EVOLUTION

1. Fill in the gaps using the words given below:

population die more offspring surviving selected struggle for existence species variation variation Inherited

Organisms tend to produce…………………………….than the environment will support. A……………………………………. follows and a large number of these offspring die before reaching reproductive age. Members of the same ……………..are not identical but show …………………..in all characteristics. Much of this…………………….. is …………………………..Those offspring better adapted have a better chance of …………………………..Those offspring less well adapted to their environment ……………. This process is repeated generation after generation. The organisms with the best characteristics are ………………….. and survive and eventually predominate in the…………………………

2. Which of the following does NOT form part of the theory of evolution proposed by Charles Darwin?

A. A struggle for existence occurs because organisms tend to produce more offspring than the environment will support.
B. Members of the same species are not identical; they show variation.
C. Any damaging change in an organism’s phenotype is inherited.
D. Those offspring less suited to the environment are likely to die before producing offspring.

**Industrial melanism in the “peppered moth”** (Biston betularia).

Two forms of the peppered moth (Biston betularia) exist. One form is light brown with dark “speckles”; the other is completely dark (melanic) in colour. They differ by only one allele of the gene which controls the formation of dark pigment (melanin). Both forms of the moth fly by night and rest on the “bark” of trees during the day. Prior to the **industrial revolution** in the 1800s, the light form was common throughout Britain and the darker form was rare “indeed”.

1
“Surveys” in the 1950s (see figure 2.) showed that the pale form was most abundant in non-industrial areas where the dark form was abundant in areas suffering from heavy industrial air “pollution”. Experiments and direct observations strongly support the following explanation of these “findings”.

PAY ATTENTION TO and READ CAREFULLY the possible EXPLANATION:
(i) “In non-polluted areas, the tree trunks are covered with pale-coloured lichens and the light-coloured moth is well “camouflaged” against this pale “background” (see figure 1.). However the dark form is easily seen and eaten by predators such as “thrushes”.
(ii) In polluted areas, toxic gases kill the lichens and “soot” particles darken the tree trunks. As a result the light-coloured moth is easily seen whereas the dark one is well “hidden” and is favoured by natural selection”.

3. Look at the pictures and explain what kind of animals they are. Explain in your own words what this camouflage means by filling in the gaps with the words from the box.

1. 
2. 
3. 
4.
It is an/a………………………...and it has……………….this form to the…………….. to avoid being………………by a……………………
eaten adapted predator

**Speciation:** is the name given to the process by which one species may evolve into another becoming two, three or more species. Species can exist as one or more populations.

Speciation happens when populations of the same species evolve to become so different that they can't breed with one another to produce fertile offspring.

**There are two main different kinds of speciation:**

A. **Geographical isolation:** The first one happens when one population is separated by a barrier (river, mountain, desert,…) and as a result becomes two different populations that cannot interbreed.
B. Reproductive Isolation: the mechanisms of reproduction occasionally develop to prevent interbreeding between members of the same population:

4. In the box below you will find different ways of collecting food by different species of birds. Decide what shape of beak would be needed for each type of food “gathering”. Choose from the list of adjectives below:
Long, short, sharp, flat, curved, hooked, sack-like, spoon-like, crossed

E.g.: The beak of a cross bill is crossed because it eats conifer-seeds
5. Now you are going to test all you can remember about Evolution. Fill in the gaps with the most suitable word from the box.

a. Natural…………………favours those members of a population best ……………………to an environment.

b. The members of a ……………………form a naturally ……………………group which is reproductively isolated.

c. The process of………………………depends on ……………………that dividing a population into two or more …………………… groups.

d. Evolution is a …………………… process. As new species appear, other less successful ones become…………………

e. Breeders use …………………….selection to selectively breed organisms useful to mankind.

<table>
<thead>
<tr>
<th>artificial</th>
<th>extinct</th>
<th>species</th>
<th>people</th>
<th>barriers</th>
<th>isolated</th>
<th>suited</th>
</tr>
</thead>
<tbody>
<tr>
<td>selection</td>
<td>different</td>
<td>continuous</td>
<td>venue</td>
<td>interbreeding</td>
<td>variable</td>
<td>speciation</td>
</tr>
</tbody>
</table>

**FOSSIL**

Fossils are once-living organisms that have been turned into rock in which the shape or form of the organisms can still be seen.

Videos to watch (OPTIONAL):
1. http://www.youtube.com/watch?v=rX_WH1bq5HQ
4. http://www.youtube.com/watch?v=g5m-SYiPylg (MUTATION)

**A. Fossil Record**

One of the few animals for which we have a fairly complete evolutionary record is the horse because all the main stages of the evolution of the horse have been preserved in fossil form. But, nowadays there still exists a lack of some fossil records.
B. Comparative anatomy and development
Similarities due to common ancestry (homology among forelimbs in vertebrates). All these organs have the same origin but different functions.

Homologies of the forelimb in six vertebrates

C. Developmental is due to common ancestry
Look at the pictures below. You can see trace similarities from an early stage. This means that they come from a common ancestry.
D. Vestigial organs
Vestigial organs are a result of common ancestry.

E. Similarities of DNA
DNA testing is a tool that Darwin never had, but it has helped scientists after him to learn and discover a lot about evolution. The quagga was the first extinct species to have its DNA studied. The DNA showed that the quagga was not a separate species as had been previously thought, but was a type of zebra.
6. Match each picture with one of the evidence of Evolution

A.  

B.  

C.  

D.  

7. Comparison of animals: Choose a pair. Why do you think they are related? Then compare the others and fill in the gaps using the words or statements given below in the box:
Look up any word you don’t know in the dictionary.

1. Mamut (extinct)  
2. Elephant  
3. Archeopterix (extinct)  
4. Iguana  
5. Zebra  
6. Cod fish  
7. Ichthyosaurus (extinct)  
8. Quagga (extinct)  
10. Iguanodon (extinct)
8. Explain what will happen if this couple has children: will they have the same muscles? Write your possible answers using the statements given in the box:

If this couple had children, their children would develop / would not develop muscles like their parents.

9. Fill this grid and discuss in plenary.

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>Who thought this—Lamarck? Darwin? or both of them.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Organisms have changed over time.</td>
<td></td>
</tr>
<tr>
<td>2. Organisms changed because they wanted to survive.</td>
<td></td>
</tr>
<tr>
<td>3. There was variation in a population.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>4.</td>
<td>Certain traits helped organisms survive and reproduce better than other organisms without those traits.</td>
</tr>
<tr>
<td>5.</td>
<td>Organisms can never become extinct.</td>
</tr>
<tr>
<td>6.</td>
<td>The environment had something to do with why organisms changed.</td>
</tr>
<tr>
<td>7.</td>
<td>Parents are able to pass on at least some of their traits to their offspring.</td>
</tr>
<tr>
<td>8.</td>
<td>Parents are only able to pass on traits that they were born with.</td>
</tr>
<tr>
<td>9.</td>
<td>Organisms could decide to change something about their body and pass on that change to their offspring.</td>
</tr>
<tr>
<td>10.</td>
<td>Organisms are still changing.</td>
</tr>
</tbody>
</table>