

Chapter 9 & 10 Essential Knowledge V2.0

Write a detailed response to each of the following pieces of information. If numbers are given in parentheses, they refer to the pages of your text book.

Main Concept: In eukaryotes, heritable information is passed to the next generation via processes that include the cell cycle and mitosis or meiosis plus fertilization.

1. What is the cell cycle?
2. Draw and describe the 3 phases of interphase.
 - a. Discuss the relationship of mitosis to interphase.
3. Using the following examples, discuss how the cell cycle is controlled.
 - a. MPF (Mitosis promoting factor)
 - b. Cancers disruption of the control pathways.
4. Explain the role of cyclins and cyclin dependent kinases in the cell cycle.
5. When a why might a cell go through a phase when it is not dividing?
 - a. What is the non-dividing phase called?
 - b. How does a specialized cell in the non-dividing phase re-enter the stages of cell division? Be sure to explain what cues cause this to happen.
6. Mitosis: Draw and then describe the processes (chromosomal & cellular) listed below in the correct order.
 - a. Cytokinesis
 - b. Prophase
 - c. Metaphase
 - d. Anaphase
 - e. DNA replication
 - f. Telophase
 - Although you don't need the names of the phases memorized, you need to know how and when replication, alignment and separation of chromosomes is happening in a dividing cell.
7. Meiosis
 - a. Contrast Mitosis and Meiosis
 - b. Why do some organisms have cells that go through meiosis?
 - c. Homologous chromosomes
 - What are they?
 - How are they "grouped" in a diploid cell?
 - Where did each one of the homologous pair come from?
 - Why do homologous chromosomes need to separate during meiosis?

- What is crossing over and when does it occur?
- How does the process of crossing over effect the process of evolution & why?

d. Fertilization:

- Define it
- How does fertilization increase genetic variation in a population?
- How does fertilization relate to the diploid number of chromosomes?

8. Asexual vs. Sexual Reproduction

- a. Contrast these two methods of reproduction
- b. What is the evolutionary advantage of asexual reproduction?
- c. What is the evolutionary advantage of sexual reproduction?