HOMEWORK WORKSHOP

WHAT IS IT?

Workshops are additional support sessions in the form of Q&A. Tutors provide individual assistance to students who have difficulties with Work Booklet questions. Students can also check the accuracy of their answers by referring to the online homework solutions.

Workshops are not alternative for make-up for missed lessons. However, if you review the Theory Booklet and flag any questions you may have, then the tutors will do their best to help you with your learning.

WHEN IS IT?

Week 2 to 9 during the term. Each session is 60 minutes long. Refer to the Notice Board for the Workshop schedule.

WHAT DO I NEED TO DO TO ATTEND?

Students must attempt all the Work Booklet questions before attending the Workshop. Students must book at the service desk as spaces are limited.
PART A: MULTIPLE CHOICE QUESTIONS

QUESTION 1.
Which scientist is accredited for the theory of evolution?
(a) Thomas Hunt Morgan
(b) Theodor Boveri
(c) Charles Darwin
(d) Francis Crick

QUESTION 2.
Lamarck proposed a theory that:
(a) Inheritance of favourable character
(b) Transmission of acquired characteristics
(c) Cells are the fundamentals of life
(d) Humans evolved from chimpanzees

QUESTION 3.
Which of the following is not a component of Darwin’s theory of natural selection?
(a) Time over generations
(b) Genetic variation in the population
(c) Passing on of acquired characteristics
(d) Reproduction

QUESTION 4.
When did Darwin propose his theory of natural selection?
(a) 17th Century
(b) 18th Century
(c) 19th Century
(d) 20th Century
QUESTION 5.
Divergent evolution involves:
(a) The study of fossils
(b) Where unrelated species have similar characteristics
(c) Speciation
(d) Studying

QUESTION 6.
What is the name of the process that occurs when different species living in similar isolated environments evolve similar adaptations?
(a) Adaptive radiation
(b) Convergent evolution
(c) Divergent evolution
(d) Punctuated equilibrium

QUESTION 7.
Which of the following is an example of divergent evolution?
(a) The similar streamline shapes of sharks and kangaroos
(b) The fact that kangaroos and Tasmanian devils are both marsupials
(c) The predatory niche filled by the thylacine in Australia and the wolf in the Northern hemisphere
(d) The large flaps of skin between front and hind legs possessed by Australian honey gliders and North American flying squirrels which are used for gliding between trees

QUESTION 8.
Evidence for evolution includes:
(a) Study of fossils
(b) Comparative anatomy
(c) Biogeography
(d) All of the above
QUESTION 9.
Mutations are advantageous in evolution because:
(a) Maintain uniformity
(b) Reproduce asexually
(c) They provide genetic diversity
(d) Makes cells divide faster

QUESTION 10.
Which of the following is a relatively new form of evidence for evolution?
(a) Biochemistry including DNA
(b) Comparative anatomy
(c) Vestigial structures
(d) None of the above
PART B: SHORT ANSWER QUESTIONS

QUESTION 11.
Complete the following questions on the age of the Earth and evolution:

a) What is the current age of the Earth?

______________________________________________________________________

b) Why is the Earth's age often given as a piece of evidence for the Theory of Evolution?
   
   Hint: think about what Darwin said about evolution and how long it takes to occur.  

______________________________________________________________________
QUESTION 12.
Complete the flowchart below by using the key ideas of Darwin's theory of evolution by natural selection.

VARIATION in a population

DEATH of poorly adapted organisms (with unfavourable characteristics)

DOMINANCE - majority of the population contains the favourable characteristics
QUESTION 13.

The following definitions of evolution come from two different sources. One is a site with conservative and religious associations and the other is an objective scientific site.

Identify these sources by circling the options under the text. Explain each choice in the space provided below. The meaning of ‘conservative’ in this context is provided below.

**Conservative:** To resist change; to have political or social values which emphasize traditional views and uphold current/historical traditions

**Text 1:**

*The theory of evolution is a naturalistic theory of the history of life on earth. Currently, there are several theories of evolution. Since World War II a majority of the most prominent and vocal defenders of the evolutionary position which employs methodological naturalism have been atheists. The theory of evolution posits a process of transformation from simple life forms to more complex life forms, which has never been observed or duplicated in a laboratory. Professor of Botany at the University of Lund in Sweden, stated: "My attempts to demonstrate Evolution by an experiment carried on for more than 40 years have completely failed. At least, I should hardly be accused of having started from a preconceived antievolutionary standpoint."

a) Circle: Conservative website / Scientific website

b) Explanation:
Text 2:

Biological evolution, simply put, is descent with modification. This definition encompasses small-scale evolution (changes in gene frequency in a population from one generation to the next) and large-scale evolution (the descent of different species from a common ancestor over many generations). Evolution helps us to understand the history of life. Biological evolution is not simply a matter of change over time. Lots of things change over time: trees lose their leaves, mountain ranges rise and erode, but they aren't examples of biological evolution because they don't involve descent through genetic inheritance. The central idea of biological evolution is that all life on Earth shares a common ancestor, just as you and your cousins share a common grandmother. Through the process of descent with modification, the common ancestor of life on Earth gave rise to the fantastic diversity that we see documented in the fossil record and around us today.

c) Circle: Conservative website / Scientific website

d) Explanation:
QUESTION 14. (2009 SCT Q66)

a) Complete the flowchart to summarise the process of natural selection and its effects on a species. Use as many boxes as you require.  

b) Name a scientific theory about evolution and explain how a specific piece of evidence supports this theory.
QUESTION 15.
Below is a diagram of the different kinds of peppered moth. Answer the following questions about this moth.

![Light and dark forms of the peppered moth](image_url)

a) Which of the moths would have an advantage on the blackened ‘sooty’ trees after the industrial revolution?  
______________________________________________________________________

b) What is the ‘environmental pressure’ for the moths? (i.e. what is threatening their survival?)  
_______________________________________________________________________
_______________________________________________________________________

c) The population of moths must have had a huge variation of colour. Given the scale below, draw what you imagine moth c) would look like.  

<table>
<thead>
<tr>
<th>Moth a)</th>
<th>Moth b)</th>
<th>Moth c)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darker</td>
<td></td>
<td>Lighter</td>
</tr>
</tbody>
</table>

Moth c)
QUESTION 16.

Below is a drawing of four of ‘Darwin’s finches’. These finches were thought to come from a common ancestor, but have changed over time to become different species. This is due to the different environments on the different parts of the Galapagos Islands.

![Darwin's finches](image)

Finches from Galapagos Archipelago

1. *Geospiza magnirostris*
2. *Geospiza fortis*
3. *Geospiza parvula*
4. *Certhidea olivacea*

a) Given the details in the pictures, and the information about the habitat and eating habits, fill in the species names below.

<table>
<thead>
<tr>
<th>Description</th>
<th>Species name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Its natural habitats are subtropical or tropical dry forests, subtropical or tropical moist montanes, and subtropical or tropical dry shrubland. This finch feeds on small insects.</td>
<td></td>
</tr>
<tr>
<td>Its natural habitats are subtropical or tropical dry forests and subtropical or tropical dry shrubland. This finch uses tools such as twigs which it can grab to probe and eat small insects.</td>
<td></td>
</tr>
<tr>
<td>Its natural habitats are subtropical or tropical dry forests and subtropical or tropical dry shrubland. This Finch manly eats leaves.</td>
<td></td>
</tr>
<tr>
<td>Its natural habitats are subtropical or tropical dry forests and subtropical or tropical dry shrubland. This finch beak can crack hard shells.</td>
<td></td>
</tr>
</tbody>
</table>
b) Darwin came up with the theory of natural selection. Summarise the theory of natural selection by placing the following statements in order. Place the number or rank in the boxes.

<table>
<thead>
<tr>
<th>Natural Selection</th>
<th>Rank (e.g. 1, 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competition - Due to environmental pressures, the organisms within a population must compete with each other to survive.</td>
<td></td>
</tr>
<tr>
<td>Speciation - as generations come along, the population changes because some traits are passed on and others are not. A new species exists when a population different enough from the original population results.</td>
<td></td>
</tr>
<tr>
<td>Overproduction - favourable conditions allow a population to increase in size. Environmental pressures in time limit the number that can survive.</td>
<td></td>
</tr>
<tr>
<td>Reproduction - Individuals that survive and reproduce can pass their traits onto their offspring.</td>
<td></td>
</tr>
<tr>
<td>Survival of the Fittest - The individuals who best adapt to the environment are the ones who will most likely survive. They possess variations that give that give them a selective advantage.</td>
<td></td>
</tr>
</tbody>
</table>
QUESTION 17.
Frogs, birds, rabbits and lizards all have different forelimbs, reflecting their different lifestyles. But those different forelimbs all share the same set of bones - the humerus, the radius, and the ulna.

With reference to the diagram above, explain how this piece of evidence supports the theory of evolution.

____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

3
QUESTION 18.
Lamarckian inheritance remained popular throughout the 1800s, and was the main rival of Darwin’s theory.

a) What would Lamarck’s estimate be of the time taken for the change in the diagram to occur? I.e. 10 years, 100 years, 1000 years, 1 million years? 1

b) What would Darwin’s estimate be for the same change to occur? 1
QUESTION 19.

Natural selection is not the only mechanism for evolution. Mutation is also important.

a) How does the above picture explain mutation?  

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

b) Can this explain how a population/organism may change over time? (Hint: there is now more variation among the beetles)  

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