PLTW Virtual Learning

Medical Detectives

Lesson 17

April 28, 2020

7 & 8 Grade Medical Detectives
Lesson: April 28, 2020

Objective/Learning Target:
Lesson 17, Part 2

Students will be able to learn about forensic scientists and explain a Gel Electrophoresis Lab and why it is used.

Warm-Ups: How Observant Are You?

Look over the pennies and determine which one is the correct penny.

Note: You can't look at a real penny.

Lesson Introduction/Background Information:

Being a forensic scientist is the application of scientific principles and techniques to matters of criminal justice, especially as relating to the collection, examination, and analysis of physical evidence. Some of the key skills needed for being a forensic scientists are:

--A logical and independent mind
--Meticulous attention to detail (How did you do on the penny test, the answer was penny #7).
--Excellent written and oral communication skills
--Objectivity and sensitivity when dealing with confidential information
--Ability to work under pressure and to a deadline
--Concentration and patience
--Ability to deal with stressful and emotional situations
--Confidence in your own judgement

Practice:

As you have learned, DNA fingerprinting/profiling is done through the process called gel electrophoresis. In this virtual lab, you will discover how the DNA is processed to determine the markers. You will be taking part in setting up and conducting the lab. Click on the link below, interact with the virtual lab and work through the five steps of the lab:

Step #1 - Make the gel
Step #2 - Set up the gel apparatus
Step #3 - Load the DNA sample into the gel
Step #4 - Hook up the electrical current and run the gel
Step #5 - Stain the gel and analyze the data

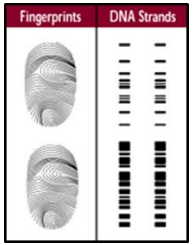
Gel Electrophoresis Virtual Lab #1

Practice:

You will be working through your second virtual gel electrophoresis lab to determine who the thief is that has been stealing bicycles in a local neighborhood. Was it suspect #1 or suspect #2? Once you have clicked on the link below, you will need to click on Gel Electrophoresis to take you to the lab. Begin with the Problem tab and work through the lab. Be sure and read the information from the Background tab also.

Follow the instructions throughout the lab, interacting when requested. You can stop at step #11 and do not need to proceed to step #12. Once the DNA markers have been moved from the light tray, you will analyze them and determine which suspect's DNA matches the evidence. Be sure to type your prediction in the Lab Notebook, skip the Data tab in the notebook (not necessary). You will be answering question from the Analyze and Conclude tab on the next page, so be ready and take notes. Enjoy!

Gel Electrophoresis Virtual Lab #2



Self Assessment:

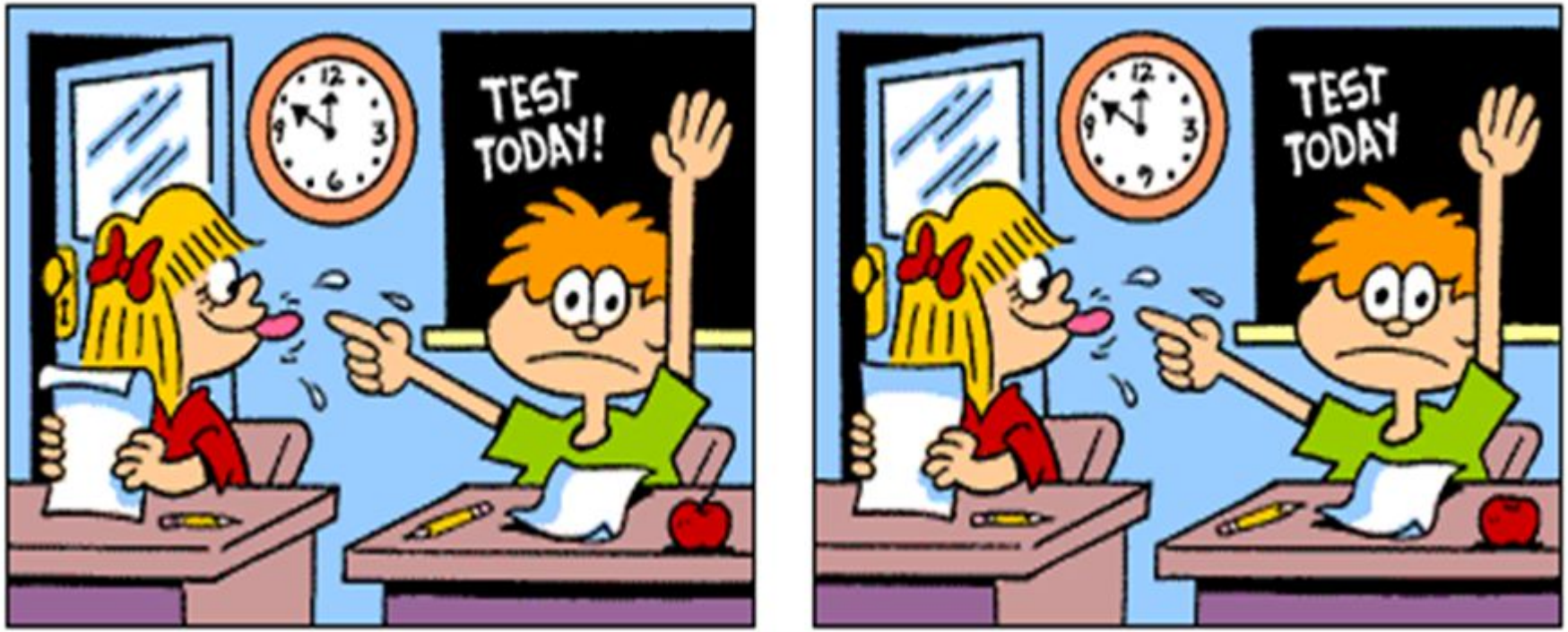
Quiz

Find out what you know by answering the following questions about forensic science, DNA and the gel electrophoresis process.

1. Larger strands will move faster and travel further away from the wells. T or F
2. Smaller strands will move slower and stay closer to the wells. T or F
3. Only extracted DNA can be used for the gel electrophoresis process. T or F
4. The TBE buffer solution is used to help carry the electrical current. T or F
5. Who was the bicycle thief? Suspect #1 or Suspect #2
6. How were you able to find out which suspect committed the crime?
7. What was found at the crime scene that provided the DNA sample?
8. Meticulous attention to detail is an important skill for a forensic scientist. T or F

Extend Your Learning/Continued Practice:

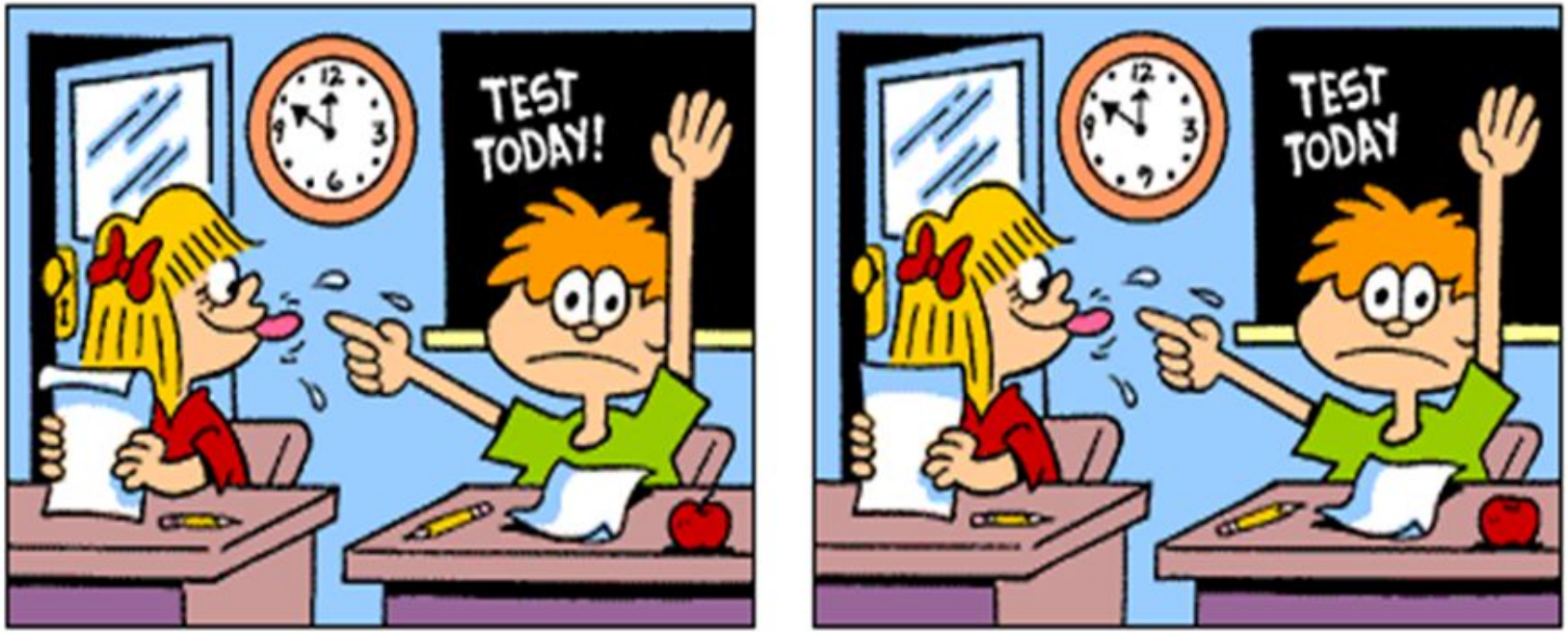
Find the 6 differences between the two pictures and find out how much attention you pay to details.



Source: http://www.slylockfox.com/arcade/6diff/index.html

Extend Your Learning/Continued Practice:
Find the 6 differences between the two pictures.

Answers: Apple stem, exclamation point, keyhole, girl's paper, clock, pencil



Source: http://www.slylockfox.com/arcade/6diff/index.html

Answer Key:

1. False
2. False
3. True
4. True
5. Suspect #2
6. Because the DNA markers from the gel electrophoresis matched perfectly.
1. A hair sample was found on the bicycle chain and DNA was taken from it.
1. True