**DNA Technology (AKA…..\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)**

**Reminders about DNA:**

* + All cells have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	+ DNA looks the same in all organisms but \_\_\_\_\_\_\_\_\_\_ for different \_\_\_\_\_\_\_\_\_\_\_\_\_
	+ The DNA is just ATCG’s. It cannot do anything outside of a cell. It needs \_\_\_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_\_ to make protein.
* One cell could use another cell’s DNA if it was \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Recombinant DNA…..Genes from different \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	+ - Ex. Frost resistance gene from potatoes put into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Terms to know:**

* Vector The vector carries target DNA into a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Example: Plasmid-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Donor Gene The target gene that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from an organism.
* Restriction Enzyme: Enzyme that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the strong bonds of DNA.
* **How do scientists recombine the DNA?**
1. Identify and isolate the target gene from the donor organism using \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ open using the same restriction enzyme.
3. Then you put the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ inside the vector (plasmid). They stick together like \_\_\_\_\_\_\_\_\_\_\_\_

**\*\*Must be returned \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\*\***

When an organism receives this new recombined DNA it is called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cut the DNA in a specific spot.
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are open pieces of DNA that attach and seal to the new gene with ligase.
Sticky Ends Plasmid
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_= Living things that contain recombined DNA (DNA from another organism).
* **After the gene has been put into the new DNA it must be placed in a living cell.**
* These organisms can be used in:
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Got Silk? [Video](https://www.youtube.com/watch?v=ktgACq4zcAU)…. Describe the main idea of the video here🡪

[Creating](http://www.abpischools.org.uk/page/modules/diabetes/diabetes6.cfm?coSiteNavigation_allTopic=1) Human Insulin……….Transgenic bacteria producing HUMAN insulin.

* **DNA Fingerprinting:** Everyone has unique sections of DNA but the restriction enzymes cut them into different sized pieces.
	+ The way your DNA cuts is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* How do we see the pieces? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Separates DNA according to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (fragments)
* DNA is put into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ like substance and an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is applied.
* Since DNA is negatively charged which direction will it move? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Large pieces get “\_\_\_\_\_\_\_\_\_\_\_\_\_\_” in the gel and smaller pieces can move \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Uses for Gel Electrophoresis DNA fingerprints for:
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ , \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **Sequencing DNA:** There will be practice questions on your quest☺
* **Cloning Organisms**
* Myths: 1. The cloned organism will be identical in every way to the original. 2. Clones cannot reproduce. 3. Clones look the same but some genes are different.
* **Truth: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* **Steps 1.** Take a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from one cell of an organism.
1. Put the DNA into a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Insert cell into an \_\_\_\_\_\_\_\_\_\_\_\_ organism (if an animal) and allow the cell to develop into a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[Cloning of Dolly](https://www.youtube.com/watch?v=-Qry1gYYDCA)- **Why Cloning?** Some say…. If it ain’t broke don’t fix it.

Make many copies of cells/ organs in the lab for use in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_…very simple and has been done for centuries

[**Human**](https://www.youtube.com/watch?v=VJycRYBNtwY) **Genome Project (HGP)**: Project to identify all genes in human genome, determine the sequence of base pairs that make up human DNA

Completed in \_\_\_\_\_\_\_\_\_\_\_\_\_

Accomplished using gene sequencing by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(determining the exact order of bases in DNA)

Eventually HGP info can help us with \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪 Correcting defective genes responsible for disease development through replacement with other genes

Not yet widespread and successful with humans.

**Why is this so important?** **Biotechnology**- use of living organisms to benefit society.

**Genetic Engineering**- manipulating genes of organisms to benefit society.

**Applications?** Forensics, Agriculture, Medicine, Pharmaceuticals, Others?….