BIOTECHNOLOGY

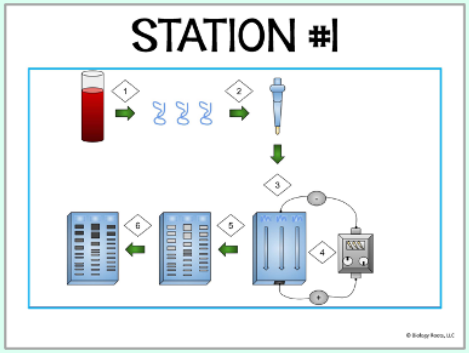
Stations

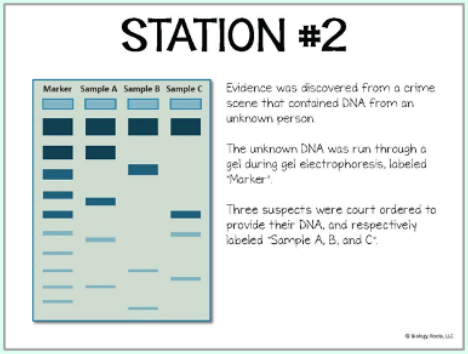
Topics include:

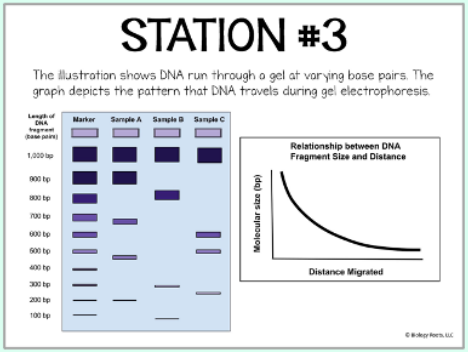
- Gel electrophoresis
- Plasmid transformation
- GMOs
- Gene therapy
- CRISPR

- Perfect for high school
- Stations are editable

biology roots



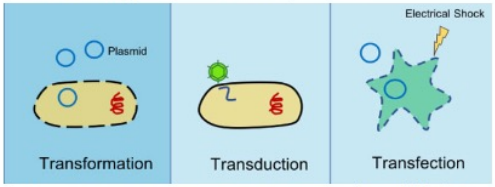




BIOTECHNOLOGY Stations

STATION #4 continued

General types of transgenesis



Merging DNA of two species using plasmids from bacteria.

Merging DNA of two species using viral vectors. This procedure is the backbone behind gene therapy.

Merging DNA of two animal species using procedures such as microinjection or stem cell mediated transfer.

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STATION #5



The corn on the left has been genetically modified in what is commonly called "Bt corn", because it contains a gene from a bacteria species called *Bacillus thuringiensis*. This particular gene produces a protein that kills the larvae of certain pests, without the use of pesticides.

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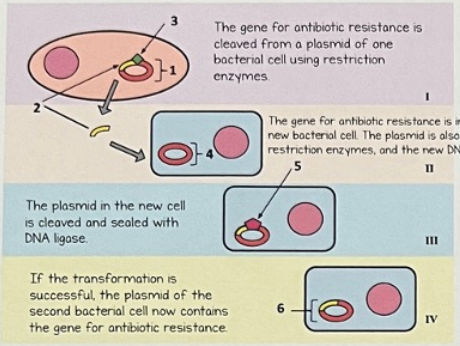
Types of activities found in the stations:

-videos
-identification
-critical thinking
-short answer
-fill in the blank

These stations are designed as classwork after students have been introduced to the concepts

13 stations total

STATION #10



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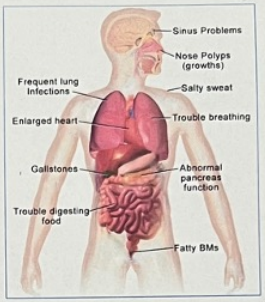
STATION #12



Cystic Fibrosis is a hereditary disorder that affects cells of the lungs, pancreas, and small intestine.

The symptoms of cystic fibrosis include coughing, poor digestion, and increased vulnerability of infection. Without treatment, those with the disorder typically do not live to see 30 years.

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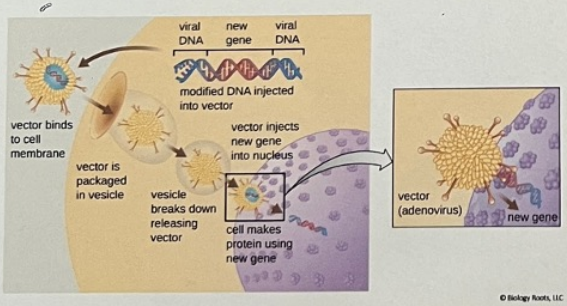
STATION #11

Many disorders, including cystic fibrosis, can be treated using gene therapy.



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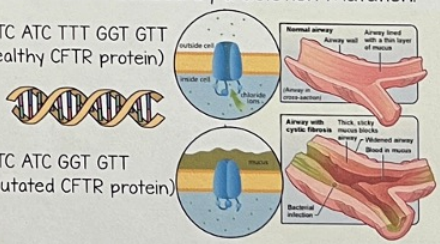
STATION #12 continued

Cystic fibrosis is caused by a deletion mutation.

...ATC ATC TTT GGT GTT
(healthy CFTR protein)



...ATC ATC GGT GTT
(mutated CFTR protein)

The CFTR protein regulates chloride ions across the cell membrane in a way that attracts water out of the cell and into the mucus layer. This keeps the mucus layer moist and enables it to trap harmful bacteria and debris.
The mutated protein that causes cystic fibrosis does not correctly regulation chloride ions, causing sticky, dry mucus.

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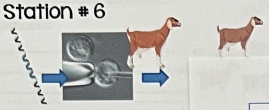
Stations can be placed around the room as students collect answers (digital version also included)

Name: _____ Date: _____

Biotechnology Stations

Station # 6



When was antithrombin appr

What is unique about the pro antithrombin? _____

How is the gene for human ar introduced to goats? _____

What was the purpose or ben antithrombin this way? _____

Station # 7

Why is spider silk valuable?

Station # 8

Scroll through the animation t questions. The First _____

- Stanley _____ and recombined genes from t resistant strains of _____
- The genes are carried on found in E. Coli. They nam pSC101 (carries gene for resistance) and pSC102 (c _____ resistanc
- EcoR1 is a _____ DNA and produces short sequences called _____
- DNA _____ is an the sugar-phosphate bon stable (DNA) molecule.
- Think About It: How is the molecule different than t

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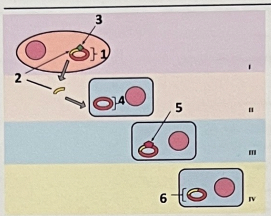
Station # 10



On the line above the diagram, write the name of the biotechnology that it illustrates.

Label numbers 1-6. Use the text summary on the station to help you.

Summarize the process in 3-4 sentences:

_____

_____

_____

_____

_____

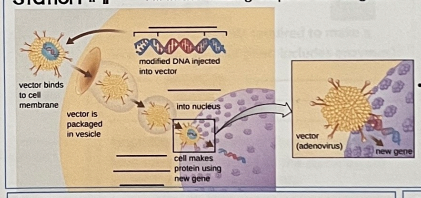
_____

_____.

Bacterial cell #1 (contains gene for antibiotic resistance.) *Bacterial cell #2 (does not naturally contain gene for antibiotic resistance.)*

Station # 11

Fill in the missing steps on the diagram.



- What is the purpose of the virus in gene therapy? _____

_____

_____.

- How does the cell respond to gene therapy? _____

_____

_____

_____.

Station # 12

Cystic fibrosis affects the cells of which organs?

_____

The symptoms include _____, poor _____, increased vulnerability for _____.

Write the DNA genetic code for a healthy CFTR protein:

_____

The mutated genetic code that leads to cystic fibrosis:

_____

What is the function of the healthy CFTR protein?_____

_____

_____

_____

_____.

Explain how gene therapy could treat cystic fibrosis:

Station # 13

Name the biotechnology represented in the illustrations: _____

Briefly summarize what CRISPR-Cas9 does within a cell: _____

_____

_____

_____

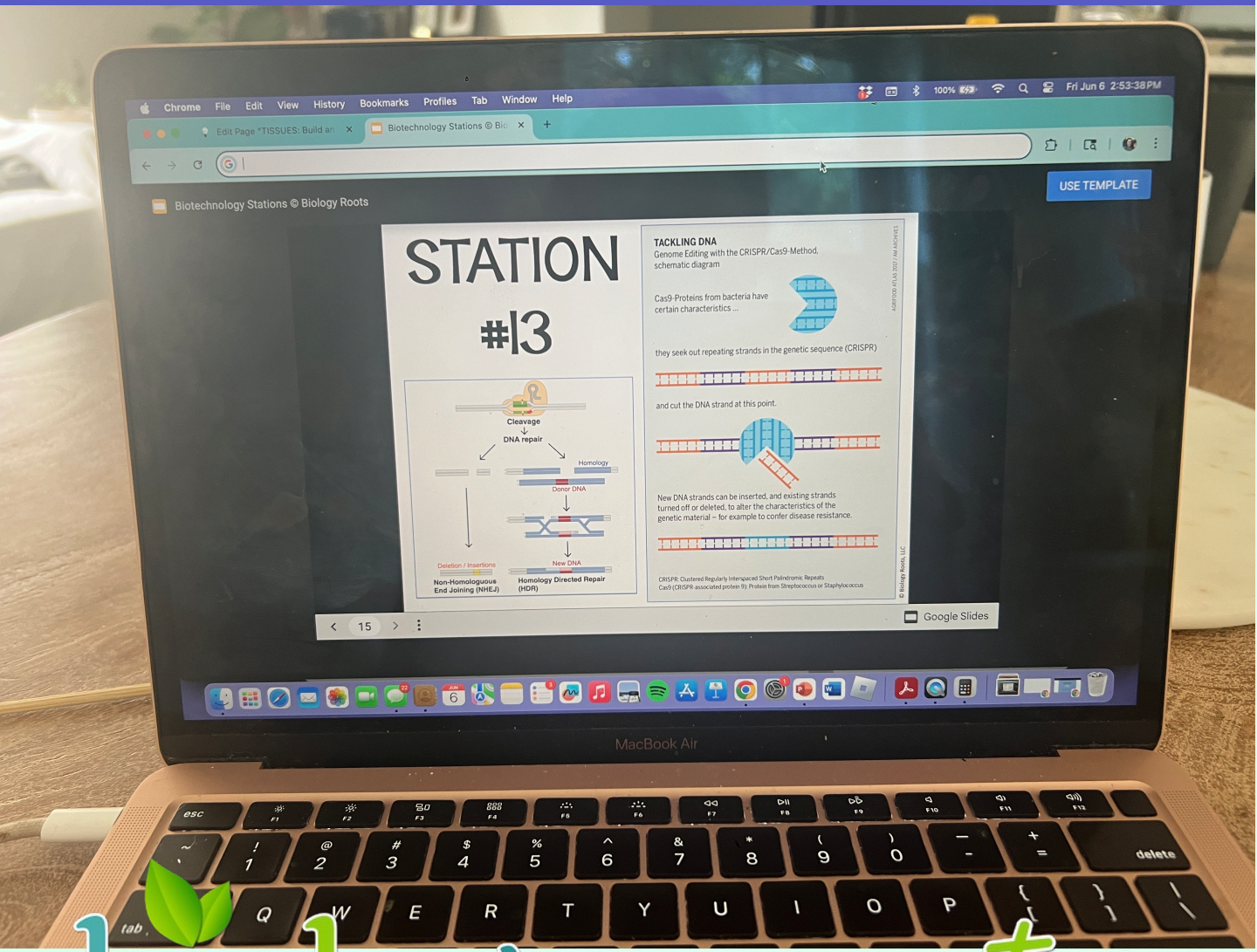
_____

_____.

The final step of CRISPR-Cas9 is DNA Repair. This can be done via non-homologous end joining (NHEJ) or homology directed repair (HDR). Which method involves adding new DNA to a strand of DNA?

Students record answers on their packet • Answer key included.

Digital version of stations included (Hosted on Google Slides)



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Still not sure if you need this resource?

This is for any biology teacher that covers biotechnology and needs an interactive way to reinforce the concepts in their classroom. This makes perfect classwork or review prior to a test and gives you a break from teaching. It's a must have in your portfolio! AP teachers have also shared that they are able to use these!

CM

Chelsea M.

Aug 13, 2024

★★★★★ **Extremely satisfied**

I use a lot of stations in my classroom and this one did not disappoint! So much great information in these stations, really helped my students understand the concept of biotechnology.

