Name: _____ Date: _____

Unit 5
Unit Test A

Unit Test: Cells: Stability and Change

Read each question. Circle the letter of the correct answer.

1. A stem cell in an animal divides by mitosis. Which statement is true about the two daughter cells?

A. They each have identical functions.

B. They each have the same DNA sequences.

C. They are the same size and shape as their parent cell.

D. They each have half as many chromosomes as their parent cell.

2. Which hypothesis about cells was later found to be wrong by scientists?

A. The cell is the most basic unit of life.

B. All organisms are made of cells and cell products.

C. Cells are formed spontaneously by free-cell formation.

D. Plant cells and animal cells share structural similarities.

3. How did the invention of the light microscope lead to the development and refinement of cell theory over time?

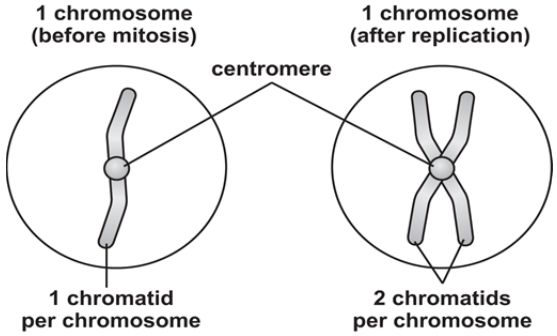
A. Cells could now be seen in very low light so that studies of reproduction could take place at night.

B. Light microscopes allowed for the visualization of internal cell parts at magnifications over 1,000 times.

C. As microscopes became more powerful, scientists could see additional structures within the cell.

D. Scientists kept what they saw through the lens of the light microscope to themselves to be sure they got all the credit for the discovery.

4. The model shows what happens to chromosomes during a certain part of the cell cycle.



Which of these is a reason that the chromosomes in the cell have two chromatids?

A. Each chromatid contains unique genetic information.

B. It allows the cell to divide into genetically identical daughter cells.

C. A chromosome requires two chromatids to initiate protein synthesis.

D. It allows genetic information to cross over between sister chromatids during mitosis, increasing genetic diversity.

5. A person cuts their finger. How does the process of mitosis help to repair the wound?

A. Mitosis forms a clot to prevent blood from flowing.

B. Mitosis allows air to enter the skin to encourage healing.

C. Mitosis prevents bacteria from entering the site of injury.

D. Mitosis forms new cells in the area where the old ones were damaged.

6. A researcher is studying the rates of mitosis of different cell types. Which of these cell types would most likely have the highest rate of mitosis?

A. a nerve cell in the brain

B. a muscle cell in the heart

C. a cell in the lens of the eye

D. a cell in the lining of the intestine

7. After fertilization, a single cell divides successfully to form a multicellular structure. What happens next in order for this structure to develop tissues and organs to meet the needs of the organism?

A. The cells undergo differentiation into particular body parts.

B. Cells start to die off naturally to form the needed body parts.

C. More cells from other fertilized embryos are added to make the new body parts.

D. Viruses contained within the cells alter the DNA to form the required body parts.

8. What factor is most important in the cell differentiation that occurs during the metamorphosis of a tadpole into a frog or a caterpillar into a butterfly?

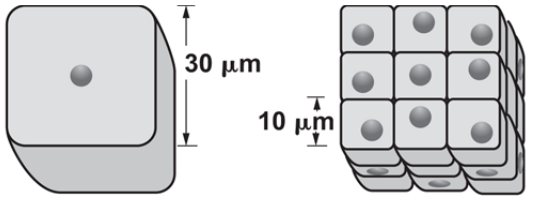
A. the expression of different genes at different times

B. the variation in temperature at a given time of year

C. the frequency with which females are able to reproduce

D. the location of where the eggs are deposited

9. Which statement best explains why a group of cells functions better than one large cell?



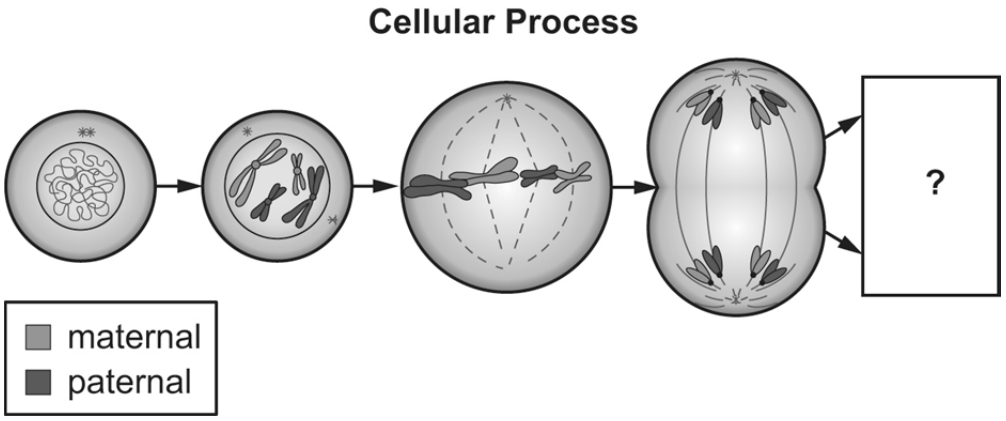
A. The increased cell size causes the organelles inside to replicate at a slower rate.

B. The farther the distance from the nucleus to the cell membrane, the easier it is for genetic abnormalities to occur.

C. As the cell gets larger, the distance from the nucleus to the membrane increases, thereby reducing its ability to function.

D. The increased distance between the cell membrane and the organelles causes an overload of protein synthesis, making the cell toxic.

10. The model shows a cellular process.



What will be the end result of the process shown in the model?

A. Two identical daughter cells will be produced.

B. Crossing over will result in new genetic material.

C. Chromatids will have just moved toward opposite poles.

D. One much larger cell will be produced through nuclear fusion.

Read each question. Follow the instructions to answer the questions.

11. A scientist is comparing cancerous cells with noncancerous cells. Write one letter in each blank to correctly complete the paragraph.

The scientist should notice that the cancer cells have a _____ rate of cell division and have a _____ response to inhibiting factors. Cell groups that are cancerous should have a _____ percent of cells in interphase than noncancerous cells.

A. lower
B. higher

12. A student created the following models to show the chromosomes during the phases of mitosis. Write the letters of the pictures in the box next to the correct description.

Chromatids separate.	
Chromosomes begin to uncoil.	
Spindle fibers attach to centromere.	

13. Which of these are elements of the cell theory? Select all that apply.

A. All cells come from other cells.

B. Cells are the basic units of life.

C. All cells contain genetic material.

D. All living things are made of cells.

E. All cells are capable of reproducing.

F. The number of cells in an organism remains constant.

14. How does the process of mitosis support the growth and repair of organisms? Circle the letters of all the correct statements.

A. As new cells are formed they replace those that have been damaged.

B. Chromosome separation results in the formation of new cells.

C. The separation of sister chromatids allows for cells to heal themselves.

D. The division of parent cells into daughter cells increases the overall cell number of the organism.

E. The alignment of chromosomes along the cell equator fixes genetic abnormalities in the organism.

15. Write one letter in each blank to correctly complete the sentences.

During differentiation, **1.** _____ divide and become different types of **2.** _____ that carry out functions within the organism. These cells will differ from their parent cells by **3.** _____.

1.	**2.**	**3.**
A. gametes	**E.** zygotes	**H.** expressing different genes
B. stem cells	**F.** stem cells	**I.** containing different DNA sequences
C. daughter cells	**G.** specialized cells	
D. specialized cells		

16. A cell with 4 chromosomes underwent mitosis, but an error prevented the cell from undergoing cytokinesis. What would be the most likely result of this? Write one letter in each blank to correctly complete the paragraph.

The result would be _____ cell(s). Each cell would have _____ nucleus/nuclei. Each nucleus would have _____ chromosomes in it.

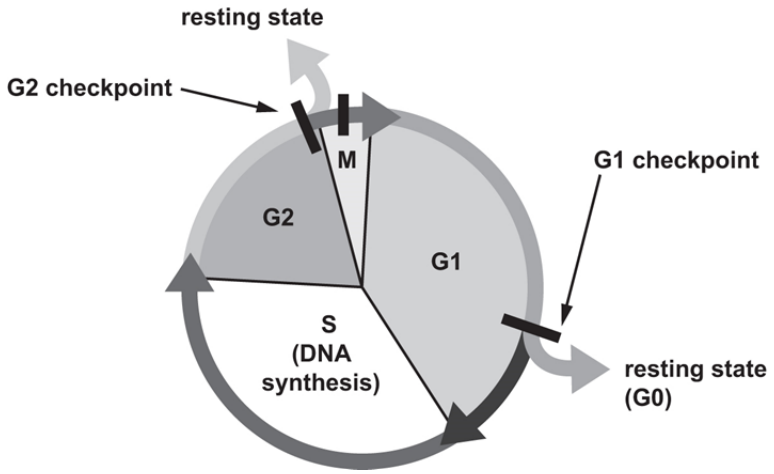
A. 1
B. 2
C. 4
D. 8

17. Cell division is influenced by both internal and external events. Write one X in the correct box for each cell event to show whether it is an internal or external influence.

Event	External	Internal
A. Cyclins activate enzymes to move the cell cycle along.		
B. Contact with other cells causes a cell to stop dividing.		
C. Kinases control phosphate addition, which helps regulate the cell cycle.		
D. Radiation causes mutation, which leads cells to divide in an unregulated manner.		

Read each statement. Write your answer on the lines.

18. The model shows the cell cycle and the checkpoints that occur during the cell cycle.



There are several factors that regulate these processes of interphase and the cell cycle.

Describe one type of factors that controls cell division.

Describe how damage to one of these factors can affect the cell division process.

19. Mitosis and binary fission are two methods different organisms use to replicate their cells.

Explain the main differences between these two processes.

Identify a type of mitotic reproduction found in multicellular organisms.

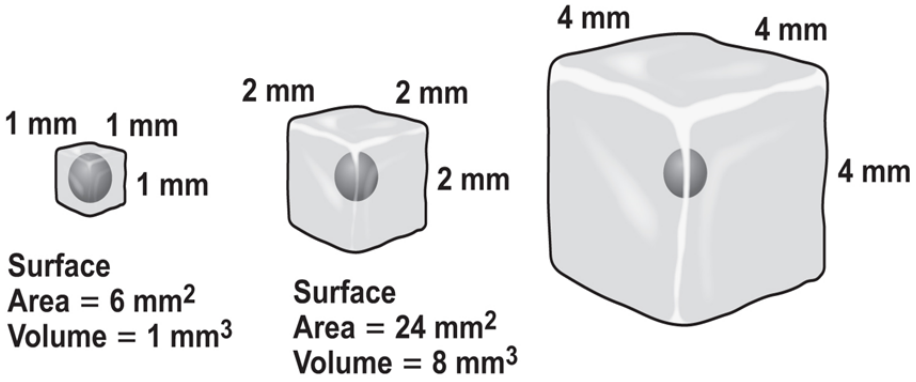
20. A student is working on developing a model of the circulatory system.

Explain how a stem cell differs from a specialized cell such as a neuron or epithelial cell.

Explain why stem cells are important in the development of multicellular organisms.

Explain why stem cells would be modeled by people who research ways to treat medical conditions.

21. The model shows the relationship between surface area and volume in cells.



Describe how the surface Area To Volume ratio affects the health of a cell.

Explain why cells function better as smaller units.

Directions: Read the passage, then answer the questions that follow.

Growth and Development

A scientist is studying the processes of growth and development in multicellular organisms. She is also comparing these processes with similar processes in prokaryotes.

22. The scientist studies two cells from a multicellular organism. One cell is from the stomach of the organism, while the other cell is from the skin. Write one letter in each blank to correctly complete the paragraph.

The cells' nuclei would contain _____ genetic information. The cells would express _____ genes. The cells would most likely have _____ structures and functions. The process by which the cells would divide would be _____.

A. different
B. the same

23. The scientist is going to make a model of a eukaryotic chromosome to show its features as it goes through mitosis. Which of these correctly describe elements of the model that the scientist should include? Circle the letters of all the correct statements.

A. The model should be single stranded.

B. The model should contain a centromere that connects sister chromatids.

C. The model should contain proteins called histones that the DNA wraps around.

D. The model should contain regions called telomeres that code for cell cycle proteins.

24. The scientist compares the process of mitosis with the process of binary fission. Write the letter of each statement in the correct column. Some statements may be used more than once or not at all.

Mitosis	Binary fission

A. occurs in prokaryotic cells

B. involves circular chromosomes

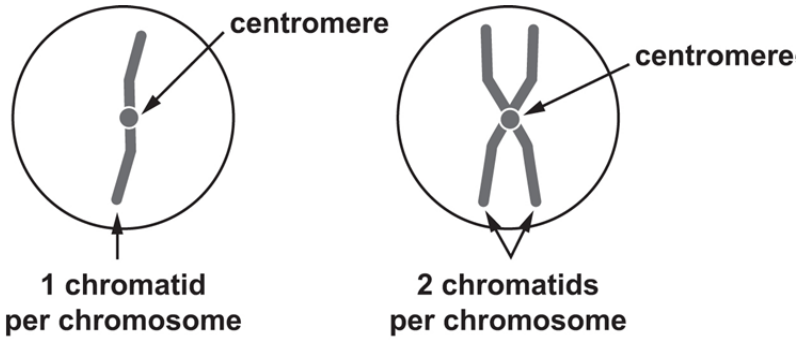
C. involves cytokinesis into daughter cells

D. involves DNA, which is contained in a nucleus

E. may involve differentiation into specialized cells

25. A scientist is studying processes that cause changes to genetic material during the cell cycle. The model shows what happens to this genetic material before and after interphase.

25.



Write your answer on the lines.

Compare the differences between the chromosome structures before and after interphase. Include in your comparison the process that causes the difference.

Predict what would happen if an error occurred during the process you identified and the cell then entered mitosis.