**Ch. 20: Biotechnology**

What you need to know:

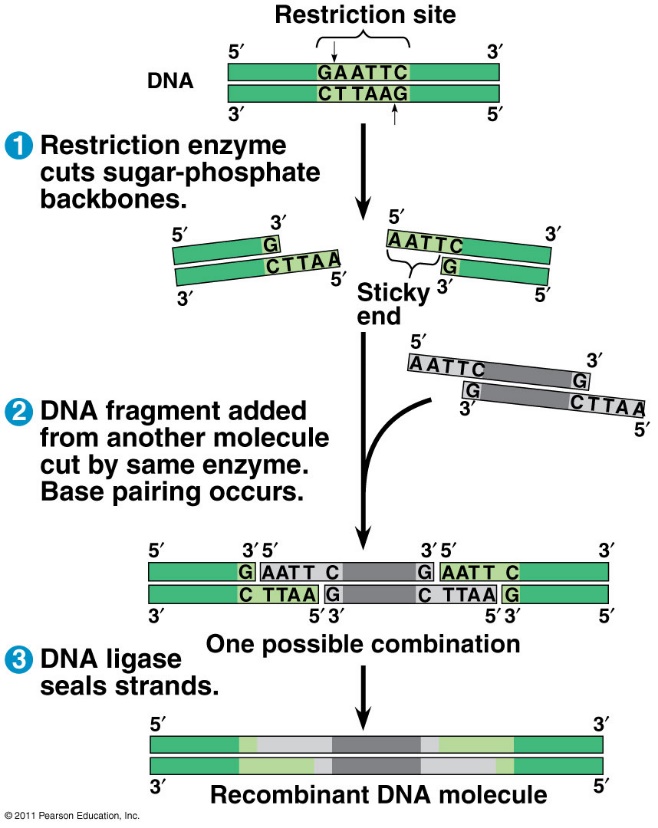
* The terminology of biotechnology.
* How plasmids are used in bacterial transformation to clone genes.
* The key ideas that make PCR possible and applications of this technology.
* How gel electrophoresis can be used to separate DNA fragments or protein molecules.
* Information that can be determined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

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| **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**

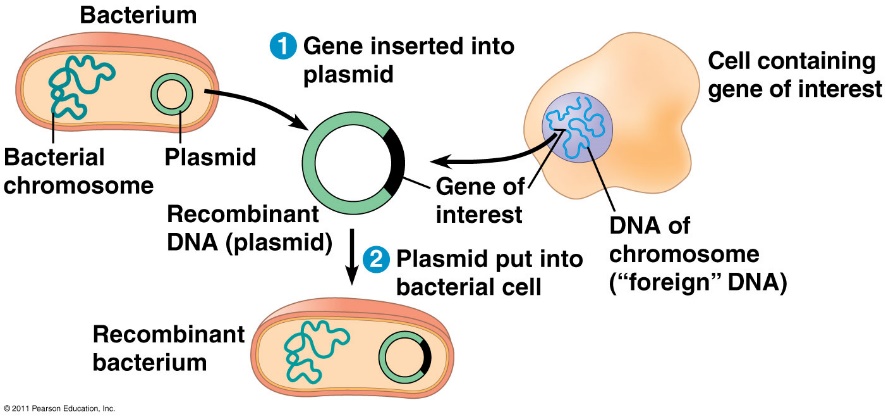
1. Why is it necessary to cut the DNA and the “gene of interest” with the same restriction enzyme?
2. How do the DNA fragments re-join?

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**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**

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| **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**