



High School Science Virtual Learning

**College Biology**

**Chapter 12 Recap Part 2**

May 5, 2020



# High School College Biology

## Lesson: May 5, 2020

### **Objective/Learning Target:**

Students will be able to identify and describe different DNA technologies and discuss the applications associated with the different technologies.



## Let's Get Started:

1. What is recombinant DNA?
2. Why are plasmids valuable tools for the production of recombinant DNA?

## Answers:

1. A molecule containing DNA from two different sources, often different species.
2. Plasmids can carry virtually any foreign gene and are replicated by their bacterial host cells.

## Lesson Activity:

1. Read over pages 12-32 of the Chapter 12 Notes. ([Linked Here](#))- Start at DNA Profiling
2. Watch this Amoeba Sisters video on [Gel Electrophoresis](#).



## Practice:

1. How are forensic scientists able to identify potential criminals with even the smallest amount of DNA from a crime scene?
2. How do you prove that two samples of DNA come from the same person?
3. The Human Genome Project gave us an enormous amount of data about our genome. How many genes do we have? What percentage of our DNA is non-coding?

## Practice Answers:

1. The polymerase chain reaction (PCR) is a technique where a specific segment of DNA can be amplified (by targeting and copying it quickly and precisely) which allows for a full DNA profile to be built.
2. By analyzing the short tandem repeats (STR) of their DNA. These segments are found between genes and repeat over and over.
3. Approximately 21,000 genes and around 98.5% is non-coding DNA.

## More Practice:

1. Why do DNA fragments containing STR sites from different people tend to migrate to different locations during gel electrophoresis?
2. What feature of a DNA fragment causes it to move through a gel during electrophoresis.
  - a. The electrical charge of its phosphate groups
  - b. Its nucleotide sequence
  - c. The hydrogen bonds between its base pairs
  - d. Its double helix shape



More Practice:

3. After gel electrophoresis procedure is run, the pattern of bars in the gel shows
  - a. the order of bases in a particular gene.
  - b. the presence of various-sized fragments of DNA.
  - c. the order of genes along particular chromosomes.
  - d. the exact location of a specific gene in the genome
  
4. Name the steps of the whole-genome shotgun method.

## More Practice:

5. Put the following steps of human gene therapy in the correct order.

- a. Virus is injected into patient.
- b. Human gene is inserted into a virus.
- c. Normal human gene is isolated and cloned.
- d. Normal human gene is transcribed and translated in the patient.

## More Practice Answers:

1. Different people tend to have different numbers of repeats at each STR site. DNA fragments prepared from the STR sites of different people will thus have different lengths, causing them to migrate to different locations on a gel.
2. A
3. B
4. Chop the genome into fragments using restriction enzymes, clone and sequence each fragment, and reassemble the short sequences into a continuous sequence for every chromosome.
5. C, B, A, D



## Review Tools:

-[Kahoot 2](#)

-Bozeman Science Video [DNA Fingerprinting](#)

-National Human Genome Research Institute Video [The Human Genome](#)