**Study Guide Unit 7: Mitosis & Meiosis (Ch. 6-7)**

**All statements are FALSE, please underline the incorrect portion of the statement and correct it below.**

 1. In most animals, not including humans, meiosis produces sperm and egg cells.

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 2. Asexual reproduction provides for genetic diversity, the raw material for evolution.

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 3. Human sperm and egg cells have 21 chromosomes.

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 4. Meiosis produces six nuclei that have different chromosome numbers from the parent cell.

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 5. In sexual reproduction, two parents each form diploid cells, which join to form offspring.

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 6. During cytokinesis in plant cells, the cell is pinched in half by a belt of protein threads.

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 7. The fusion of two diploid gametes produces a haploid zygote.

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 8. Cells spend most of their lifetime in cytokinesis.

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 9. Gametes are diploid so that when fertilization occurs, the resulting zygote will have the characteristic number of chromosomes for that species.

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 10. A male can produce sperm with only Y chromosomes.

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 11. A karyotype is a type of gene.

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 12. After mitosis and cytokinesis, each new cell has a half set of the parent cells’ chromosomes.

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 13. In asexual reproduction, two parents each pass copies of all of their chromosomes to their offspring.

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 14. Binary fission is a form of sexual reproduction in bacteria.

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 15. Spindle fibers don’t move chromosomes during cell division.

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 16. The function of the cell cycle is to produce daughter cells with only ½ the DNA as the original cell. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 17. If an intestinal cell of a grasshopper contained 12 chromosomes, its sperm would also contain 12.

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 18. An animal cell forms a cell plate during cytokinesis but plant cells pinch in half and pull apart.

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**Multiple Choice**

*Identify the letter of the choice that best completes the statement or answers the question.*

1. Sexual and asexual reproduction are alike in that
	1. they both involve two parents.
	2. they both require meiosis to complete the reproductive cycle.
	3. they can both occur in multicellular organisms.
	4. they both give rise to genetically distinct offspring.
2. Which statement *best* describes the primary function of DNA replication?
3. to ensure daughter cells have a complete copy of the DNA
4. to prevent mutations from occurring in cells
5. to provide genetic variation within specific organisms
6. to allow prokaryotic cells to undergo meiosis
7. Which process *most* contributes to genetic variation in a population?
8. crossing over during meiosis
9. chromosome replication during mitosis
10. cytokinesis during cellular division
11. duplication of chromosomes in asexual reproduction
12. Why is it advantageous for a bacteria to reproduce asexually?
13. genetic variation
14. rapid growth
15. both A and B
16. none of the above
17. What is the result of the fertilization of an egg?
18. It restores the diploid number of chromosomes.
19. It deletes polypeptide chains in the chromosomes.
20. It gives offspring more chromosomes that the parents.
21. It gives offspring fewer chromosomes that the parents.

\_\_\_\_ 24. The difference between Prophase and Prophase I is that

|  |  |
| --- | --- |
| a. | Cytokinesis occurs in Prophase but not in Prophase I |
| b. | The nuclear envelop reforms in Prophase I |
| c. | In Prophase I, crossing-over can occur |
| d. | Spindles move chromosomes to opposite poles in Prophase I |

\_\_\_\_ 25. The exchange of segments of DNA between the members of a pair of chromosomes

|  |  |
| --- | --- |
| a. | acts as a source of variations within a species. |
| b. | ensures that variations within a species never occur. |
| c. | always produces genetic disorders. |
| d. | is called trisomy. |

\_\_\_\_ 26. The difference between Telophase and Telophase II is that

|  |  |
| --- | --- |
| a. | In Telophase begins with haploid cells |
| b. | You end with four diploid cells after Telophase  |
| c. | Telophase II results in haploid cells |
| d. | Cytokinesis doesn’t occur in Telophase II |

\_\_\_\_ 27. The phase of mitosis that is characterized by the arrangement of all chromosomes along the equator of the cell is called

|  |  |  |  |
| --- | --- | --- | --- |
| a. | telophase. | c. | prophase. |
| b. | anaphase. | d. | metaphase. |

\_\_\_\_ 28. Which of the following does *not* provide new genetic combinations?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | random fertilization | c. | independent assortment |
| b. | cytokinesis | d. | crossing-over |
|  |  |  |  |

\_\_\_\_ 29. When crossing-over takes place, chromosomes

|  |  |
| --- | --- |
| a. | double in number. |
| b. | exchange corresponding segments of DNA. |
| c. | decrease in number. |
| d. | produce new genes. |

\_\_\_\_ 30. As a result of mitosis, each of the two new cells produced from the parent cell during cytokinesis (3.3.C.a)

|  |  |
| --- | --- |
| a. | receives a few chromosomes from the parent cell. |
| b. | receives exactly half the chromosomes from the parent cell. |
| c. | receives an exact copy of all the chromosomes present in the parent cell. |
| d. | donates a chromosome to the parent cell. |

**Matching**

**Use the choices below to fill in the best possible answer for questions 47-55**

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Interphase | f. | Telophase |
| b. | Prophase | g. | S |
| c. | G1 | h. | Anaphase |
| d. | Metaphase | i. | Cytokinesis |
| e. | G2 |

\_\_\_\_ 31. Chromosomes line up in the middle

\_\_\_\_ 32. The cell grows for the first time

\_\_\_\_ 33. The nuclear envelop reforms around the two new nuclei

\_\_\_\_ 34. DNA is copied (synthesized)

\_\_\_\_ 35. The cytoplasm pinches in half

\_\_\_\_ 36. The cell spends 90% of its life in the phase

\_\_\_\_ 37. Chromosomes get pulled to opposite sides of the cell by the spindle

\_\_\_\_ 38. The nuclear envelop opens and dissolves, the spindle is formed

\_\_\_\_ 39. The cell grows a second time and organelles are copied

**Use the choices below to fill in the best possible answer for questions 40-47**

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Chromosomes | e. | 23 |
| b. | XX | f. | Mitosis |
| c. | 46 | g. | Chromatid |
| d. | XY | h. | Meiosis |

\_\_\_\_ 40. A female’s sex chromosmes.

\_\_\_\_ 41. The number of chromosomes in humans.

\_\_\_\_ 42. Two exact copies of DNA that make up a chromosomes.

\_\_\_\_ 43. Human gametes contain this number of chromosomes.

\_\_\_\_ 44. A cell’s nucleus divides.

\_\_\_\_ 45. Haploid cells are produced.

\_\_\_\_ 46. These contain thousands of genes.

\_\_\_\_ 47. A male’s sex chromosomes.

**Short Answer**

 48. In humans, which person’s gametes determine the sex of the child? Why?

 49. Out of the total 46 chromosomes, how many of them are related to determining the sex of a child? \_\_\_\_\_\_\_\_\_ and how many have nothing to do with determining the sex (autosomes) \_\_\_\_\_\_\_\_?

 50. If an intestinal cell in a grasshopper contains 24 chromosomes, a grasshopper sperm cell would contain \_\_\_\_\_\_\_\_\_ chromosomes.

 51. The function of the cell cycle is to produce daughter cells that

 52. In a diploid cell containing 10 chromosomes, meiosis results in the formation of daughter

cells containing \_\_\_\_\_\_\_\_\_chromosomes

 53. A human zygote (fertilized egg), like most other human cells, contains 46 chromosomes. How many chromosomes does a zygote receive from the mother? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 54. What are some advantages of asexual reproduction?

 55. What are some population advantages of sexual reproduction?

**Problem**

 56. 

Please label each picture with the correct phase of Mitosis (Prophase, Metaphase, Anaphase, or Telophase)

 57. ****

Next to each description, write Figure A or B.

Mitosis \_\_\_\_\_\_\_\_

Meiosis\_\_\_\_\_\_\_\_

Diploid cells produced\_\_\_\_\_\_\_\_

Haploid cells produced\_\_\_\_\_\_\_\_

Sperm or Egg produced\_\_\_\_\_\_\_\_

Somatic cells produced\_\_\_\_\_\_\_\_

Daughter Cells identical to parent\_\_\_\_\_\_\_\_

Daughter Cells contain 1/2 of parents chromosomes\_\_\_\_\_\_\_\_

Crossing over can occur\_\_\_\_\_\_\_\_

Two divisions of nucleus\_\_\_\_\_\_\_\_

Nucleus divdes once\_\_\_\_\_\_\_\_

Gametes produced\_\_\_\_\_\_\_\_

 58. 

Please number the following words according to where they should go on the diagram:

\_\_\_\_\_\_\_G1 \_\_\_\_\_\_\_Cytokinesis \_\_\_\_\_\_\_G2 \_\_\_\_\_\_\_S phase

\_\_\_\_\_\_\_Prophase \_\_\_\_\_\_\_Anaphase \_\_\_\_\_\_\_Metaphase \_\_\_\_\_\_\_Telophase

 59. Label the following pictures: Mitosis, Cloning, Haploid cells being produced.



 60. Please label each picture with the correct description (some used more than once).

Yeast, Gametes, Hydra, Bacteria, Sexual reproduction, budding, binary fission, clones.



**Study Guide Unit 5: Mitosis & Meiosis (Ch. 6-7)**

**Answer Section**

**TRUE/FALSE**

 1. F

take out not

 2. F

Change asexual to sexual

 3. F

Change 21 to 23

 4. F

change six to four

 5. F

Change diploid to haploid

 6. F

change plant to animal

 7. F

change haploid and diploid

 8. F

change cytokinesis to interphase

 9. F

Change diploid to haploid

 10. F

X or Y

 11. F

change type of gene to picture of chromosomes arranged by size

 12. F

change half to complete or (full)

 13. F

change all to half

 14. F

change sexual to asexual

 15. F

remove don’t

 16. F

Change “only ½” to “a full set of”

 17. F

change “its sperm would have 12” to “its sperm would have 6”

 18. F

switch animal and plant

**MULTIPLE CHOICE**

 19. C

 20. A

 21. A

 22. B

 23. A

 24. C

 25. A

 26. C

 27. D

 28. B

 29. B

 30. C

**MATCHING**

 31. D

 32. C

 33. F

 34. G

 35. I

 36. A

 37. H

 38. B

 39. E

 40. B

 41. C

 42. G

 43. E

 44. F

 45. H

 46. A

 47. D

**SHORT ANSWER**

 48. Because the female’s egg can only be an X but a male’s sperm can be either an X or a Y.

 49. 2 (the X and Y chromosomes) and 44 autosomes

 50. 12

 51. identical to parent

 52. 5

 53. 23

 54. exponential growth, many generations, no parental care, less energy used.

 55. genetic variation, offspring stronger than parents

**PROBLEM**

 56. 3=Prophase

2=Metaphase

1=Anaphase

4=Telophase

 57. Mitosis Figure B

Meiosis Figure A

Diploid cells produced Figure B

Haploid cells produced Figure A

Sperm or Egg produced Figure A

Somatic cells produced Figure B

Daughter Cells identical to parent Figure B

Daughter Cells contain 1/2 of parents chromosomes Figure A

Crossing over can occur Figure A

Two divisions of nucleus Figure A

Nucleus divdes once Figure B

Gametes produced Figure A

 58. G1=1

Cytokinesis=8

G2=3

S=2

Prophase=4

Anaphase=6

Metaphase=5

Telophase=7

 59. 1) Cloning

2) Mitosis

3 & 4) Haploid

 60. A) Gametes, sexual reproduction

B) Hydra, budding, clones

C) Bacteria, binary fission, clones

D)Yeast, budding, clones