

## Cell Division, Differentiation and DNA Changes Review

1. The longest phase of the cell cycle is \_\_\_\_\_.
2. The two halves of a doubled chromosome structure are called \_\_\_\_\_.
3. There are \_\_\_\_\_ organ systems in the human body.
4. Put in order from smallest to largest: tissue, organ, cell, organism, organ system  
\_\_\_\_\_
5. Name the 4 tissue types. \_\_\_\_\_
6. Chromosomes that have the same genes in the same location and are the same size and the same shape are called \_\_\_\_\_ chromosomes.
7. The first signs of cell differentiation begin during the \_\_\_\_\_ stage of embryonic development.
8. As multicellular organisms grow and develop, their cells begin to \_\_\_\_\_ taking on specific functions.
9. The life of a cell from the time it first forms from a parent cell, until it divides into two daughter cells is referred to as the \_\_\_\_\_.
10. How many chromosomes are there in humans? \_\_\_\_\_ How many pairs of chromosomes in humans? \_\_\_\_\_
11. The belly button like, protein structure that attaches two chromatids to each other in a doubled chromosome is called a \_\_\_\_\_.
12. Name the 3 phases of the cell cycle. \_\_\_\_\_
13. Give an example of a cell that divides frequently. \_\_\_\_\_
14. Give an example of a cell that does not divide. \_\_\_\_\_
15. Define mitosis. \_\_\_\_\_
16. Before a cell undergoes mitosis, it must grow and do what to the nuclear DNA? \_\_\_\_\_
17. DNA in each chromosome is condensed into compact sister chromatids attached by a centromere during the \_\_\_\_\_ stage of mitosis.
18. Diagram an example of crossing over in chromosomes.
  
19. Diagram an example of a tetrad formed when homologous chromosomes align.
  
20. What are **two** reasons why cells cannot keep growing larger? \_\_\_\_\_
21. When a cell is undergoing division, the \_\_\_\_\_ are visible and appear as short, fat rods.
22. \_\_\_\_\_ is any chromosome that is not a sex chromosome.
23. What are the sex chromosomes for a male? \_\_\_\_\_ What are the sex chromosomes for a female? \_\_\_\_\_
24. If a snake's somatic cells have 30 chromosomes, how many chromosomes do the new cells have after mitosis? \_\_\_\_\_
25. \_\_\_\_\_ is an image of an individual's chromosomes arranged in homologous pairs by size and order.
26. \_\_\_\_\_ is the complete set of genes or chromosomes present in a cell or organism.
27. Somatic cells are \_\_\_\_\_ while gametes are haploid.
28. A doctor can study a \_\_\_\_\_ to learn about the number of chromosomes present in a body cell.
29. \_\_\_\_\_ cells are being used to test new drugs and provide cell-based therapy because they can mimic differentiation or different cell types which can be signaled to repair tissue.
30. The division of the cytoplasm after mitosis is known as \_\_\_\_\_.
31. What occurs in the S phase of the cell cycle? \_\_\_\_\_
32. Mitosis is a form of \_\_\_\_\_ reproduction used by unicellular organisms.
33. Cell \_\_\_\_\_ is the process by which a less specialized cell becomes more specialized to perform a specific function.
34. All cells in the body originate from the \_\_\_\_\_ (fertilized egg) which divides.
35. All cells start out as \_\_\_\_\_ cells which divide by mitosis.
36. The most likely consequence of interrupting the \_\_\_\_\_ phase of the cell cycle would be a failure to replicate chromosomes.
37. \_\_\_\_\_ stem cells come from that developing embryo.
38. \_\_\_\_\_ stem cells are for repair and replenishing adult body tissues.
39. Name and describe the 3 types of stem cells.

40. Endoderm, mesoderm, and ectoderm are all examples of \_\_\_\_\_.
41. When describing the potential of a stem cell, the terms totipotent, pluripotent, and unipotent refer to the ability of the stem cell to \_\_\_\_\_ into other cells.
42. The blastula folds in on itself to form the \_\_\_\_\_ which will eventually determine the tissue type.
43. Describe the appearance of the three early stages of embryonic development.
44. Is the DNA in the nucleus of your heart cells that same as the DNA in your brain cells? \_\_\_\_\_
45. During meiosis homologous chromosomes undergo a unique process called \_\_\_\_\_ which does not occur during mitosis.
46. What cells are produced from oogenesis at the end of meiosis? \_\_\_\_\_
47. What cells are produced from spermatogenesis at the end of meiosis? \_\_\_\_\_
48. What happens to the genes during crossing over? \_\_\_\_\_.
49. If an ant's somatic (body) cells have 4 chromosomes, how many chromosomes do new cells have after meiosis? \_\_\_\_\_
50. The 2N number for humans is \_\_\_\_\_.
51. The 1N number for humans is \_\_\_\_\_.
52. Give an example of a gamete. \_\_\_\_\_
53. How many divisions are there in mitosis? \_\_\_\_\_
54. How many divisions are there in meiosis? \_\_\_\_\_
55. \_\_\_\_\_ is when different genes independently separate from one another during meiosis.
56. Gametes fuse to form a \_\_\_\_\_.
57. Transcription factors are regulatory proteins that control the start or rate of \_\_\_\_\_.
58. \_\_\_\_\_ are permanent changes to the nucleotide base sequence of DNA.
59. \_\_\_\_\_ are environmental factors that damages DNA.
60. Give an example of a helpful mutation. \_\_\_\_\_
61. Which category of mutations can be passed from parent to offspring? \_\_\_\_\_ In which cell types do these mutations occur? \_\_\_\_\_
62. Which category of mutations cannot be passed from parent to offspring? \_\_\_\_\_ In which cell types do these mutations occur? \_\_\_\_\_
63. Diagram and label the 4 types of **chromosome** mutations.
64. The original DNA sequence is **GCTACCTTGGACT**. A replication error occurs resulting in the mutated sequence **GCTACCTTGGCT**. What type of mutation is this? \_\_\_\_\_ Does it cause a frameshift? \_\_\_\_\_
65. If a base is deleted or inserted from a mRNA strand, what kind of mutation occurs? \_\_\_\_\_
66. Give an example of a mutagen. \_\_\_\_\_
67. \_\_\_\_\_ is the failure of chromosomes to separate correctly during of meiosis.
68. Give an example of a trisomy disease. \_\_\_\_\_
69. \_\_\_\_\_ is the study of changes in DNA that are caused by environmental factors.
70. Explain what happens during methylation.
71. Give an example of how methylation can be helpful.  
\_\_\_\_\_
72. Histone proteins which have "tails" are wrapped with DNA. If chemicals attach to histone tails and change the structure of chromatin, this process is called \_\_\_\_\_.
73. RNA Interference \_\_\_\_\_ gene expression and is used by our cells to fight RNA viruses.
74. Transcription factors can control the initial rate of RNA \_\_\_\_\_.
75. Can epigenetic markers be passed on to future offspring? \_\_\_\_\_
76. How many somatic chromosomes in a human cell? \_\_\_\_\_ How many sex chromosomes in a human cell? \_\_\_\_\_
77. One disadvantage of \_\_\_\_\_ organisms is that each cell is dependent on the proper functioning of the whole system.

