Review and Assessment

Go Online PHSchool.com
For: Self-Assessment
Visit: PHSchool.com
Web Code: cva-1040

Target Reading Skill

Create Outlines To help review the structure and replication of DNA, fill in details under **A** and **B** in the partially completed outline at right.

I. Structure and Replication of DNA
A. Structure of DNA

B. Replication of DNA

Reviewing Key Terms

Choose the letter of the best answer.

1. The organelle in which photosynthesis takes place is the
   a. mitochondrion.
   b. chloroplast.
   c. chlorophyll.
   d. nucleus.
2. What process produces carbon dioxide?
   a. photosynthesis
   b. replication
   c. mutation
   d. respiration
3. The process in which a cell makes an exact copy of its DNA is called
   a. fermentation.
   b. respiration.
   c. replication.
   d. reproduction.
4. The stage of the cell cycle when a spindle forms is called
   a. interphase. **b.** prophase.
   c. metaphase. **d.** anaphase.
5. Which of the following is a result of differentiation?
   a. An organism grows larger.
   b. Cells in an embryo increase in number.
   c. Cells in an embryo become different from one another.
   d. An organism reproduces.

Complete the following sentences so that your answers clearly explain the key terms.

6. Chlorophyll is a type of **pigment,** which is _____ .
7. A lion is a **heterotroph,** a type of organism that _____ .
8. Organisms that live in the mud of swamps obtain their energy through **fermentation,** which is _____ .
9. **Cytokinesis** is the stage of the cell cycle in which _____ .
10. Both red blood cells and white blood cells can be produced in the body by **stem cells** because _____ .

Review and Assessment

Target Reading Skill

Create Outlines Check students' outlines for accuracy.

Reviewing Key Terms

1. b **2.** d **3.** c **4.** b **5.** c
6. found in chloroplasts, captures light energy, and uses the captured light energy to power the second stage of photosynthesis
7. obtains food by eating other organisms
8. an energy-releasing process that does not require oxygen
9. the cell divides to form two cells
10. stem cells can respond to certain needs of the body by becoming specialized cells

Writing in Science

E-LA: Writing 7.2.0

Writing Mode Explanation

Scoring Rubric

4 Includes complete and accurate information with many details; writing is clear and organized
3 Includes all criteria but fewer details
2 Includes all criteria but writing is disorganized
1 Includes inaccurate or incomplete information

Video Assessment

Cell Processes and Energy

Show the Video Assessment to review chapter content and as a prompt for the writing assignment.

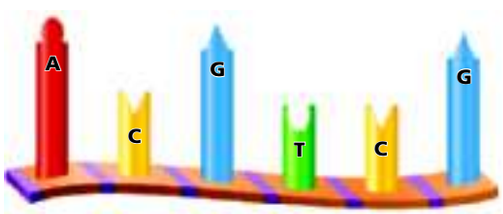
Review and Assessment

Checking Concepts

11. Briefly explain what happens to energy from the sun during photosynthesis.
12. Why do organisms need to carry out the process of respiration?
13. How are respiration and fermentation similar? How are these processes different?
14. Explain why cell division is a vital process for organisms.
15. Describe what happens during interphase.
16. How do the events in the cell cycle ensure that the genetic information in the daughter cells will be identical to that of the parent cell?
17. How are stem cells different from other cells in an adult animal?

Thinking Critically

18. **Predicting** Suppose a volcano threw so much ash into the air that it blocked most of the sunlight that usually strikes Earth. How might this affect the ability of animals to obtain the energy they need to live?
19. **Comparing and Contrasting** Explain the relationship between the processes of breathing and cellular respiration.
20. **Relating Cause and Effect** Do plant cells need to carry out respiration? Explain.
21. **Inferring** The diagram below shows part of one strand of a DNA molecule. What would the bases on the other strand be?



22. **Making Generalizations** Why is cell differentiation a necessary process in a developing multicellular organism?

Applying Skills

Use the table below to answer Questions 23–26.

Percentages of Nitrogen Bases in the DNA of Various Organisms

Nitrogen Base	Human	Wheat	*E. coli* Bacterium
Adenine	30%	27%	24%
Guanine	20%	23%	26%
Thymine	30%	27%	24%
Cytosine	20%	23%	26%

23. **Graphing** For each organism, draw a bar graph to show the percentages of each nitrogen base in its DNA.
24. **Interpreting Data** What is the relationship between the amounts of adenine and thymine in the DNA of each organism? What is the relationship between the amounts of guanine and cytosine?
25. **Inferring** Based on your answer to Question 24, what can you infer about the structure of DNA in these three organisms?
26. **Applying Concepts** Suppose cytosine made up 28% of the nitrogen bases in an organism. What percentage of the organism's nitrogen bases should be thymine? Explain.

Standards Investigation

Performance Assessment Bring in your plants, recorded observations, and graphs to share with the class. Be prepared to describe your experimental plan and explain your results. How well did you follow your experimental plan? What did you learn about photosynthesis and light from the experiment you performed?

Checking Concepts

11. During photosynthesis, energy from sunlight is changed into chemical energy, which is used to convert carbon dioxide and water into oxygen and sugars.

12. Organisms need to carry out respiration to provide energy for cell processes.

13. Both processes release energy that cells can use. Respiration requires oxygen. Fermentation does not.

14. Organisms grow by producing more cells through cell division.

15. During interphase, the cell grows, DNA is replicated, and the cell prepares to divide.

16. During interphase, exact copies of the DNA are made. During mitosis, the DNA and cell organelles are divided equally between the daughter cells.

17. Most body cells are differentiated and cannot produce new kinds of cells. Stem cells are able to differentiate and form new kinds of cells.

Thinking Critically

18. The lack of sun would prevent plants from carrying out photosynthesis to make food. Plants would die out, and the animals and other organisms that get their energy from plants would die out as well.

19. Breathing brings oxygen into the body for respiration. Cellular respiration uses the oxygen to break down food and provide energy for the body's needs.

20. Yes, plants need to carry out respiration to get the energy they need for their cell processes. Photosynthesis provides sugars, which are used in respiration to generate energy.

21. The bases on the other strand would be TGCAGC.

22. Cell differentiation is necessary for multicellular organisms to develop specialized structures and cells that can carry out different functions.

Applying Skills

23. Graphs should consist of 12 bars. Bars may be grouped by organism (3 groups of 4 bars) or by nitrogen base (4 groups of 3 bars). The vertical axis should have a scale from 0 to at least 30%.

24. The percents of adenine and thymine are equal. The percents of guanine and cytosine also are equal.

25. Sample: In all of the organisms, adenine is paired with thymine and guanine is paired with cytosine.

26. The percentage of cytosine must equal the percentage of guanine, so together, they equal 56%. The percentages of all four must add up to 100%. The percentages of thymine and adenine must be half of the remaining bases, or 44%. Therefore, the percentage of nitrogen bases that are thymine would be 22%.

CALIFORNIA Standards Practice

Success Tracker Online at PHSchool.com

Choose the letter of the best answer.

1. Which of the following statements is true?
- **A** Plants cannot respire because they have no mitochondria.
- **B** Photosynthesis produces carbon dioxide.
- **C** Animals cannot photosynthesize.
- **D** Only plants photosynthesize and only animals respire. S 7.1.d

2. Which of the following nitrogen base pairs can be found in DNA?
- **A** A-G
- **B** T-C
- **C** G-T
- **D** A-T

S 7.2.e

3. Which stage of mitosis is represented by the following cell?

- **A** interphase
- **B** anaphase
- **C** telophase
- **D** metaphase

S 7.1.e

4. Which of the following statements about differentiated cells is false?
- **A** They look different but have the same functions.
- **B** They look different and have different functions.
- **C** They become grouped with similar cells, forming tissues.
- **D** They make up the tissues and organs of multicellular organisms. S 7.1.f

5. Which statement best describes chromosomes?
- **A** They carry out respiration.
- **B** They consist mostly of the pigment chlorophyll.
- **C** They consist of tightly coiled strands of DNA and proteins.
- **D** Their structure is only visible during interphase. S 7.2.e

Use the table below to answer Questions 6 and 7.

Effect of Temperature on Length of Onion Cell Cycle

Temperature (°C)	Length of Cell Cycle (hours)
10	54.6
15	29.8
20	18.8
25	13.3

6. A scientist performed an experiment to determine the effect of temperature on the length of the cell cycle. On the basis of the data in the table above, how long would the cell cycle last at a temperature of 5°C?
- **A** less than 13.3 hours
- **B** more than 54.6 hours
- **C** between 29.8 and 54.6 hours
- **D** about 20 hours

S 7.1.e

7. The data in the table above show that
- **A** cells divide faster when the temperature is decreased.
- **B** cells divide faster when the temperature is increased.
- **C** the length of the cell cycle is not affected by temperature.
- **D** the length of the cell cycle is inherited.

S 7.1.e

Apply the BIG Idea

8. Compare and contrast the raw materials and products of photosynthesis with those of respiration. Then explain how the two processes are connected. S 7.1.d

Success Tracker™ Online at PHSchool.com

Teachers can monitor student progress and supply remediation when necessary.

Standards Practice

1. C; S 7.1.d
2. D; S 7.2.e
3. D; S 7.1.e
4. A; S 7.1.f
5. C; S 7.2.e
6. B; S 7.1.e
7. B; S 7.1.e

Apply the BIG Idea

8. Sample: The raw materials of photosynthesis are water and carbon dioxide. The product are sugars and oxygen. The raw materials of respiration are sugars and oxygen. The products of respiration are carbon dioxide and water. They are opposite processes. S 7.1.d

Lab zone Standards Investigation S 7.1.d

Performance Assessment Advise students to describe how they varied lighting conditions and controlled other variables, as well as how they assessed plant health and growth. One learning outcome is that plants cannot carry out normal photosynthesis without adequate light. Students may not have varied the lighting conditions enough to affect plant growth. In another study, students might vary the color of light plants receive.

Teaching Resources

Laboratory Manual TE

- Standards Investigation Scoring Rubric

The Standards Investigation Scoring Rubric will help you evaluate students' work. If you shared the rubric in advance, students will know what is expected of them.