*Use the information in Chapter 12 (p.228-243) to complete the following questions. Bozeman also has the following helpful podcasts:* [*Cell Division*](http://www.bozemanscience.com/cell-division)*,* [*Mitosis*](http://www.bozemanscience.com/mitosis)*,* [*Phases of Mitosis*](http://www.bozemanscience.com/phases-of-mitosis)*, and* [*What is Cancer*](http://www.bozemanscience.com/what-is-cancer)*?*

**Concept 12.1 Most cell division results in genetically identical daughter cells**

1. Describe the purpose of cell division for different living organisms.
2. Complete the following table to organize information relating to the cellular organization of genetic material. Check out Figure 16.22 (p.320-321) if you need a visual on this!

|  |  |  |
| --- | --- | --- |
| **Term** | **Definition** | **Diagram** |
| Genome |  |  |
| Chromosome |  |  |
| Chromatin |  |  |
| DNA |  |  |

1. Differentiate between somatic cells and gametes in eukaryotic cells.
2. Draw and label a pair of sister chromatids. Explain the relationship between these two chromosomes and how they are made/separated.
3. Differentiate between mitosis and cytokinesis.

**Concept 12.2 The mitotic phase alternates with interphase in the cell cycle**

1. Complete the following table in which you **describe** the major events of the cell cycle.

|  |  |
| --- | --- |
| **Phase** | **Events Inside Cell** |
| INTERPHASE (G1 Phase) |  |
| INTERPHASE (S Phase) |  |
| INTERPHASE (G2 Phase) |  |
| MITOSIS  |  |
| CYTOKINESIS |  |

1. Explain the relationship between the mitotic spindle, centrosome, centrioles, aster, and kinetochore.
2. For each of the phases of the cell cycle displayed in Figure 12.7 (p.232-233), draw a labeled diagram and list the major cellular events that occur in that phase.
3. Explain the process and role of binary fission in prokaryotes.

**Concept 12.3 The eukaryotic cell cycle is regulated by a molecular control system**

1. Discuss the purpose and timing of the major checkpoints within the cell cycle.
2. Explain what happens if a cell at the G1 checkpoint does not receive a “go ahead signal”.
3. Describe the relationship between a cyclin, a cyclin-dependent kinase (Cdk), MFP, and the cell cycle. Use Figure 12.17 (p.240) to help you with your explanation.
4. Differentiate between and give examples of internal and external signals that can be given at checkpoints.
5. Differentiate between the characteristics of a benign and malignant tumor. Discuss at least two cancer treatment options that are currently available.