AP Biology **Name** _____
Chapter 12 Guided Reading: The Cell Cycle
10ed

1. **What** are the three key roles of cell division? State each role and give an example.

Key Role	**Example**

2. **What** is meant by the *cell cycle*?

3. **What** is the meaning of genome?

4. **How** many chromosomes are in a human somatic cell? **Name <u>two</u>** types of somatic cells in your body.

5. **What** is a gamete? **Name** the **<u>two</u>** types of gametes.

6. **How** many chromosomes are present in a human gamete?

7. **Describe** a eukaryotic chromosome.

8. How many DNA molecules are in each of your somatic cells? Think carefully!
_____

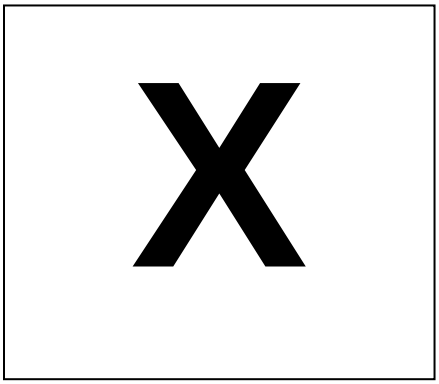
9. You are going to have to learn the difference between several similar-sounding terms. The following sketch that looks like an X represents a *replicated chromosome* that has two *sister chromatids*. The narrow waist represents the location of the *centromere*. The centromere is a region of the DNA, a part of the chromosome where one sister chromatid will attach to the other sister chromatid. A single chromosome has one centromere: replicated chromosomes, therefore, have two centromeres, adhering to each other in this region**. Label** the figure and **define** each of the terms below.

Chromosome

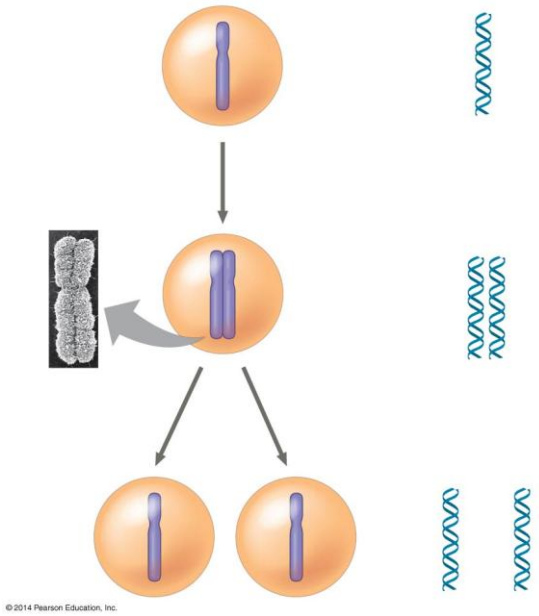
Chromatid

Centromere

Chromatin



10. Using Fig 12.5, **label** the following figure and **summarize** what occurs at the DNA level in each stage.

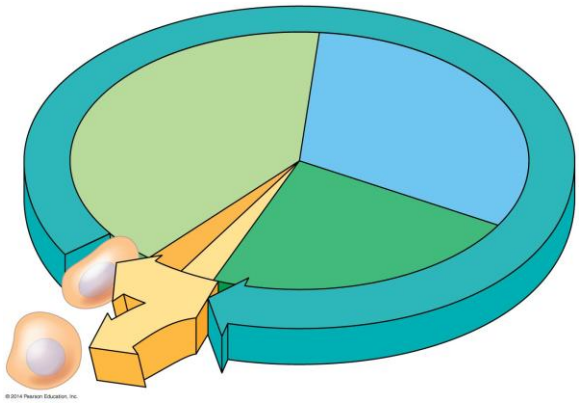


11. **What** is *mitosis*? **How** is it different from *cytokinesis*?

12. **What** occurs in *meiosis*? **How** is the chromosome number of daughter cells different?

13. **Label** each of the parts of the cell cycle listed below and give a **brief explanation** of what happens in each phase.

G_1
S
G_2
M



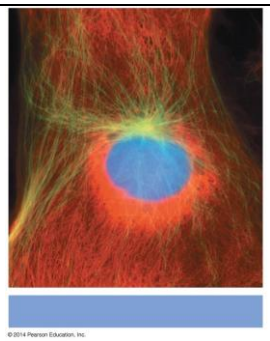
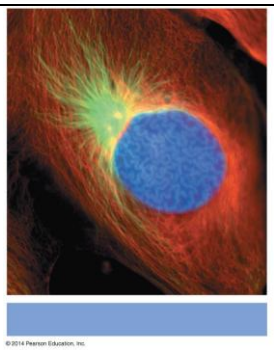
14. **What** are the components of the mitotic spindle? **What** is the source of these components?

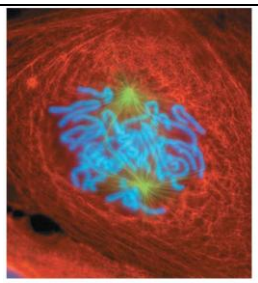
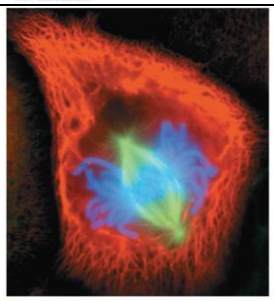
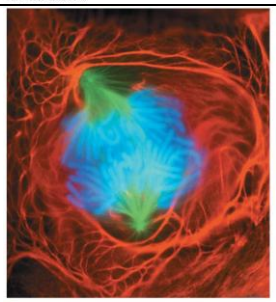
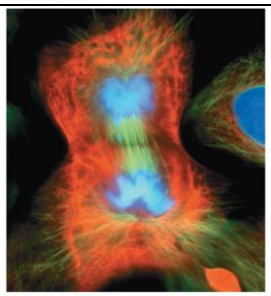
15. In animal cells, the assembly of spindle microtubules starts at the *centrosome*. **What** is another name for the centrosome? _____

16. **Sketch and label** a centrosome with two centrioles.

17. **Describe** what happens to the centrosome during interphase and then prophase.

18. Use Figure 12.7 in your text to help you **complete this chart. Label** each phase by name; then **label** the smaller structures in the pictures. Finally, **make two or three summary statements** that indicated important features to note about the phase.

	Phase	**Important Features of Phase**
		
		

		
		
		
		
	Phase	**Important Features of Phase**

19. **What** is a *kinetochore*? Read your text carefully and then make a **labeled sketch** that shows a replicated chromosome with two kinetochores and some attached spindle fibers. Fig 12.8 in your text will help.

20. **Explain** the difference between kinetochore and nonkinetochore microtubules. **What** is the function of each?

21. Using Fig 12.9, **explain** how evidence was gathered to justify the claim that microtubules depolymerize from the kinetochore end during anaphase.

22. **Describe** *cytokinesis* in an animal cell. **Draw and label** a sketch that shows the *cleavage furrow.*

23. **Describe** cytokinesis in a plant cell. **Draw and label** a sketch that shows the *cell plate*.

24. **How** is the cell plate formed? **What** is the source of the material for the cell plate?

25. Prokaryote reproduction does not involve mitosis, but instead occurs by *binary fission*. This process involves an *origin of replication*. **Describe** binary fission.

26. Besides the fact that prokaryotes lack a membrane-bounded nucleus, **describe** the following differences:

    Mode of reproduction? _____

    Number of chromosomes? _____

    Shape of the bacterial chromosome? _____

27. **What** controls the cell cycle? (Inquiry Fig 12.14 will help with this)

28. **What** is a cell-cycle *checkpoint*?

29. **Summarize** what happens at each checkpoint.

Checkpoint	**What Happens? How Is It Controlled?**
G_1	
G_2	
M	

30. **What** is the function of a *protein kinase*?

31. Kinases drive the cell cycle, but they must be activated by attachment of what molecules? _____

32. The activity of *cyclin-dependent kinases* (*Cdks*) rises and falls. **Why**?

33. **What** does *MPF* trigger? **What** are some specific activities that it triggers?

34. **What** is the *G_0 phase*? **Describe** this phase. **What** cell types remain in this phase throughout their life spans?

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35. **What** happens if all the chromosome kinetochores are not attached to spindle fibers? When this occurs, **which** checkpoint is not passed?

36. **What** are *growth factors*? **How** does *platelet-derived growth factor (PDGF)* stimulate fibroblast division?

37. Cancer cells exhibit different behaviors than normal cells. Here are two normal behaviors they no longer show. **Explain** each behavior and tell how its loss affects normal cell behavior.

    Density-dependent inhibition

    Anchorage dependence

38. Cancer cells also show loss of cell-cycle controls and may divide with being checked. The story of HeLa cells is worth noting. **What** is their source? **How** old are they? Note, that unlike normal cells, HeLa cells are immortal!

39. **What** is transformation? **What** is metastasis?

40. **Distinguish** between a benign tumor and malignant tumor.

41. **List <u>two</u>** specific cancer treatments and **tell how** each treatment works.

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