



## WEEKLY HOME STUDY PACKAGE - WEEK 2 (12/07/21 – 16/07/21)

Subject	BIOLOGY	Year/Level	13
Strand	B13.1.2 - EVOLUTION		
Sub-strand	B13.1.2.1 – ORGANIC EVOLUTION – Theories and Evidences		
Content Learning Outcome	Describe theory explaining the origin of life and the evolution of complex life forms from simple life forms. Evaluate the given evidence that supports this theory		

**Lesson Objectives:** (i) Understand Stanley Miller's experiment that supports Oparin's Theory.  
(ii) Briefly describe evolution of complex life form from simple life forms  
(iii) State evidences that support Organic evolution.

### Lesson Notes:

#### A. Stanley L. Millers Experiment

- Miller showed experimentally that the organic compounds can form from the gases in the primitive atmosphere.
- He boiled water and passed the water vapour through a chamber containing the gases methane ammonia and hydrogen. The gaseous mixture was then exposed to electrical discharge, which induced chemical reaction. The mixture was cooled, condensed and analysed. It was found to contain several amino acids and some other organic molecules such as succinic acid, urea and lactic acid.
- Miller continued his research using sterilized gases and proved that microorganisms played no part in the formation of organic compounds.

#### B. Organic Evolution

- Organic evolution refers to the slow and gradual process by which living organisms have changed from the simplest unicellular form to the most complex multi-cellular forms that are existing today.
- "All living things on earth are here as a result of descent, with modifications from a common ancestor".
- Characteristics of organisms had been changing in the past and will continue to do so in the future as well. This is because, the environment in which organisms live also changes and organisms need to adapt to the changed environment in order to survive.
- Several living organisms of the past have become extinct.

#### C. Evidences Of Organic Evolution

1. MORPHOLOGY - Morphological evidence comes in two forms:
  - Homologous Structures – having similar structure and origin with different function such as forelimbs of vertebrate
  - Analogous Structures – having similar function but are structurally different eg. wings of a bird and of an insect
2. EMBRYOLOGY - the study of prenatal development of gametes (sex cells), fertilization, and development of embryos and fetuses. Similar stages of early development (morula, blastula or gastrula) in all the animals suggest common ancestry.
3. PALEONTOLOGY - the study of fossils. Fossils are the remains or traces of animal and plant life of the past, found embedded in rock either as petrified hard parts or as moulds, casts or tracks.
4. BIOCHEMISTRY. Cells in all organisms have biomolecules common to all organisms. Eg. Proteins like Cytochrome c (a blood protein) is found in all aerobic respiring organisms. Also Amino acids are coded for by the same triplet of bases in all organisms producing the same proteins
5. PHYSIOLOGY - numerous life processes and functions associated with organisms occur in the same way in all living things.

6. Selective Breeding – Charles Darwin explained natural selection as a mechanism by which complex multicellular organisms evolved from single celled organisms. This proof of natural selection today comes from selective breeding (artificial selection) of plants and animals.

**Activity Questions**

1. Briefly state **two** discoveries of Stanley Miller’s experiment that supported Oparin’s theory on the origin of life. **(2 marks)**

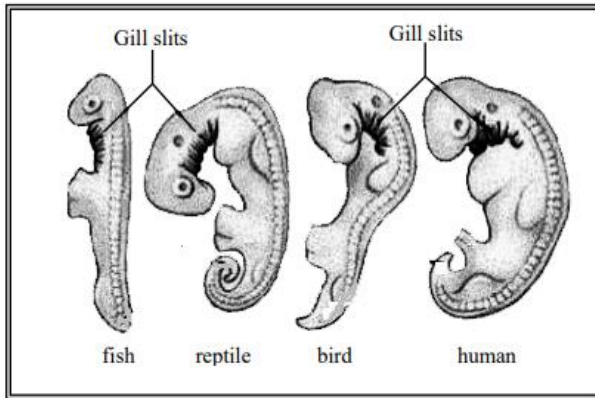
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2. Define the term **organic evolution** **(1 mark)**

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3. With reference to the diagram below, describe how organic evolution is supported by this piece of evidence.



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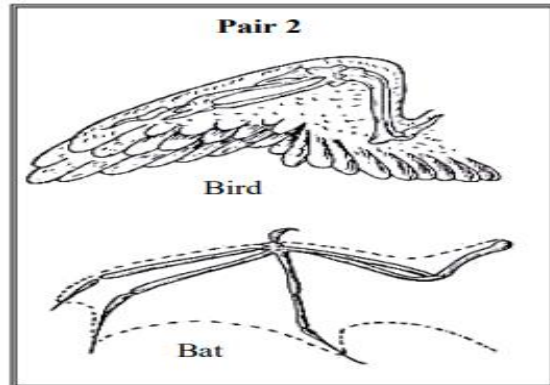
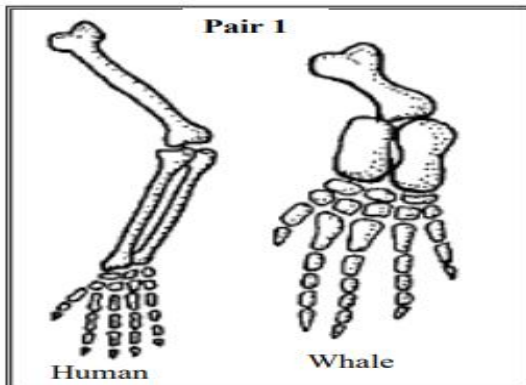
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**(2 marks)**

4. Study the pairs of anatomical structures provided in the diagram below. Identify the **homologous pair** and provide a **reason** to support your answer. **(2 marks)**



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**The End**