DNA Evidence

**Background** – Through news accounts and crime stories, we’re all familiar with the fact the DNA in our cells reflects each individual’s unique identity and how closely related we are to one another (your DNA is most similar to your parents and siblings). The same is true for the relationships among organisms. DNA is the molecule that makes up an organism’s genome in the nucleus of every cell. It consists of genes, which code for proteins. DNA is especially important in the study of evolution. The amount of difference in DNA is a test of the difference between one species and another – and thus how closely or distantly related they are.

Genes are made of DNA and are inherited from parent to offspring. Some DNA sequences code for proteins which are made up of a sequence of amino acids. Cytochrome C is a protein involved in using energy in the cell. Cytochrome C is found in most, if not all, plants and animals. Over time, random mutations in the DNA sequence occur. As a result, the amino acid sequence of Cytochrome C also changes. In this activity you are going to compare the amino acid sequence of Cytochrome C in various organisms to determine which are most closely related.

**Method** –

Step 1 – Using the chart on the back of this page, highlight the row containing the amino acid sequence for the horse.

Step 2 – Choose two other organisms record the names of those organisms in the top of the table below. Compare amino acid sequences. Circle the amino acids that are different than the horse. Determine the number of differences and record them in the table below.

<table>
<thead>
<tr>
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<th>Horse</th>
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<tbody>
<tr>
<td>Horse</td>
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**Questions** –

1. Which of the organisms that you choose is most closely related to the horse? How do you know?

2. How is the amino acid sequence related to DNA evidence?

3. Why do the amino acid sequences change over time?

On your Evidence for Evolution worksheet, write a 3 – 5 sentence summary explaining how DNA is considered evidence for evolution.