
- Diffusion is the movement of particles from a region of _____ concentration to a region of _____ concentration.

Part B

In the boxes below, draw what you think particles would look like in a liquid and in a gas. Write a brief description to explain your diagrams in the space below the boxes.

| | |
|--|--|
| | |
|--|--|

particles in a liquid

particles in a gas

Tissues Found in Plants

Goal • This page helps you review the types of tissues in plants and their functions.

1. Why is xylem tissue useful to a plant?

2. Why is phloem useful to a plant?

3. Why do you think it is important for a plant to have different types of vascular tissues?

4. What substances are transported in the xylem? What is the direction of movement?

5. What substances are transported in the phloem? What is the direction of movement?

6. What does the epidermal tissue do in a plant?

Testing Your Knowledge about Plants

Goal • This page allows you to test your knowledge of plants.

What to Do

Part A

Compare and contrast the following terms. Make sure that you mention the similarities and differences for each pair. (2 marks for each pair)

1. phloem and xylem: _____

2. shoot system and root system: _____

3. tissues and organs: _____

4. palisade cells and epidermis: _____

Part B

Beside each statement on the left-hand side, place the letter representing the term on the right-hand side that best matches the statement.

| Statement | Term |
|--|-------------------|
| ___ 1. an example of this is a leaf | (a) system |
| ___ 2. an example of this is a maple tree | (b) tissue |
| ___ 3. are part of the reproductive system | (c) stoma |
| ___ 4. is where most photosynthesis occurs | (d) organism |
| ___ 5. is surrounded by a guard cell | (e) organ |
| ___ 6. includes the stems and leaves | (f) palisade cell |
| ___ 7. an example of this is phloem | (g) flowers |

Testing Your Knowledge about Plants (continued)

Part C

For the following sentences, decide if the statement is related to:

(a) xylem (b) phloem (c) both xylem and phloem

- 1. helps to transport the sugars within a plant
- 2. carries minerals from the roots to the leaves
- 3. carries water throughout the plant
- 4. tissue that runs lengthwise in a plant's stem
- 5. an example of vascular tissue

Total: /20

Name: _____

Date: _____

Science Eight
Module Two
Cells and Systems Ws #6
(Read Pages 138-141)

1. Contrast between unicellular and multicellular organisms.
2. List some advantages and disadvantages for an organism that is unicellular.
3. List some advantages and disadvantages for an organism that is multicellular.
- ~~4. Explain how the structure of a specialized cell is related to its function in the body of a multicellular organism.~~

Name: _____

Date: _____

5. Why do cells in your body need to be specialized?

~~6. Why do nerve cells have long fibres, whereas red blood cells are thin and disklike? (See Mr. Blum for help)~~

~~7. Draw a diagram of your stomach (organ). Be sure to label the four different types of tissue that make up the stomach.~~

~~8. What if one of the tissues in your stomach did not function properly? For example, the muscle tissue no longer functions. Will this change the overall function of your stomach? What relation is there between tissue and organ function?~~

Organization in Biology

Goal • Use this page to review your knowledge of organization in biology, and then use a concept map to show different organs that contribute to the digestive system.

Think About It

- An organism that is too large to function as a single-celled entity must be multicellular. This ensures that all of its cells receive the substances required and have their waste products removed. These functions are accomplished through specialization of cells and their organization into tissues, organs, and systems.

What to Do

- Read page 140 of *SCIENCEFOCUS™ 8*. Answer questions 1–4 below using complete sentences. Then fill in as many organs as you can think of that are part of the digestive system in question 5.

Define the following terms:

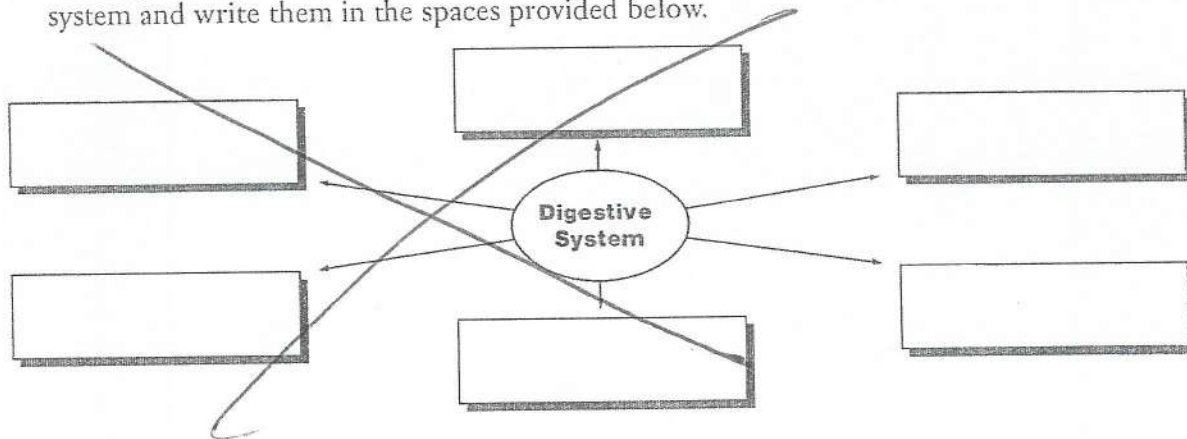
1. tissue:

2. organ:

3. system:

4. organism:

5. The digestive system is an example of a system. Brainstorm organs that are part of this system and write them in the spaces provided below.

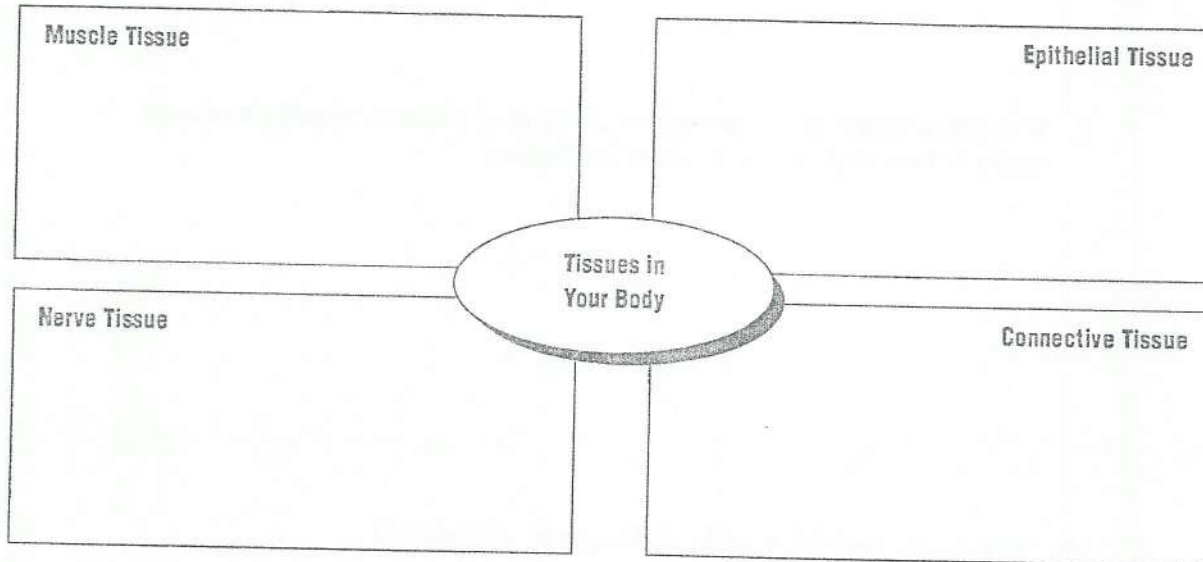


Goal • Use this page to help you review the four main types of body tissue.

What to Do

- Refer to pages 141–142 of *SCIENCEFOCUS™ 8* to help you complete this activity.

1. In the graphic organizer below, explain where in your body these tissues are found and why they are important.



2. Can you give an example of how these tissues can participate in one organ of the body?

3. Why do you think that it is beneficial for an organism to have different types of tissues?

4. Can you give an example of a body part where two or more different tissues are needed. Be sure to explain your answer.

Name: _____

Date: _____

Science Eight
Module Two
Cells and Systems Ws #7

The following are some review question of the unit so far...

1. How are osmosis and diffusion different?

2. If a cell is placed in a concentrated solution of glucose, would you expect water to move into or out of the cell? Explain.

~~3.~~ Why are cells specialized in multicellular organisms?

4. Name the main types of specialized cells in animals.

Name: _____

Date: _____

5. Explain how the structure of specialized cell is related to its function in the body of a multicellular organism.

6. ~~List some advantages that multicellular organisms have over some unicellular organisms.~~

7. ~~Name the five levels of organization in a multicellular organism and give an example of each.~~

8. ~~Study the two photographs on the bottom of page 145. One cell was part of a group of cells placed in distilled water, while the other was placed in a strong salt solution. Make an inference about which one was in which solution, giving your reasons for your inference.~~

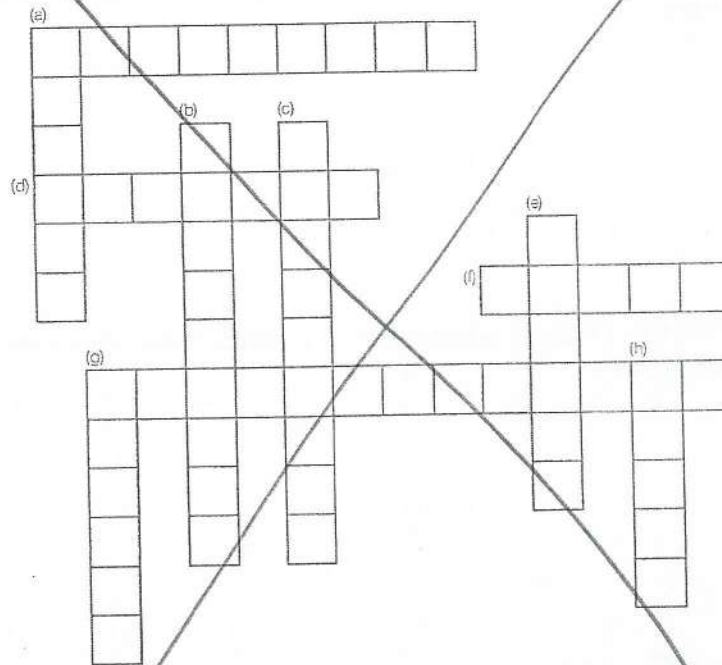
Goal • Assess your understanding of terms and concepts in Topics 4–5.

What to Do

Carefully read the instructions before answering each set of questions.

Puzzle

1. Complete the following crossword puzzle using the clues provided.



Across

- (a) A membrane that allows all substances to cross it is _____.
- (d) Diffusion of water through a selectively permeable membrane.
- (f) A type of vascular tissue in plants that conducts water and minerals from the roots to the rest of the plant.
- (g) The loss of water from a plant through evaporation.

Down

- (a) A type of plant vascular tissue that transports sugars manufactured in the leaves to the rest of the plant.
- (b) Fine extensions of the cells of a root. Water enters these cells by osmosis.
- (c) A spreading out process, like colored crystals spreading through a liquid without stirring.
- (e) Groups of organs working together form a/an _____.
- (g) Groups of similar cells that have the same function and structure form a/an _____.
- (h) Your heart is an example of a/an _____.

(continued)

Classify the following as tissue (T), organ (O), or system (S).

- | | |
|---------------------------|----------------------------------|
| 2. _____ heart | 3. _____ muscle |
| 4. _____ xylem | 5. _____ heart and blood vessels |
| 6. _____ stems and leaves | 7. _____ stomach |
| 8. _____ bone | |

Short Answer

Answer the following questions in the space provided.

9. Number the following related terms in order from the simplest to the most complex, with 1 being the simplest.
- _____ organism
 _____ cell
 _____ organ
 _____ tissue
 _____ system
10. Choose an organ you studied in class and answer the following questions about the organ.
 Organ _____
- (a) What is the function of this organ?
- (b) To what system does this organ belong?
- (c) What is one interesting fact about this organ?
11. (a) What are 2 functions of a plant's root system?
- (b) Name 2 structures of the root system and explain how they are adapted to these functions.

Topics 4-5 Test

(continued)

12. Name 2 advantages a multicelled tree has over a single-celled algae.

Long Answer

Answer the following questions in complete sentences.

13. Explain how water from the soil reaches the cells in the leaves of a tree. Use the following words in your explanation: root hair, osmosis, xylem tissue, transpiration, push, and pull.
14. Use the concept of diffusion to explain why crisp slices of potato go limp when placed in a solution of salt water.

Organ Systems in Humans: The Digestive System

Goal • This activity provides an opportunity to reinforce understanding and use of terms related to the digestive system.

What to Do

- Refer to Topic 6, Body Systems in Humans, beginning on page 146 of *SCIENCEFOCUS™ 8* to complete this review of the digestive system.

MUST LABEL

- Using the diagram on page 146, label the parts of the digestive system.
- Which structure connects the mouth and the stomach?

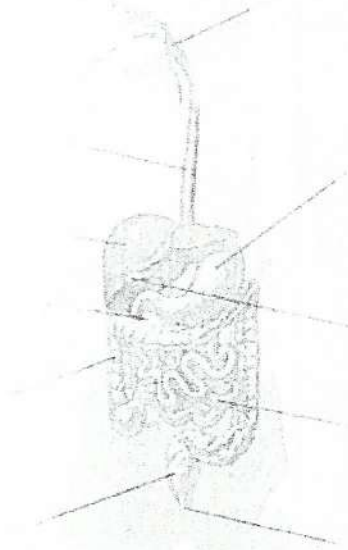
- Which organ produces insulin?

- In which structure does most of the absorption of nutrients occur?

- The small intestine is connected to the stomach at one end and which structure at the other end?

- Why is the digestive system important to humans?

- What do you think is the function of the saliva produced by the salivary glands?



Organ Systems in Humans: The Digestive System (continued)

8. What is the function of the stomach?

9. Why do you suppose many different structures are needed by the digestive system?

Organ Systems in Humans: The Respiratory System

Goal • This activity provides an opportunity to reinforce understanding and use of terms related to the respiratory system.

What to Do

- Refer to Topic 6, Body Systems in Humans, beginning on page 146 of *SCIENCEFOCUS™ 8* to complete this review of the respiratory system.

MUST LABEL



- Using the diagram on page 146, label the parts of the respiratory system.
- What is the main tube connecting the mouth to the lungs?

- Which muscle plays a main role in breathing?

- In which structures does gas exchange occur?



- What are the main organs of the respiratory system?

- Why is the respiratory system important to humans?

- Why do you think many different structures are needed by the respiratory system?

Organ Systems in Humans: **The Respiratory System** (continued)

8. Why do you think that there are so many alveoli?

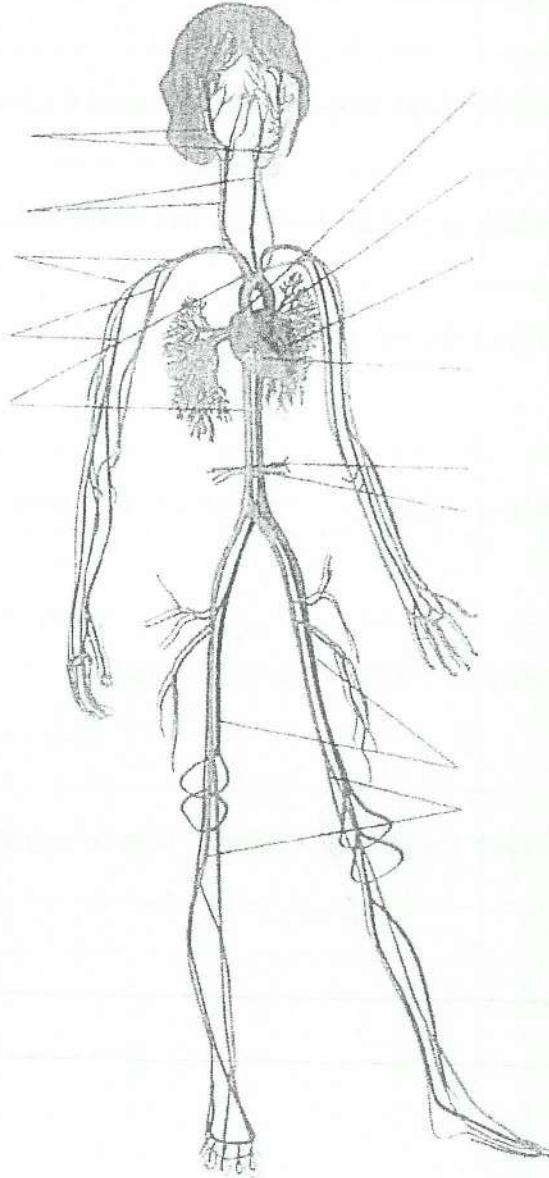
9. Do you think that smoking harms your respiratory system? Explain.

Organ Systems in Humans: The Circulatory System

Goal • This activity provides an opportunity to reinforce understanding and use of terms related to the circulatory system.

What to Do

- Refer to Topic 6, Body Systems in Humans, beginning on page 146 of *SCIENCEFOCUS™ 8* to complete this review of the circulatory system.
1. Using the diagram on page 147, label the parts of the circulatory system.



★ MUST LABEL

Organ Systems in Humans: The Circulatory System (continued)

2. Which structures connect the arteries and veins?

3. Which vessels transport blood away from the heart and have thick muscular walls?

4. Which vessels transport blood toward the heart and have valves?

5. Which part of the heart receives blood from the lungs?

6. Why is the circulatory system important to humans?

7. Which structures are included in the circulatory system?

8. Why are capillaries small and thin?

9. Name the parts of the heart. Why do you suppose the heart needs all these parts?

The Respiratory and Circulatory Systems

Goal • This activity helps you understand the connection between the circulatory and respiratory systems.

What to Do

- Using the information on pages 148–149 of *SCIENCEFOCUS™ 8*, answer the questions to help review your understanding of how the respiratory and circulatory systems in the body work together.
1. The respiratory system is really a collection of tubes that end in a bunch of air sacs. List the tubes that help you to breathe and their diameter in the chart below:

| Name of tube | Diameter of tube |
|--------------|------------------|
| | |
| | |
| | |

2. What are the tiny air sacs at the end of the tubes called?

3. What are the tiniest tubes in the circulatory system called?

- ~~4~~ How are these tiny tubes related to the air sacs?

- ~~5~~ What is diffusion? (If you need to review this term refer to pages 129–130 of *SCIENCEFOCUS™ 8*).

The Respiratory and Circulatory Systems (continued)

6. What important role does diffusion play in connection with the respiratory and circulatory systems?

~~7.~~ Which substances are exchanged between the blood in the capillaries and the air in the air sacs?

The Digestive and Circulatory Systems

Goal • This activity helps you to review the way that food enters your body.

What to Do

• Refer to page 149 of *SCIENCEFOCUS*TM 8 to help you complete this page.

1. What are two functions of your bloodstream?

2. Where does the transfer of food from the digestive system to your circulatory system take place?

~~3.~~ Digestion is one of the main functions of the digestive system. What does digestion mean? (You may need to look up the word in a dictionary.)

4. The process that allows food particles to pass from the intestine to the circulatory system is called _____.

~~5.~~ Write down in your own words the two main functions of the digestive system.

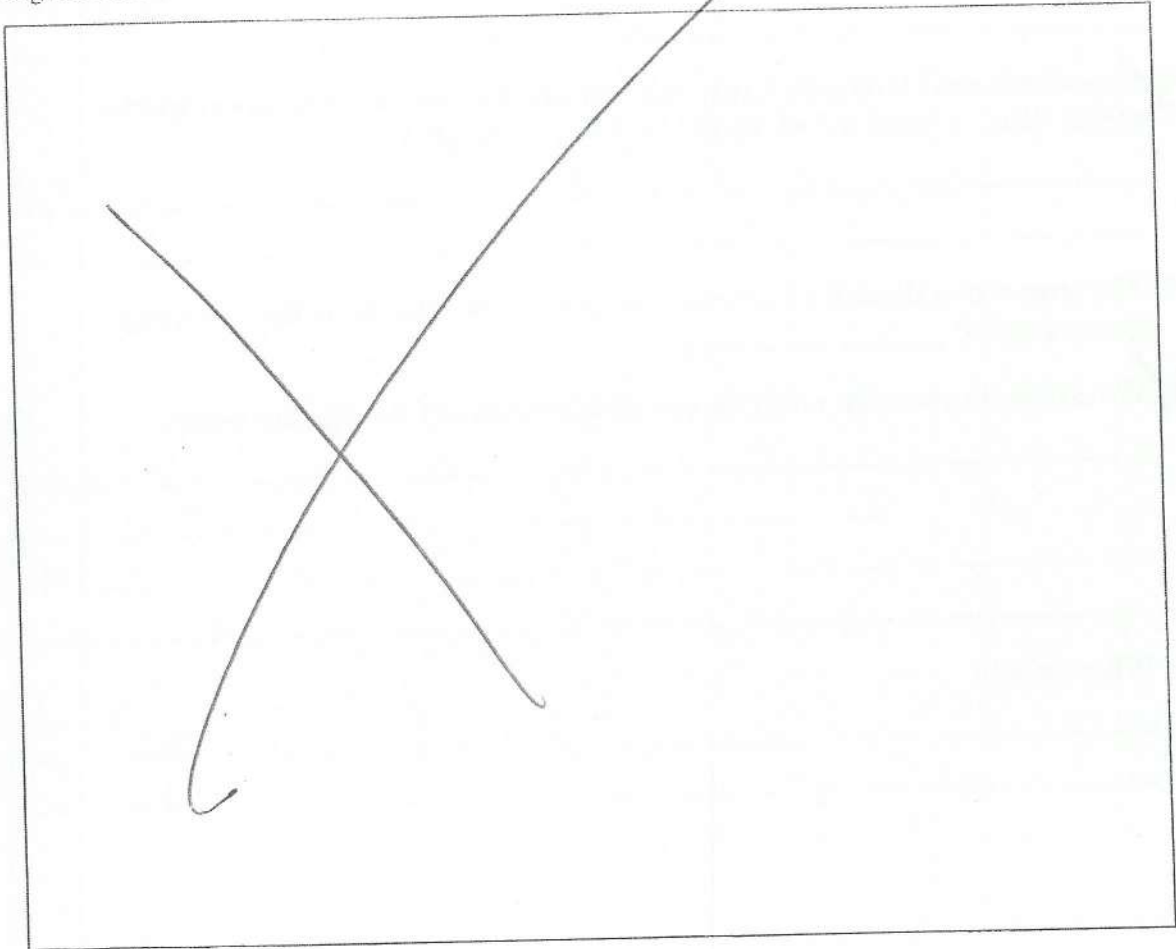
6. What are villi?

The Digestive and Circulatory Systems (continued)

7. In what way are the villi in your intestines and the alveoli in your lungs similar?

8. Why are there so many villi and air sacs?

9. In the space provided, draw and label a diagram of a villus. (You may refer to Figure 2.31 of *SCIENCEFOCUS*TM 8.)



How Well Do You Know Your Systems?

Goal • This quiz provides an opportunity to demonstrate your understanding of the body's systems.

What to Do

- Answer questions below in the space provided.

Part A

Beside each statement on the left-hand side, place the letter representing the system on the right-hand side that best matches the statement.

| Statement | System |
|--|-----------------|
| ___ 1. regulates blood composition and excretes waste fluids | (a) digestive |
| ___ 2. a set of glands that produce chemical messengers | (b) nervous |
| ___ 3. circulates blood; transports food particles, dissolved gases and other substances | (c) respiratory |
| ___ 4. controls and coordinates body activities; senses internal and external changes | (d) excretory |
| ___ 5. breaks down, absorbs food particles, and eliminates wastes | (e) circulatory |
| ___ 6. exchanges oxygen and carbon dioxide | (f) endocrine |

Part B

Define the following terms and provide an example for each.

- diffusion: _____
example: _____
- absorption: _____
example: _____
- hormone: _____
example: _____

How Well Do You Know Your Systems? (continued)

Part C

Given the following pairs of terms, state one similarity and one difference for each pair.

1. alveoli and villi

similarity: _____

difference: _____

2. ~~oxygen and carbon dioxide~~

~~similarity: _____~~

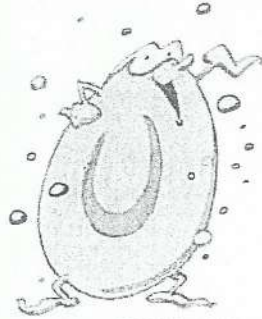
~~difference: _____~~

3. trachea and artery

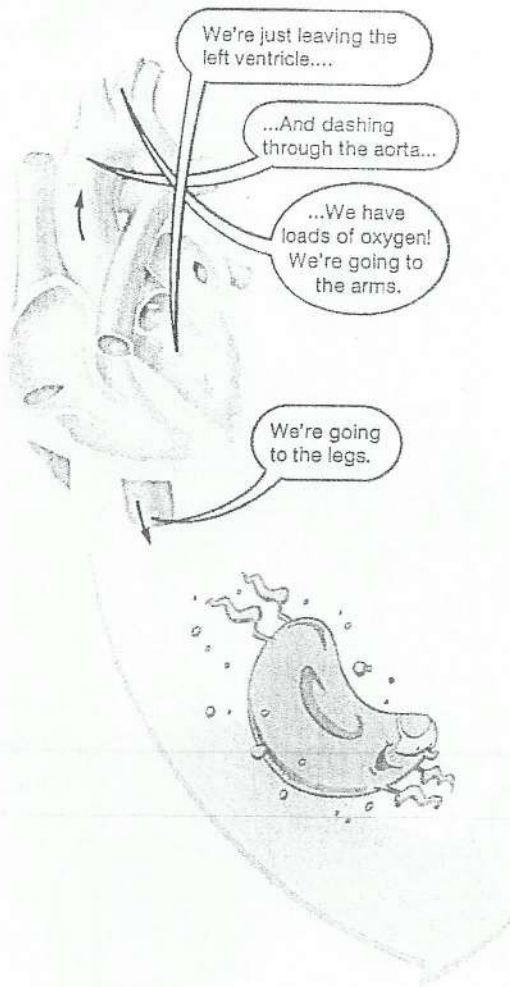
similarity: _____

difference: _____

Journey of a Red Blood Cell



The blood in your body travels in a double circuit, going through your heart twice before it completes one full circulation. The first circuit is from the heart to all tissues and organs except the lungs. The second circuit is from the heart to the lungs, where carbon dioxide diffuses out of the capillaries and oxygen diffuses into the capillaries. Follow a group of red blood cells on their journey around the body.

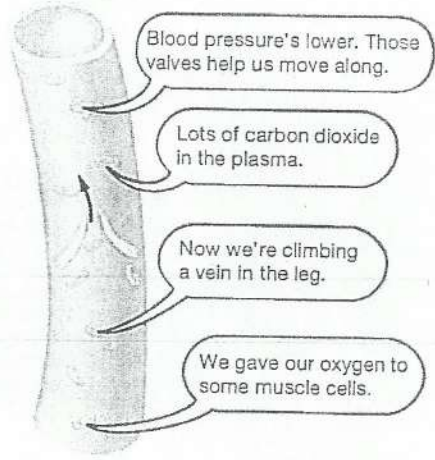
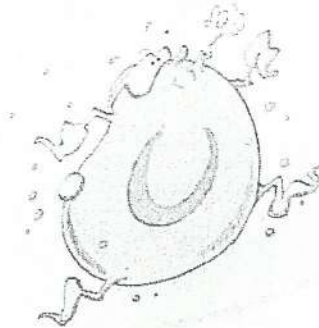


We're just leaving the left ventricle....

...And dashing through the aorta...

...We have loads of oxygen! We're going to the arms.

We're going to the legs.



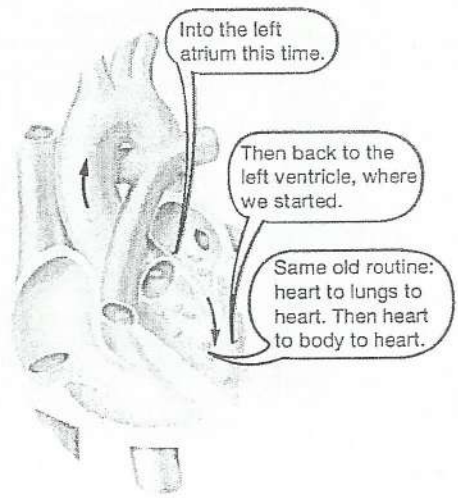
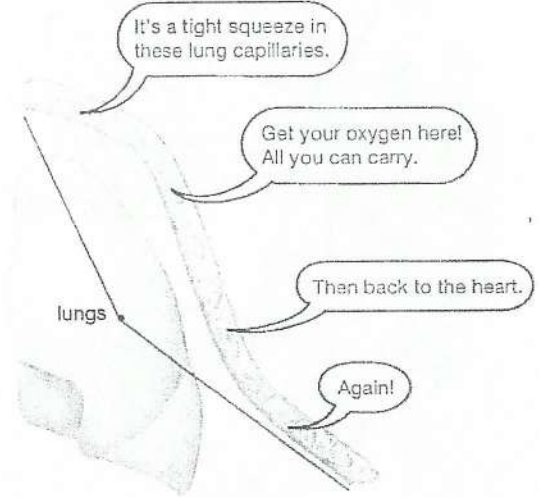
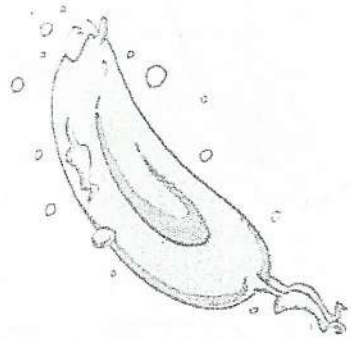
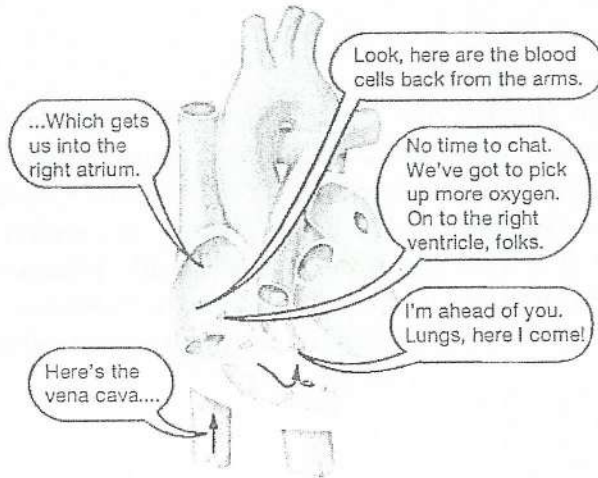
Blood pressure's lower. Those valves help us move along.

Lots of carbon dioxide in the plasma.

Now we're climbing a vein in the leg.

We gave our oxygen to some muscle cells.

Journey of a Red Blood Cell (continued)



Goal • Use this activity to review your understanding of the food you eat and how it can affect your health.

Think About It

- You can think of your body as a complex machine that functions smoothly when all its parts are in good working order. To keep your body in top form, you must supply it with the proper nutrients. Your body needs these nutrients to ensure growth and repair, and the maintenance of a stable internal environment. This means that eating a balanced healthy diet is a good start to having a healthy body.

What to Do

- Refer to pages 158–159 of *SCIENCEFOCUS™ 8* to help you complete this activity.

1. What is a nutrient?

2. Complete the following table.

| Nutrient | Function in body | Food source |
|---------------|------------------|-------------|
| carbohydrates | | |
| fats | | |
| proteins | | |

3. What do you think is the ideal food for a marathon runner before a race?

4. Besides carbohydrates, fats, and proteins, what are three other substances that are needed to have a healthy body?

5. Why do you think eating a balanced diet is important for good health?

Goal • Assess your understanding of terms and concepts in Topics 6-7.

What to Do

Carefully read the instructions before answering each set of questions.

Fill in the Blanks

Complete each sentence with the correct term.

1. The _____ system helps to regulate the blood and remove fluid wastes.
2. The _____ system breaks food into molecules that can be used by the rest of the body.
3. The _____ system exchanges oxygen and carbon dioxide.
4. The _____ system transports food, gases, and water throughout the body.

Graphic Organizers

Answer the following questions using graphic organizers.

5. Use a chart or another type of graphic organizer to show the relationship between the systems and organs/structures listed below.
 - respiratory system
 - digestive system
 - circulatory system
 - heart
 - stomach
 - artery
 - lungs
 - salivary glands
 - alveoli
 - small intestine
 - diaphragm
 - liver
 - pancreas
 - vein
 - gall bladder

(continued)

6. Draw a flow chart to show how strenuous exercise affects the circulatory system. Include at least 4 parts in your chart.

Short Answer

Answer the following questions in the space provided.

7. The lungs do not have any muscle tissue, yet they can expand and contract to allow air to enter and leave. Using a diagram, explain how this is possible.

8. (a) What structures in the lungs help to increase the absorption of oxygen?

(b) What structures in the small intestine help to increase the absorption of food?

(c) How are the structures in (a) and (b) similar?

Long Answer

Answer the following question in complete sentences.

9. (a) How do smoking and pollutants affect the ability of the respiratory system to absorb oxygen?

(b) What effect does nicotine have on the circulatory system?

(continued)

Graphing

10. The data in the chart summarizes the results of an experiment. Construct a bar graph to show this data in another way.

Effect of Exercise on Heart Rate

| Pulse Taken | Heart Rate | |
|----------------------|------------|---------------|
| | Individual | Class Average |
| At rest | 73 | 72 |
| After exercise | 110 | 112 |
| 1 min after exercise | 94 | 90 |
| 5 min after exercise | 76 | 75 |

11. Answer the following questions.
- According to the graph, what is the effect of exercise on heart rate?
 - In the experiment that produced this data, what was the responding variable?
 - What 2 variables needed to be controlled in this experiment?