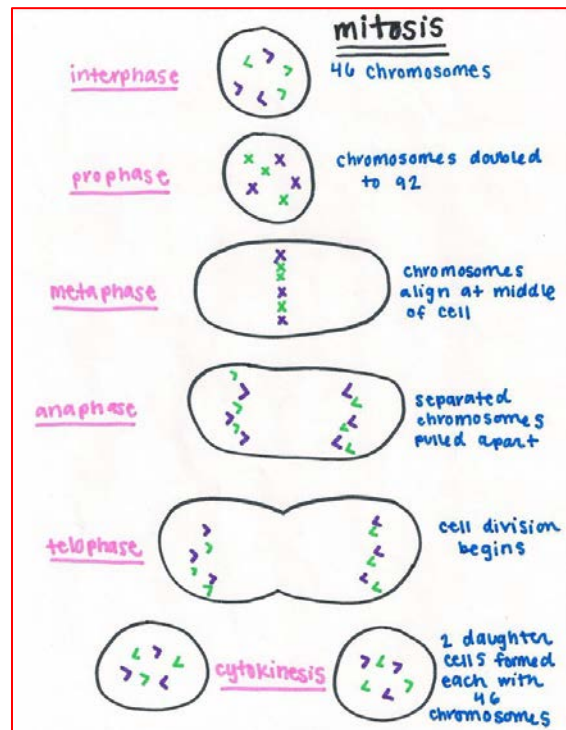


Answer Key: Cellular Replication and the Law of B and G Review

1. The Law of B and G states what 4 things about radiosensitivity?
 - a. Stem or immature cells are more radiosensitive than mature cells
 - b. Younger tissues and organs are more radiosensitive than older tissues and cells
 - c. The higher the metabolic cell activity, the more sensitive to radiation
 - d. The greater proliferation and growth for tissues, the more sensitive to radiation.
2. What is mitosis?
 - a. Cell reproduction when a cell divides in to two genetically identical daughter cells.
 - b. Goes through phases: prophase, prometaphase, metaphase, anaphase, and telophase.
3. Draw a representation of the phases/cycle of mitosis



4. Based on the Law of B and G:
 - a. Cells are most sensitive to radiation interactions are during which two phases? Why is this true? Cells are most sensitive to radiation interactions during Mitosis (M) and early in the DNA synthesis phase. This is due to the fast growth and replication of the chromosomes and cells.
 - b. Cells are least sensitive to radiation are which two phases? Why is this true? Cells are least sensitive to radiation interactions in G₂ and late S phase. There is a slower growth and replication process in these phases.

- a. Cytologists can determine chromosomal damages during which phase? Why is this important? Cytologists can determine chromosomal damages during Metaphase. This is when they can pair the chromosomes and determine any damage. They can get important information about future genetic concerns. Future research will hopefully make great strides in the use of this.
5. Describe why understanding this cellular replication process is important when considering radiation safety and protection of the patient in the clinical setting.
- a. Thinking about the most common exams that are performed in the healthcare setting you can determine how much radiation the patients are really being exposed to and the varying degree of sensitivity of the body's tissues. In general, most people think the body would be affected the same. The Chest X-ray exam is the most common exam performed in the clinic. The lung tissues are very sensitive in comparison to the skin of the arms, the bladder, and bone surface. However, we can place a lead shield on the lungs during a chest xray because it would cover up important anatomy. However, we can shield other radiosensitive organs such as the gonads, bladder and bone marrow of the hips. The gonadal area is important for genetics, but also patients also have prostates, cervix, bladder, ovaries, and uterus that are all prone to cancer due to the sensitive of the tissue. Patient safety should always be our priority – there is always some part of the body we can shield when doing an x-ray of the patient.