**Ch. 20: Biotechnology**

What you need to know:

* The terminology of biotechnology.
* How plasmids are used in bacterial transformation to clone genes.
* The key ideas that make PCR possible and applications of this technology.
* How gel electrophoresis can be used to separate DNA fragments or protein molecules.
* Information that can be determined from DNA gel results, such as fragment sizes and RFLP analysis.

|  |  |  |
| --- | --- | --- |
| **VOCABULARY TERM:** | **What you THINK it means** | **What it REALLY means** |
| 1. Genetic Engineering
 |  |  |
| 1. Biotechnology
 |  |  |
| 1. Recombinant DNA
 |  |  |
| 1. Gene Cloning
 |  |  |
| 1. Restriction Enzymes
 |  |  |
| 1. Restriction Fragment
 |  |  |
| 1. DNA Ligase
 |  |  |
| 1. Cloning Vector
 |  |  |

**Using a Restriction Enzyme to make Recombinant DNA**

**Notes & Questions**

1. Why is it necessary to cut the DNA and the “gene of interest” with the same restriction enzyme?
2. How do the DNA fragments re-join?

****

**Gene Cloning**

**Notes & Questions**

1. How is the bacterial DNA plasmid cut?
2. How is the bacterial DNA joined with the “gene of interest”?
3. Give an example of a possible “gene of interest” and why it used in this technique?
4. When the recombinant DNA plasmid (a vector) is placed back into the bacterium, the bacterium has been “**transformed**.” What does this mean?



List/describe some applications of gene cloning technology:

**Techniques of Genetic Engineering**

|  |
| --- |
| **PCR**http://ib.bioninja.com.au/_Media/pcr-components_med.jpeg |
| **GENE THERAPY**http://vectorblog.org/wp-content/uploads/2014/05/Illustration-1-Gene-Therapy-Final-Draft_small_WAS_gene_therapy.jpg |
| **CLONING ORGANISMS**20_19aMammalReproCloning-L.jpg |
| **DNA MICROARRAY**20_15_MicroAssayGeneAct-L.jpg |
| **STEM CELLS****20_21StemCells-L.jpg** |
| http://thewellesleynews.com/wp-content/uploads/2014/12/gmo.jpg**GMOs** |
| **GEL ELECTROPHORESIS & DNA FINGERPRINTING****http://media-2.web.britannica.com/eb-media/72/47672-004-4E16B61F.jpg** |

**RFLPs vs STR**