

Unit 2: What is the Origin of Humankind?

Evolution and God's Special Creation

Lesson 2: Day 2 - The Science of Evolution - Evidence and Acceptance

Time Length: 45-50 min.

INSTRUCTIONAL OUTCOMES

Next Generation Science Standards (NGSS)

Life Sciences:

HS-LS4 Biological Evolution: Unity and Diversity: This standard addresses understanding the evidence for evolution, the process of natural selection, and biological diversity, which are key aspects of your lesson.

Science and Engineering Practices:

- Analyzing and Interpreting Data: Students engage in analyzing the fossil record, homology, and genetic evidence to understand evolutionary theory.
- Engaging in Argument from Evidence: The lesson includes evaluating and discussing the evidence for and against Neo-Darwinism and the implications for Islamic viewpoints.

Crosscutting Concepts:

- Patterns: Identifying patterns in biological evidence that support the theory of evolution.
- Cause and Effect: Understanding how genetic variations and environmental factors contribute to evolution through natural selection.

Common Core State Standards (CCSS)

English Language Arts Standards for Literacy:

CCSS.ELA-Literacy.RST.11-12.1: Cite specific textual evidence to support analysis of science and technical texts, including discussions on evolution and its scientific basis.

CCSS.ELA-Literacy.RST.11-12.9: Compare and contrast findings presented in a text to those from other sources, including determining whether the findings support or contradict previous explanations or accounts.

English Language Arts Standards for Speaking and Listening:

CCSS.ELA-Literacy.SL.11-12.1: Initiate and participate effectively in a range of collaborative discussions on evolution, integrating diverse perspectives and responding thoughtfully to different viewpoints.

Content Learning Outcomes:

- Describe and explain the scientific account of Neo-Darwinian evolution.
- Describe, categorize, and evaluate various Muslim responses to Neo-Darwinism.
- Distinguish and evaluate the various kinds of conflicts (potential, apparent, and actual) between Islam and evolution.

Materials:

- **Presentation Slides**
- **Triple-Entry Vocabulary Journal** (Student Responsibility)
- **Pre-historic Time** - Supplemental Material
- Article: [Does evolutionary theory need a rethink?](#)
- **Comprehending "Human Exceptionalism"** - Supplemental Material
- **Microevolution vs Macroevolution** - Resource Material
- Unit 2: Lesson 2 Assessment Questions – **Instructor's Version** and **Student's Version**

Instruction/Teacher Facilitation:

- ❖ In the previous lessons, we discussed the two big factors in the concept of evolution; the age of the earth (a time factor) and the origin of man, from an Islamic/theological perspective. Then we shifted gears and looked at evolution from a scientific perspective by studying the key principles on evolution.
- ❖ Now that we have defined the concept of evolution, particularly Neo-Darwinism, and looked at its key principles, let's look at the evidence presented in favor of evolution.

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- When examining Neo-Darwinism through an Islamic lens, we would ask: Is Neo-Darwinism qat'i or zanni? In order to do that, we have to first look at the data or evidence.

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- Main evidences are: (and there are many others)

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- Fossil records - Fossil evidence provides a record of how creatures evolved and how this process can be represented by a 'tree of life', showing that all species are related to each other. These fossil records provide snapshots of the past which are then assembled together to illustrate a wide view of evolutionary change over the past 3.5 billion years (based on the oldest fossil uncovered).

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- Homology - Homology refers to the similarity of the structure, physiology, or development of different species of organisms.
 - A common example of homologous structures is the forelimbs of vertebrates, where the wings of bats and birds, the arms of primates, and the front flippers of whales, (along with the forelegs of four-legged vertebrates like dogs and crocodiles) are all derived from the same ancestral tetrapod structure.

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- Some homologous structures can be seen only in embryo development. For example, all vertebrate embryos, from humans to chickens to fish,

have a tail during early development, even if that tail does not appear in the fully developed organism.

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- Genetics - Genetic variations that alter gene activity or protein function can introduce different traits in an organism. If a trait is advantageous and helps the individual survive and reproduce, the genetic variation is more likely to be passed to the next generation. Examining the genetics reveals the similarity within species and across various species.
 - Genetics allows for better placement on phylogenetic trees and homology as well.
 - When genetic change occurs, those changes carry on in their descendants, and only descendants can inherit those changed genes. Working backward, geneticists track those genes to early common ancestors.

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- **Genetic Video - DNA Evidence**

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- ❖ The main question, or concluding question, then is if Neo-Darwinism is qat'i or zanni?
 - As was mentioned earlier, fossil records are only snapshots and they are assembled together by researchers based on their own perspectives and interpretations of the raw data. [That does not necessarily mean that that is how it actually occurred; they are educated assumptions.]
 - Evolutionary biologists still are divided over the processes that actually take place.
 - Homology is only based on seeing similarities which can be seen through the fact that the source of all these organisms is the same (ALLAH swt). So it makes sense to see unity in living beings as well as diversity.
- ❖ Activity: Have students read the article: [Does evolutionary theory need a rethink?](#):
 - Students should be instructed to read through the article looking for proofs for Neo-Darwinism and proofs against Neo-Darwinism (or proof that it needs to be revised).
 - This will help students to sift through information and research to make it clear that this is a zanni issue. (For more explanation of those who argue that Neo-Darwinism needs to be revised, view [Islam and evolution with Professor Shoaib Ahmed Malik](#) at time stamp 10:51.)

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- ❖ So we can conclude that Neo-Darwinism and its principles are zanni/probabilistic and NOT qat'i/certain.
 - Researchers are divided over what processes should be considered fundamental.
 - Extended Evolutionary Synthesis - This is an umbrella term for a set of contemporary theories that propose modifications or extensions to Neo-Darwinism. It includes ideas related to epigenetics, developmental biology, and niche construction, which can influence the course of evolution.

- There are numerous arguments regarding the exact mechanisms of evolution, and if the mechanisms are not certain, then the theory as a whole is not certain either.

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- ❖ Conclusion: What can we accept?
 - We would need some qat'i knowledge or criteria to be able to decide; only through revelatory judgments, we would be able to come to a clear conclusion.
 - IF we do not find any clear ayaat or hadith regarding these topics, we would then need to make sure that it does not go against what /S mentioned.
 - The concept of Insaan is NOT the same as the concept of homo-sapiens. The distinctions of humans and animals is evident.
 - The revelatory sources present a clear difference. (Haywaan vs Haywaan an-Natiq)
 - Question: What are the philosophical assumptions being made if we do lump them into the same category?
 - Looking at the Ancestral Trees and how and where the various species branch off, we can have two possible revisions based on revelatory evidence and the lack of revelatory evidence (revelation silent about it) [about 2 million years ago]:

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- **Human Exceptionalism:** an isolated species, no evolutionary connection
 - This concept generally refers to the belief that humans are fundamentally different from and superior to other animals, owing to unique qualities such as rationality, morality, language, or a soul.

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- **Adamic Exceptionalism:** maintains Adam A (and Hawwa A) as direct divine creation, but postulates that their descendant humans could have interbred with other hominids (who were already present on earth which were results of the evolutionary process).

[Use **Comprehending "Human Exceptionalism"** - Supplemental Material for further information and discussion.]

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- ❖ Let us look at where these principles of evolution intersect with what we believe to be true as Muslims:
 - Q: Is the proposition 'the earth might be 4.6 billion years old' in conflict with specific doctrines of the Quran or Sunnah?
 - A: No conflict - because no actual estimate is mentioned
 - Q: Is the proposition 'all biological life, including the human being, is interconnected through a long, historical lineage like a family tree' in conflict with specific doctrines of the Quran and Sunnah?
 - A: YES, it is in conflict - humans are an exception

- Q: Is the proposition 'human beings, chimpanzees, and monkeys all have a common ancestor from which they evolved' in conflict with specific doctrines of the Qur'an or Sunnah?
 - A: YES, it is in conflict - Adam A was divinely created, not "evolved"
- As we learned, there are clear Quranic statements that Adam A was a new and unique creation and the original human being, which is why he is recognized as the father of mankind.
- These points show that the theory of evolution is a demonstration of the interpretive aspect of science; human interpretation of data (not statements of truth as we assume).
- We need to continually look at how certain are the pieces of evidence and what assumptions are being made about them.

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[Keynote for students who are still perplexed: have patience! We should be comfortable and patient with the idea of not having all the answers, we don't need to have an answer immediately either. This should be a general principle with how scientific projects work anyway, it takes time to research, get data, test that data, compare that data etc. Now that we have established that the concept of evolution is zanni, and if one is distraught and would like to have some level of certainty, the only resort is looking at qat'i knowledge, which comes from the Quran and Authenticated Sunnah.]

[IF discussion of microevolution vs macroevolution comes up, because human beings do undergo evolution in a sense are have been "changing" or "evolving" since the time of Adam (upon him be peace) then this extra portion can be covered formally in class as well.]

Microevolution vs. Macroevolution: Resource Material

- ❖ Is Darwinian Evolution successful in explaining how life on earth evolved?
 - Microevolution - changes of populations over time
 - Within species, develop new attributes - well-established within the scientific realm.
 - Example: Horses - different breeds due to their differences, seen from past horse population changes.
 - Generally affects all living beings ("living" in the scientific sense and the Islamic sense).
 - Macroevolution -
 - Across species, changing from one species entirely into another species - not well-established, still maintains a questionable stance in the realm of science.
 - Example: Horses evolving into something that is no longer considered a horse.
 - Questions that remain:
 - Has this actually happened? Is it metaphysically possible?
 - Logically possible? Because even the evidence is not well-established and questionable. Evidence doesn't live up to scientific standards.
 - What convincing evidence is provided? - most of the evidence is not stable enough to consider.
 - Still questionable in general, even of who/what if effects (IF it occurs).

Biological Connections:

- This lesson can be connected to the chapter on concepts of evolution and biodiversity of life in Biology classes (usually the 3rd or 4th Unit, according to most Biology textbooks.)
- When discussing the last point about human classification, this can be connected to a taxonomy lesson, but showing that human taxonomy under homo sapiens is an *assumption* being made by evolutionary theorists. And the statements from our revelatory text prove this. This can also be connected to the concept of qat'i and zanni, and human taxonomy as classified in mainstream biology is zanni, whereas our human exceptionalism is qat'i.

Genetics Video