Who Committed the Crime? A WebQuest about DNA Sequencing

WebQuest Description: This WebQuest allows you to learn how to create and run a gel electrophoresis to determine the DNA sequence of a criminal.

Grade Level: 9-12
Curriculum: Science
Keywords: DNA, gel electrophoresis
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WebQuest URL: http://zunal.com/webquest.php?w=6751

Introduction

You are a group of geneticists and crime scene investigators and you need to solve the mystery of who stole the Sheboyganite Diamond from the National Museum. There was blood left at the scene that you have collected and now need to analyze for DNA. Your job is to create and run a gel electrophoresis to determine what suspect left the blood at the scene. Gel electrophoresis makes it possible to sequence DNA which can be used for solving crimes or determining paternity. This quest will prepare you for what we will be doing in our own high school crime lab! So lets get ready to solve that crime and catch the perpetrator.

Tasks

You will work alone on the WebQuest to run a gel of the blood left at the crime scene. The quest will walk you through the basic steps of making the gel to running the DNA. When you have figured out who the criminal is, you are to write a journal entry reviewing how you determined who committed the crime and how you intend to penalize that person. Be sure to include what you learned from the WebQuest as well, using the new scientific terms you know. Your suspects are as follows:

- Jules McBeth, DNA sequenced at: 5500 bp, 3500 bp, 2000 bp
- Winston Smith, DNA sequenced at: 4500 bp, 4000 bp, 1000 bp
- Thomas Kane, DNA sequenced at: 6000 bp, 3500 bp, 1500 bp
- Steph Sinclair, DNA sequenced at: 6000 bp, 3600 bp, 1000 bp

Process

You have been assigned to figure out who stole the Sheboyganite Diamond by analyzing DNA from blood left at the crime scene. To do this, you must first understand a basic structure of DNA. Briefly read more at this site: http://accessexcellence.org/AE/AEC/CC/DNA_structure.html. Now you must learn what gel electrophoresis is. Learn more at this site: http://www.dnalc.org/ddnalc/resources/electrophoresis.html. Now that you have a basic understanding, it is time to run your gel to find out who the criminal is. Are you up for this task? Go to the following website to begin: http://learn.genetics.utah.edu/units/biotech/gel/.

Evaluation

<table>
<thead>
<tr>
<th>Category and Score</th>
<th>Exemplary 4</th>
<th>Very Good 3</th>
<th>Developing 2</th>
<th>Beginning 1</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation</td>
<td>Used time well in lab and focused attention on the experiment.</td>
<td>Used time pretty well. Stayed focused on the experiment most of the time.</td>
<td>Did the lab but did not appear very interested. Focus was lost on several occasions.</td>
<td>Participation was minimal OR student was hostile about participating.</td>
<td>%25</td>
</tr>
<tr>
<td>Journal/Notebook</td>
<td>Clear, accurate, dated notes are taken regularly.</td>
<td>Dated, clear, accurate notes are taken occasionally.</td>
<td>Dated, notes are taken occasionally, but accuracy of notes might be questionable.</td>
<td>Notes rarely taken or of little use.</td>
<td>%25</td>
</tr>
<tr>
<td>Scientific Concepts</td>
<td>Report illustrates an accurate and thorough understanding of scientific concepts underlying the lab.</td>
<td>Report illustrates an accurate understanding of most scientific concepts underlying the lab.</td>
<td>Report illustrates a limited understanding of scientific concepts underlying the lab.</td>
<td>Report illustrates inaccurate understanding of scientific concepts underlying the lab.</td>
<td>%25</td>
</tr>
</tbody>
</table>
You have completed your virtual gel electrophoresis and hopefully have successfully solved the mystery of who stole the Sheboyganite Diamond. Some questions to answer in your journals and to keep in mind for further investigation are: In what ways is gel electrophoresis used and why? What is the purpose of the electrical current running through the gel? What does “bp” mean and what is its significance? What are some possible ways that running a gel may become flawed? Do you feel prepared enough to be put into our own crime lab to run some real gels to sequence DNA? Hope you enjoyed your WebQuest! You are now an experienced CSI and can move on to more crime scenes!

**Conclusion**

This WebQuest is intended for high school students learning about genetics and DNA. They will understand the structure of DNA and how to run a gel electrophoresis to see a DNA sequence. The students will use internet skills and following directions as a means of reading through this activity. The rubric helps for assessing their journals that they will write after the activity, which should include what they learned and how they answered the questions within the WebQuest. Some other useful resources are: Putting DNA to Work http://www.koshlandsciencemuseum.org/exhibitdna/index.jsp; DNA Activity Booklet http://www.maf.govt.nz/mafnet/schools/activities/dna/dna3.pdf; Rubric creation http://rubistar.4teachers.org/index.php

**Teacher Page**

Credits

Other