AP Biology – Cells, Chromosomes, and the Cell Cycle
Life: The Science of Biology (Chapters 4, 9, and 11)

1. Chromosomes contain large amounts of different interacting proteins, which are known as

2. The appropriate decisions to enter the S phase and the M phase of the cell cycle depend on a pair of biochemicals called

3. The molecules that make up a chromosome are

4. During mitosis and meiosis the chromatin compacts. Which of the following processes takes place more easily because of this?

5. The basic structure of chromatin has sometimes been referred to as beads on a string of DNA. These beads are called

6. DNA replication occurs

7. When cyclin binds to Cdk,

8. Mature nerve cells are incapable of cell division. These cells are probably in

9. A cell cycle consists of

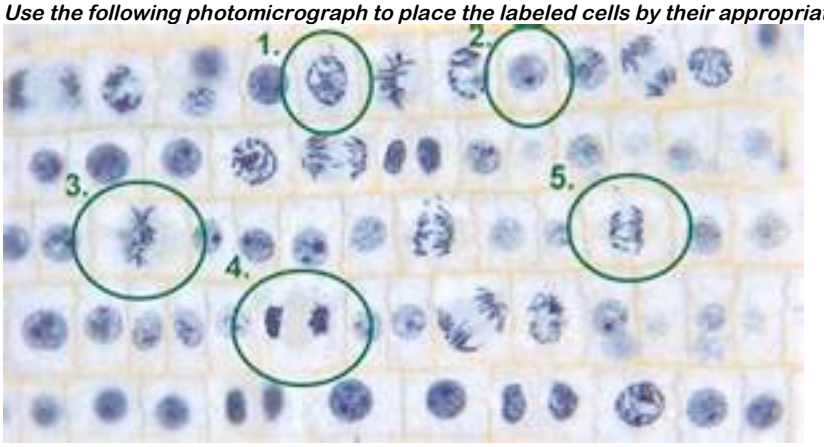
10. The cells of the intestinal epithelium are continually dividing, replacing dead cells lost from the surface of the intestinal lining. If you examined a population of intestinal epithelial cells under the microscope, most of the cells would

11. The products of mitosis are

12. The mitotic spindle is composed of

13. When dividing cells are examined under a light microscope, chromosomes first become visible during

Use the following photomicrograph to place the labeled cells by their appropriate position in the cell cycle in questions 14-18.



14. Cell 1 is in…

15. Cell 2 is in…

16. Cell 3 is in…

17. Cell 4 is in…

18. Cell 5 is in…

19. The microtubules of the mitotic spindle attach to a specialized structure in the centromere region of each chromosome called the

20. Genetically diverse offspring result from

21. During asexual reproduction, the genetic material of the parent is passed on to the offspring by

22. The diagnosis of Down syndrome is made by examining the individual's

23. During meiosis, the sister chromatids separate during

24. The exchange of genetic material between chromatids on homologous chromosomes occurs during

25. Diploid cells of the fruit fly *Drosophila* have 10 chromosomes. How many chromosomes does a *Drosophila* gamete have?

26. The fact that most monosomies and trisomies are lethal to human embryos illustrates the

27. A bacterial cell gives rise to two genetically identical daughter cells by a process known as

28. Genetic recombination occurs during

29. The total DNA content of each daughter cell is reduced during meiosis because

30. Trisomies and monosomies can result from accidents that occur during meiosis called

31. During mitotic anaphase, chromatids migrate

32. Which of the following is NOT true of sister chromatids?

33. Which of the following is NOT true of homologous chromosome pairs?

34. The second meiotic division of meiosis is important because

35. The energy to move chromosomes during mitosis is provided by

36. The process of programmed cell death is called

37. A person with Klinefelter Syndrome has 44 chromosomes and three sex chromosomes (XXY). The resulting aneuploidy is caused by

38. How does sexual reproduction increase genetic variability?

39. Cyclin-dependent kinases (Cdk's) catalyze the phosphorylation of targeted proteins. Phosphorylation

40. Regulation of the cell cycle is dependent upon cyclins and cyclin-dependent kinases. The key(s) that allows a cell to progress beyond the restriction point is (are)

41. The optimal time to observe sizes and shapes of chromosomes is

42. How does the nucleus in G2 differ from one in the G1 phase?

43. What causes the rhythmic change in cyclin concentration in the cell cycle?

44. If there are 12 chromosomes in an animal cell in the G1 stage of the cell cycle, what is the diploid number of chromosomes for this organism?

45. Enzymes that control the activities of other proteins are called

46. The MPF protein complex turns itself off by

47. What is a karyotype?

48. In Griffith's experiments, what happened when heat-killed S strain pneumococci were injected into a mouse along with live R strain pneumococi?

49. The Hershey-Chase experiment determined that

50. The rules formulated by Erwin Chargaff state that

51. Purines include

52. The nitrogenous bases (and the two strands of the DNA double helix) are held together by

53. In order to show that DNA is the "transforming principle", Avery, MacLeod, and McCarty showed that DNA could transform nonvirulent strains of pneumococcus. Their hypothesis was strengthened by their demonstration that

54. Bacteriophage nucleic acids were labeled by carrying out an infection of E. *coli* cells growing in

55. Information sources used by Watson and Crick to determine the structure of DNA included

56. In the structure of DNA, the "steps of the ladder" are

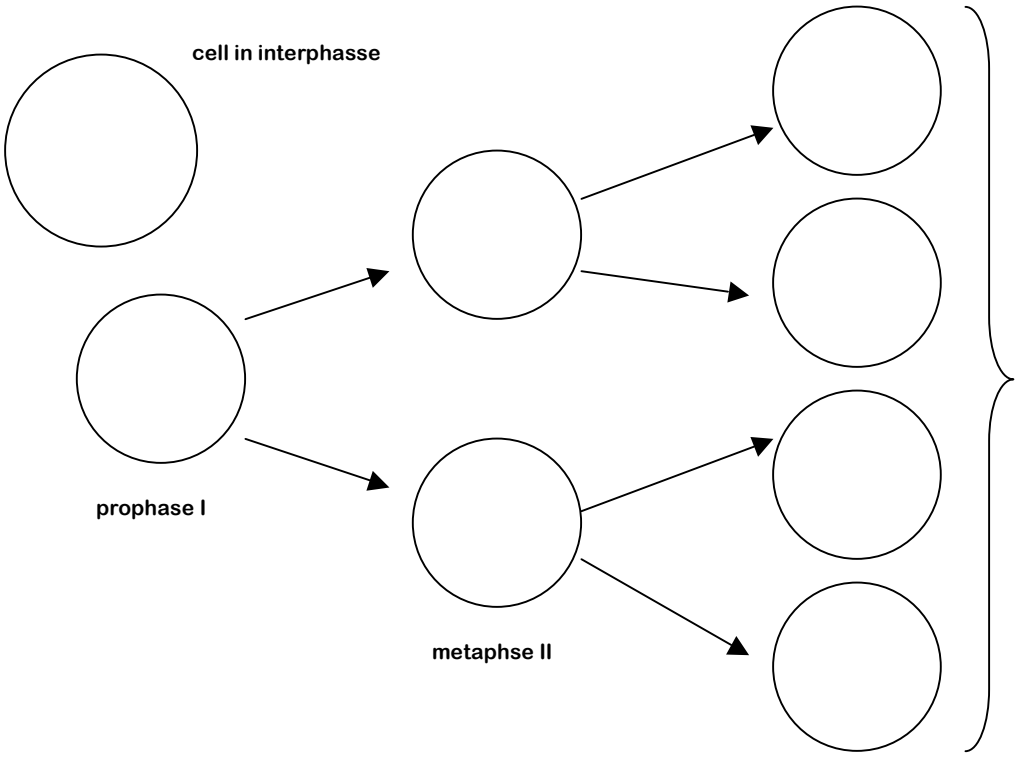
57. What accounts for the uniform diameter of the DNA molecule?

58. Griffith was able to distinguish the two strains of pneumococcus by means of

59. Which feature of the Watson-Crick model of DNA structure explains its ability to function in replication and gene expression?

60. If Hershey and Chase had found ^{35}S in both the pellet and the supernatant, what would have been their likely conclusion about the nature of DNA replication?

Use the colored pencils provided to you to complete the following diagram of meiosis, in which the organism's somatic cells contain 4 chromosomes.



Show all the possible assortments at metaphase I below.

What is the sex of this individual?

What genetic disorder does this individual have?