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Cellular Basis of Heredity

Due Date:

**Guide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Review \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Critical Thinking \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Concept Map \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Crossword \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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Cellular Basis of Heredity Guide

Define the following terms.

Chromosomes

Haploid

Diploid

Homologous chromosomes

Sexual reproduction

Zygote

Meiosis

Draw and define each term.

Interphase

Prophase I

Metaphase I

Anaphase I

Telophase I

Prophase II

Metaphase II

Anaphase II

Telophase II

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Cellular Basis of Heredity Review

|  |  |  |
| --- | --- | --- |
| anaphase | interphase | prophase |
| chromosomes | meiosis | telophase |
| diploid | metaphase | tetrad |
| haploid | multiple alleles | zygote |
| homologous chromosomes |  |  |
|  |  |  |

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are shortened and thickened strands of DNA.
2. Two sets of homologous chromosomes that form during prophase are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. The phase of meiosis in which DNA shortens and thickens into chromosomes is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
4. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the result of two haploid gametes coming together.
5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the process of cell division in which the number of chromosomes is reduced by half to produce gametes.
6. A gene with more than two alleles is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ means half the number of chromosomes.
8. Matched pairs of chromosomes are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. One from mom and one from dad.
9. The phase of meiosis where two or four new cells are formed is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
10. The phase of meiosis where the chromosomes line up at the equator is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
11. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ happens when tetrads separate and move toward the poles of the cell.
12. A complete set of chromosomes is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
13. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the resting phase of the cell.

Draw and describe the phases of meiosis.

1. Interphase
2. Prophase I
3. Metaphase I
4. Anaphase I
5. Telophase I
6. Prophase II
7. Metaphase II
8. Anaphase II
9. Telophase II
10. \_\_\_\_\_Chromosomes line up at the equator. a. interphase
11. \_\_\_\_\_Chromosomes separate and move toward the poles. b. metaphase
12. \_\_\_\_\_DNA shortens and thickens into chromosomes. c. anaphase
13. \_\_\_\_\_Two new cells are formed. d. telophase II
14. \_\_\_\_\_Four new cells are formed. e. prophase
15. \_\_\_\_\_Resting phase, chromosomes are unraveled. f. telophase I

Determine whether the statement is true (T) or false (F).

1. \_\_\_\_\_Humans have 46 pairs of chromosomes.
2. \_\_\_\_\_The first part of meiosis is replication.
3. \_\_\_\_\_When homologous pairs connect they form tetrads.
4. \_\_\_\_\_Chromosomes separate during metaphase.
5. \_\_\_\_\_One set of the homologous pair comes from mom, the other comes from dad.
6. \_\_\_\_\_During interphase the DNA is shortened and thickened into chromosomes.
7. ­­\_\_\_\_\_Meiosis undergoes two cell divisions to make four daughter cells.
8. Process of cell division in which the number of chromosomes is reduced by half. Four daughter cells are produced.
	1. Haploid
	2. Meiosis
	3. Mitosis
	4. Diploid
9. Phase in which chromosomes line up at the equator.
	1. Anaphase
	2. Metaphase
	3. Telophase
	4. Prophase
10. A cell with a complete set of chromosomes.
	1. Haploid
	2. Diploid
	3. Triploid
	4. Comploid
11. Phase in which DNA shortens and thickens into chromosomes and form tetrads. This is the first phase of meiosis.
	1. Anaphase
	2. Metaphase
	3. Telophase
	4. Prophase
12. A cell with half the total number of chromosomes. They are reproductive cells.
	1. Diploid
	2. Haploid
	3. Monoploid
	4. Triploid
13. Matched pairs of chromosomes. One comes from the mother and the other comes from the father.
	1. Homozygous
	2. Homologous
	3. Homogeneous
	4. Homosomes
14. Process of making an exact copy of DNA. It is the first thing that happens during Prophase I.
	1. Meiosis
	2. Replication
	3. Transcription
	4. Translation
15. The resting phase of a cell. DNA is uncoiled.
	1. Prophase
	2. Metaphase
	3. Interphase
	4. Anaphase
16. Short, thick strands of DNA. Humans get 23 from each parent.
	1. RNA
	2. Ribosome
	3. Chromosome
	4. Amino acid
17. During this phase tetrads are pulled apart and move toward the poles.
	1. Prophase
	2. Telophase
	3. Anaphase
	4. Metaphase
18. The result of two haploid gametes coming together.
	1. Diploid
	2. Zygote
	3. Homozygous
	4. Replication
19. The phase in which new cells are formed.
	1. Anaphase
	2. Telophase
	3. Interphase
	4. Metaphase
20. Why do cells replicate?
	1. To make proteins
	2. To make new cells
	3. To pass traits on to the next generation
	4. To make chromosomes
21. Why do cells undergo meiosis?
	1. Growth and repair
	2. To make reproductive cells
	3. To make proteins
	4. To make chromosomes
22. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the process of cell division in which the number of chromosomes is reduced by half.
23. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the phase of meiosis characterized by chromosomes lining up at the equator of the cell.
24. A cell with a complete set of chromosomes is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
25. The first phase of meiosis is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. DNA shortens and thickens into chromosomes.
26. A cell with half the number of chromosomes is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
27. Matched pairs of chromosomes are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, one from mom and one from dad.
28. The process of making an exact copy of DNA is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It is the first step of meiosis.
29. The resting phase of a cell when the chromosomes are uncoiled is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
30. Shortened and thickened strands of DNA are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
31. During \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ tetrads are pulled apart and move toward the poles.
32. The result of two haploid gametes coming together forms a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
33. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the phase in which new cells are formed.

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Cellular Basis of Heredity Critical Thinking

1. Why do cells replicate before meiosis?
2. What are homologous chromosomes?
3. How does meiosis explain the Principle of Segregation?
4. How does the Chromosome Theory explain the Principle of Segregation?
5. How does the Chromosome Theory explain the Principle of Independent Assortment?
6. What is the difference between haploid and diploid cells?
7. Describe what happens during prophase.
8. Describe what happens during interphase.
9. Describe what happens during anaphase.
10. Describe what happens during telophase.
11. Describe what happens during metaphase.
12. Why are there two phases in meiosis? (What would happen if it were only one phase?)
13. Why are homologous chromosomes like pairs of socks?

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Cellular Basis of Heredity Concept Map

Use the following terms to create a concept map: telophase, meiosis, resting, metaphase, interphase, chromosomes, 4 gametes, anaphase, equator, prophase, poles,

1. Identify the phase of meiosis.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



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1. Why do cells undergo meiosis?
2. What are homologous chromosomes?

**Cellular Basis of Heredity**



Across

8. resting phase

9. the cell divided into two smaller cells with half the number of chromosomes

11. chromosomes shorten and thicken

Down

1. strands of DNA

2. product of two haploid gametes combining

3. matched pairs of chromosomes, one from each parent

4. process of cell division in which the number of chromosomes is reduced by half

5. 2 sets of DNA

6. chromosome pairs are pulled apart

7. chromosomes line up at the equator

10. half the number of chromosomes

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| A | K | S | F | S | V | I | H | K | H | I | E | Q | E | E |
| N | P | Y | U | S | I | A | Q | Z | S | S | M | S | Y | S |
| A | J | R | C | O | P | S | D | B | A | G | W | Z | L | A |
| P | L | K | O | L | G | Z | O | H | Q | O | C | A | L | H |
| H | O | D | O | P | I | O | P | I | V | W | D | Q | C | P |
| A | W | I | E | T | H | A | L | J | E | L | P | H | H | R |
| S | D | X | O | U | T | A | C | O | C | M | L | T | N | E |
| E | Y | E | U | E | M | O | S | O | M | O | R | H | C | T |
| L | O | T | M | V | I | K | A | E | R | O | J | R | L | N |
| D | I | O | L | P | I | D | C | H | W | L | H | Q | J | I |
| V | B | G | N | Z | K | K | O | U | I | U | G | L | O | U |
| D | F | Y | X | T | O | K | P | M | J | G | J | E | F | X |
| W | S | Z | Z | Z | Y | Y | F | T | N | O | E | M | T | A |
| T | E | L | O | P | H | A | S | E | Y | Z | Y | Q | W | K |
| K | C | A | L | B | I | K | N | Y | O | E | F | G | T | Q |

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|  |
| ANAPHASE | CHROMOSOME | DIPLOID |
| HAPLOID | HOMOLOGOUS | INTERPHASE |
| MEIOSIS | METAPHASE | PROPHASE |
| TELOPHASE | ZYGOTE |  |

**Cellular Basis of Heredity**

