**Biology Concept Review**

**The nucleus controls the functions of life**

1. Chromosomes found within the nucleus contain the genes that store the information to make proteins.
2. Proteins control the activities of cells.
3. RNA carries the message out of the nucleus to  the ribosomes, which function to make proteins.
4. A gene mutation is a change in the order of the  A, G, C, and T bases.
5. Gene mutations can have a positive, negative, or neutral effect on the individual.
6. Mutations can occur when DNA is being replicated, or they can be caused by mutagens.
7. Gene therapy attempts to correct gene mutations.

**Mitosis is the basis of asexual reproduction**

1. There are three stages to the cell cycle: interphase, mitosis, and cytokinesis.
2. There are four phases to mitosis: prophase, metaphase, anaphase, and telophase.
3. Checkpoint proteins instruct the nucleus whether or not to proceed through the cell cycle.
4. An error in a checkpoint protein can cause diseases such as cancer, which is uncontrolled cell division.
5. Asexual reproduction requires only one parent, and the resulting offspring are genetically identical to the parent.
6. Types of asexual reproduction include binary fission, budding, fragmentation, vegetative reproduction, and spore formation.
7. Human-assisted plant and animal cloning methods can be used to save the genetic information of endangered species or to produce an organism with a desired trait.

**Circuits are designed to control the transfer of electrical energy**

1. Meiosis produces gametes with half the number of chromosomes as body cells.
2. In meiosis I, homologous chromosome pairs line up at the equator, separate, and then move to opposite poles of the cell.
3. In meiosis II, chromosomes move to the equator and sister chromatids move to opposite poles of the cell.
4. The process of meiosis creates variation in organisms because genetic information is shuffled during meiosis I.
5. Chromosome mutations can occur during meiosis and can cause genetic disorders.
6. The three stages of sexual reproduction are mating, fertilization, and development.
7. For sexually reproducing plants and animals,
8. There are two ways for a sperm cell and an egg cell to meet—through either internal or external fertilization.
9. The early development of an organism takes place during a stage called embryonic development.
10. Assisted reproductive technologies enable infertile couples to have children and have an impact on society.