**Biotechnology Notes**

**Human genome project- a federal government project aimed at mapping the location of every gene on all of the 46 chromosomes.**

* **The genome project will have far reaching effects for curing disease, preventing birth defects, etc.**

**Gene Therapy- Manipulation of genes to correct disorders(Cystic Fibrosis and Severe Combined Immunodeficiency)**

**Genetically Modified Individuals (GMO)– Manipulation of genes to obtain desired characteristics and/or eliminating undesired characteristics. (example: corn and drought resistant crops**

<http://www.pbs.org/wgbh/harvest/coming/>

**Cloning- The process of making exact genetic replicas of plants or animals.**

* **There are ethical concerns over cloning humans. Although a scientist once made 4 copies of himself, the copies were destroyed at the blastula stage.**
* **Cloning has already been used extensively to create animals and plants for the food industry.**
* **Cloning results from making mitotic copies of an organism, the same as would happen during mitosis.**

[**http://learn.genetics.utah.edu/content/tech/cloning/clickandclone/**](http://learn.genetics.utah.edu/content/tech/cloning/clickandclone/)

**Stem cells- cells that have not been “differentiated” (told what they will become as an adult cell and what job they will do).**

* **Embryonic stem cells are used because they can be re-programmed to do many more jobs than adult stem cells can.**
* **There is a great controversy about the ethics of using embryonic stem cells since they have been harvested from aborted fetuses.**

**DNA Fingerprinting- the process of using a gel electrophoresis machine to produce a pattern from the DNA of an individual.**

* **The DNA pattern (or fingerprint) is unique to every human on Earth.**

**Gel Electrophoresis Machine- an old technology that separates fragments of DNA according the patterns of N2 bases in each strand.**

* **Uses restriction enzymes to cut the DNA at specific points producing a pattern unique for any individual.**
* **The negatively charged DNA floats on a gel in the machine. Smaller fragments float more quickly and move closer to the positively charged electrode.**