Topic 1.5: The Origin of Cells

**Essential Idea: There is an unbroken chain of life from the first cells on Earth to all cells in organisms alive today.**

**Statements & Objectives:**

**1.5.U1 Cells can only be formed by division of preexisting cells.**

Discuss two implications of all cells being formed from preexisting cells.​​

**(Discuss:** Give an account including , where possible, a range of arguments for and against the relative importance of various factors, or comparisons of alternative hypotheses)

**1.5.U2 The first cells must have arisen from non-living material.**

Outline the four processes needed for the spontaneous origin of cells on Earth.

​**(Outline**: Give a brief account or summary)

Outline the experiments of Miller and Urey into the origin of organic compounds.

​**(Outline**: Give a brief account or summary)

Define polymerization, monomer and polymer.

**(Define**: Give the precise meaning of a word, phrase, or physical quantity.)

Outline two properties of RNA that would have allowed it to play a role in the origin of life.

​**(Outline**: Give a brief account or summary)

**1.5.U3 The origin of eukaryotic cells can be explained by the endosymbiotic theory.**

State the endosymbiosis theory.

(**State:** Give a specific name, value or other brief answer without explanation or calculation)

Outline the major events in the origin of eukaryotic cells.

​**(Outline**: Give a brief account or summary)

Describe the evidence for the endosymbiotic theory.​

**(Describe**: Give a detailed account)

**1.5.A1 Evidence from Pastuer’s experiments that spontaneous generation of cells and organisms does not now occur on Earth.**

Define spontaneous generation.

**(Define**: Give the precise meaning of a word, phrase, or physical quantity.)

Describe Pasteur’s experiments about spontaneous generation.

**(Describe**: Give a detailed account)

Explain why Pasteur’s experiments did not support the idea of spontaneous generation. ​

(**Explain**: Give a detailed account including reasons or causes)

**1.5.NOS Testing the general principles that underline the natural world- the principles that cells only come from pre-existing cells needs to be verified.**

Explain historical thinking about spontaneous generation (what did people think and why did they think it?).

(**Explain**: Give a detailed account including reasons or causes)

Define conformity bias and give an example of conformity bias in the historical study of life.

**(Define**: Give the precise meaning of a word, phrase, or physical quantity.)

Outline the experiments of Redi and Spallanzani.

​**(Outline**: Give a brief account or summary)

List reasons why biologists now universally accept that cells only come from preexisting cells.​

**(List**: Give a sequence of brief answers with no explanation.)

**Key Terms**

cell theory

​endocytosis

prokaryotes

​chloroplasts

​aerobic respiration

​abiogenesis

multinucleated cell

​Pasteur

Miller and Urey

70s ribosomes

anaerobic respiration

endosymbiosis

​polymers

​symbiosis

​circular DNA

​linear chromosomes

eukaryotic

​monomers

polymerization

​chromosomes

​inorganic

mitochondria

​inheritance

​mutualistic

​nucleus

​organic