

UNIT TEST
Cells and Heredity

Name _____ Period _____ Date _____

UNIT CELLS
Cells Benchmark Review

Key Concepts

Choose the letter of the best answer. (5 points each)

1. An organism is unicellular. What can you conclude about this living thing?
 - a. It reproduces sexually.
 - b. Its DNA is in its nucleus.
 - c. Its cells do not form proteins.
 - d. It can undergo binary fission.
2. How are the cells of most multicellular organisms different from those of unicellular organisms?
 - a. Individual cells cannot exist on their own.
 - b. They do not divide.
 - c. They use less energy.
 - d. All have cell walls instead of cell membranes.
3. Water is important to a cell because
 - a. DNA and RNA are mostly water
 - b. the cell membrane is made of lipids
 - c. most chemical reactions inside a cell take place in water
 - d. carbohydrates are not soluble in water
4. How is the energy stored in glucose released?
 - a. by osmosis
 - b. during photosynthesis
 - c. by cellular respiration
 - d. by active transport
5. What is a domain?

6. List the three domains and give an example of what kinds of organisms fit into each.

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7. Which of these is NOT a part of a cell cycle?
 - a. interphase
 - b. cancer
 - c. cytokinesis
 - d. mitosis
8. Any offspring produced by asexual reproduction has
 - a. more than one cell
 - b. the ability to reproduce sexually
 - c. the same genetic material as the parent
 - d. half of each parent's genetic material
9. In a certain plant, red is the dominant allele and white is the recessive allele. What is the genotype of the white-flowered plants?
 - a. RR
 - b. rr
 - c. rR
 - d. Rr

10. List 4 characteristics of all living organisms.

11. List the 3 parts of cell theory.

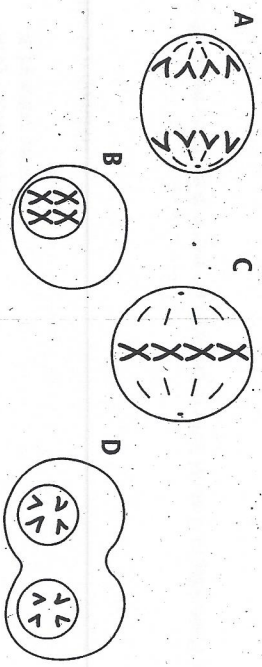
12. Complete the table about the 4 protists that we studied extensively.

	Draw it	How does it eat?	How does it move?	Special features
Volvox				
Amoeba				
Euglena				
Paramecium				

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Interpreting Visuals

Using the diagram, answer the following questions. (5 points each)



13. Identify the stages of mitosis and arrange them in the order in which they occur.

14. Describe what is happening to genetic material in each stage.

15. How many chromatids are present in stage C?

16. Next to the four diagrams above, draw a plant cell that is undergoing the next stage of the cell cycle.

Extended Response

Answer the following questions on the back of this paper or on a separate sheet of paper. (6 points each)

17. **Explaining** Identify and explain three ways multicellular organisms use cell division.

18. **Describing** Describe three forms of asexual reproduction and give an example of an organism that reproduces using each method. In what important way is asexual reproduction different from sexual reproduction?

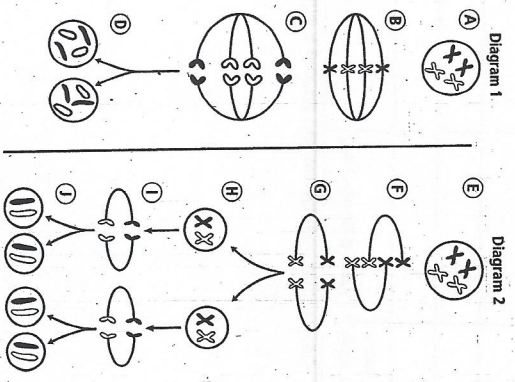
CHAPTER 3
Cell Division

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Interpreting Visuals

Using the diagrams, answer the following questions. (5 points each)



19. Which diagram shows mitosis, and what are the products of this process?

20. Which diagram shows meiosis, and what are the products of this process?

21. How is stage C different from stage G?

22. How is the genetic material in stage D different from that in stage J?

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23. In order to function properly, every cell must have

- a. many central vacuoles
- b. a strong cell wall
- c. a complete copy of DNA
- d. one or more chloroplasts

24. In asexual reproduction,

- a. one parent produces an identical offspring
- b. two parents produce an identical offspring
- c. an egg cell combines with a sperm cell
- d. RNA is copied to produce an offspring

25. Suppose the tall (T) allele is dominant in a plant. What is the genotype of a short plant?

- a. TT
- b. tt
- c. Tt
- d. tT

26. What type of cells does meiosis produce?

27. What is fertilization?

28. Why is meiosis necessary to prepare cells for fertilization?

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CHAPTER 5
DNA and Modern Genetics

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UNIT CELLS AND HEREDITY

Key Concepts

Choose the letter of the best answer. (5 points each)

29. The smallest unit that can perform basic activities of life is

- a. an organ
- b. a tissue
- c. a cell
- d. an organism

30. Which of these organelles releases energy in all cells?

- a. chloroplasts
- b. mitochondria
- c. cell walls
- d. central vacuoles

31. Describe how and where (which organelle) photosynthesis takes place.

32. Describe the process in which cells convert nutrients (sugars and other materials) into energy in the mitochondria.

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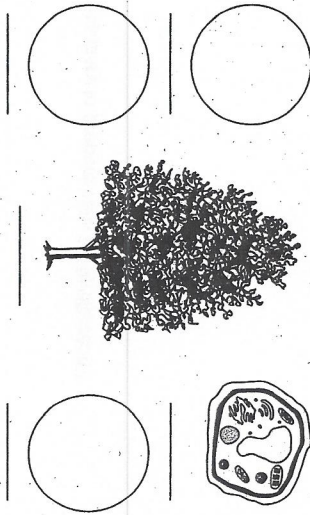
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Interpreting Visuals

Using the drawings, answer the following questions. (6 points each)



CHAPTER 1 The Cell

33. Number and label the five levels of organization in the illustration, including the three missing levels represented by circles. Describe how one level relates to the next.

34. A tree has different parts, such as leaves and roots, that have specific functions. What does that tell you about its cells?

35. Not all cells in a tree contain chloroplasts, but the cell shown here does. What does that suggest about where this cell is located?

Extended Response

Answer the following questions on the ~~back~~^{bottom} of this paper or on a separate sheet of paper. (6 points each)

36. **Describe** Pasteur conducted experiments that confirmed the cell theory. State the cell theory. Describe one of Pasteur's experiments and explain how it confirmed the cell theory. Identify the theory disproved by Pasteur's experiments and describe how the experiments disproved this theory.

37. **Evaluate** A scientist may have discovered a new species of Archaea. What type of microscope would help to show the inside of the organism? the outside? Would a light microscope be useful? Why or why not?

38. _____

When cell division is complete, how much cytoplasm and how many chromosomes will a daughter cell have compared to the parent cell?
a. about twice the cytoplasm and the same number of chromosomes
b. about half the cytoplasm and twice the number of chromosomes
c. about twice the cytoplasm and half the number of chromosomes
d. about half the cytoplasm and the same number of chromosomes

39. _____

A cell that has two nuclei and a cell plate beginning to develop across the middle of it is most likely
a. a plant cell in interphase
b. an animal cell in interphase
c. a plant cell in the process of cytokinesis
d. an animal cell in the process of cytokinesis

40. _____

A cutting taken from a plant grows into a new plant as the result of
a. budding
b. regeneration
c. binary fission
d. sexual reproduction

41. _____

Budding produces an organism that
a. has characteristics from both parents
b. always stays attached to the parent
c. is genetically identical to the parent
d. is independent of both parents

42. _____

One advantage of asexual reproduction is that many offspring
a. soon become part of a multicellular organism
b. spend time and energy looking for mates
c. are produced by two parent organisms
d. can be produced quickly by one organism

43. _____

A mutation will probably have no effect if it occurs
a. in noncoding DNA
b. during RNA transcription
c. during replication of DNA
d. in an organism's sex cells

44. _____

Does meiosis occur in all cells? Explain.

45. _____

Explain why meiosis is necessary.

46. _____

Contrast the number of chromosomes in the diploid and haploid cells.

CHAPTER 3 Cell Division

CHAPTER 1 THE CELL

Key Concepts

Choose the letter of the best answer. (4 points each)

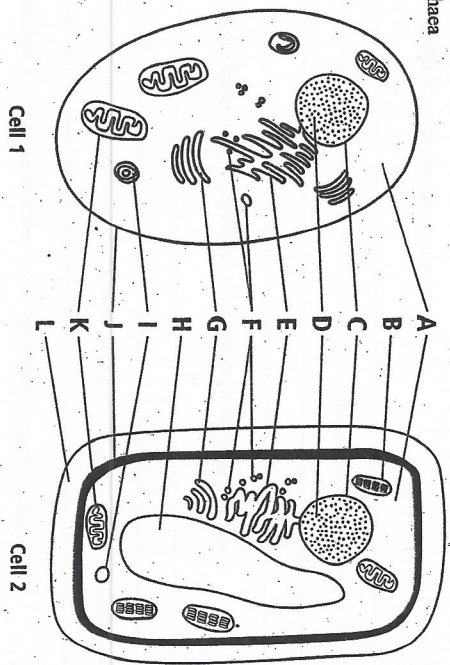
47. — A cell is
 a. the most complicated level of organization of multicellular organisms
 b. the most basic unit of only single-celled organisms
 c. the most basic unit of all organisms
 d. the most complicated of all scientific models
48. — The invention of the microscope allowed
 a. life to be discovered
 b. eukaryotes to be seen
 c. cells to be discovered
 d. multicellular organisms to be seen
49. — The TEM uses _____ to produce images.
 a. light
 b. electrons
 c. ultrasound
 d. protons
50. — Where is genetic information found in a prokaryote?
 a. cytoplasm
 b. endoplasmic reticulum
 c. Golgi apparatus
 d. chloroplast
51. — Any part of a cell that is enclosed by its own membrane is called
 a. DNA
 b. a cell wall
 c. a tissue
 d. an organelle
52. — The cell organelles that release stored energy from sugars are called
 a. mitochondria
 b. chloroplasts
 c. ribosomes
 d. Golgi apparatuses
53. — The cell organelles that finish processing cell products are called
 a. mitochondria
 b. cell walls
 c. Golgi apparatuses
 d. ribosomes

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CHAPTER 1 The Cell

40.

- Which of the following statements is true?
 a. Only bacteria are prokaryotes.
 b. Organisms in the domains Archaea and Bacteria are prokaryotes.
 c. All bacteria are eukaryotes.
 d. Organisms in the domains Archaea and Bacteria are eukaryotes.
- Most organisms that have many different types of specialized cells are in the domain
 a. Eukarya
 b. Prokarya
 c. Bacteria
 d. Archaea



54. — Identify each type of cell and the domain it belongs to.
57. — Identify the label and name of the structures found in Cell 2 but not in Cell 1.
58. — Identify the label and name of the structure that allows both cells to release energy from sugar.
59. — Identify the labels that point to the endoplasmic reticulum and Golgi apparatus. How are the functions of these organelles related?
60. — Identify the structure and function of structures J and L.

Key Concepts

Choose the letter of the best answer: (5 points each)

- 61. _____ Cell division always results in the formation of
 - a. tissues
 - b. new organisms
 - c. new cells
 - d. specialized cells
- 62. _____ Cells in an adult human
 - a. stop dividing with age
 - b. divide so that the body can grow and repair itself
 - c. bind to replace damaged and worn out cells
 - d. get larger as the body ages
- 63. _____ During most of the cell cycle, DNA exists as
 - a. threadlike chromosomes
 - b. condensed chromosomes
 - c. doubled centrioles
 - d. doubled chromatids
- 64. _____ When does the cell cycle end?
 - a. when DNA replicates
 - b. when chromosomes pull to opposite ends of a cell
 - c. when chromosomes line up in the center of a cell
 - d. when mitosis and cytokinesis are over
- 65. _____ During the phase in the cell cycle in which a cell carries out normal functions, the cell also
 - a. divides its chromosomes
 - b. condenses its chromosomes
 - c. begins to replicate its DNA
 - d. undergoes cytokinesis

Reading in the Sciences

Using the passage, answer the following questions. (6 points each)

Plant tissue culture is a technique that can be used to produce many plants from a single plant. For example, tissue culture can be used to produce hundreds of new plants from one African violet leaf.

The first step in culturing African violet plants is cleaning the leaf. This cleaning process removes bacteria, fungi, insects, and any other organisms that might be on the leaf. Then the leaf is cut into tiny pieces, called explants. The explants are placed on a medium. This medium contains food and other substances that help new shoots, or the stem and leaf part of the plant, to develop.

After six to eight weeks, many tiny new shoots will have formed on the original leaf. The shoots are cut from the explant. Then they are placed on a new medium. This new medium contains a different mixture of food and other substances. This mixture of substances help roots to grow. Once roots have formed, the new plants are complete. They have everything they need to exist as individual plants. At this point, they can be planted in soil.

66. _____ What type of reproduction occurs during plant tissue culture? Explain.

67. _____ Do all the plants produced from one leaf have the same DNA? Explain.

68. _____ Why might scientists use plant tissue culture?

Key Concepts

If the statement is true, write "true" on the line. If it is false, change the underlined word or words to make it true.

69. Mating and raising cows that produce a large amount of milk is an example of selective breeding.

70. Genetic engineering results in random mutations being introduced into an organism.

71. A selectively bred plant or animal can have DNA from another species.

72. A DNA fingerprint is all the genetic material found in a complete set of chromosomes of an organism.

73. A clone has exactly the same genetic composition as its parent.

74. DNA profiling has allowed large quantities of certain proteins and drugs to be made easily and quickly.

Extended Response

Answer the following question on the back of this paper or on a separate sheet of paper.

75. A farmer is given seeds for a genetically modified corn plant. Its leaves produce a chemical that works as a pesticide for certain insect pests. The pests are kept under control for the first growing season. However, the next season, a large number of insect pests are again attacking the corn. Explain what has probably happened and discuss the situation in terms of the benefits and risks of genetic engineering.

how