**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Regents Review: Genetics**

**Per. \_\_\_\_\_ Mr. Mayer**

**DNA**  
All Organisms have a set of instructions that determine their characteristics.  These instructions are called **genes** and contain the instructions for life that are passed from parents to offspring during reproduction.   
  
The inherited instructions that are passed from parent to offspring exist as a code. The **DNA** molecule which makes up our genes contains this code.

**Asexual v. Sexual Heredity**  
The **DNA** molecules must be accurately **replicated** before being passed on. Asexually reproducing organisms normally pass on this genetic code identically between the parent and offspring, while the offspring of sexual reproduction produce offspring that resemble their parents, but exhibit some variations from them.  
  
Changes in DNA or **mutations** which occur in non sex cells of a sexually reproducing organism will not be passed on to their offspring.   **Mutations** which occur in sex cells or **gametes** will be frequently passed on to their offspring.

**Protein Synthesis**Once the coded information contained in the DNA molecule is passed on, it is used by a cell to make proteins. The proteins that are made become cell parts and carry out most functions of the cell.   The subtle differences in DNA between different human beings and different species results in the production of different proteins.    This is a major reason why we show individual differences.

**Genetic Engineering**  
Throughout recorded history, humans have used **selective breeding** and other methods to produce organisms with desirable traits. Our current understanding of genetics and heredity allows for the manipulation of genes and the development of new combinations of traits and new varieties of organisms.   This includes various aspects of DNA technology, including **recombinant DNA** technology.  Scientists have also developed many ways of determining the genetic makeup of different organisms, including humans.

1. What makes up the genes?
2. What are genes?
3. What do we call changes in DNA?
4. What do mutations lead to?
5. Name one example of selective breeding.
6. What do we use karyotyping for?