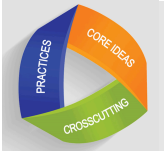
2:3

Unit: 2
Lesson: 3

Time Length: 45–50 min

The Science of Evolution: Evidence and Acceptance

Evolution and God's Special Creation



NGSS Instructional Outcomes

Next Generation Science Standards

Life Sciences

HS-LS4 Biological Evolution: Unity and Diversity: Understanding the evidence for evolution, the process of natural selection, and biological diversity.

Science and Engineering Practices

Analyzing and Interpreting Data: Students engage in analyzing the fossil record, homology, and genetic evidence to understand the 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.

CCSS Instructional Outcomes

Common Core State Standards

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-Darwanism.
- Distinguish and evaluate the various kinds of conflicts (potential, apparent, and actual) between Islam and evolution.

Materials:

- Instruction/Teacher Facilitation: Slides 2.39–2.53
- Triple-Entry Vocabulary Journal (Student Responsibility)
- YouTube Video: DNA Evidence That Humans and Chimps Share a Common Ancestor: Endogenous Retroviruses
- YouTube Video: Islam and Evolution with Professor Shoaib Ahmed Malik
- Supplemental Material: Microevolution versus Macroevolution
- Supplemental Material: Comprehending “Human Exceptionalism”
- Supplemental Material: Question Bank
- Lesson 2.2 & 2.3 Assessment

Instruction/Teacher Facilitation: Slides for Lesson 2.3

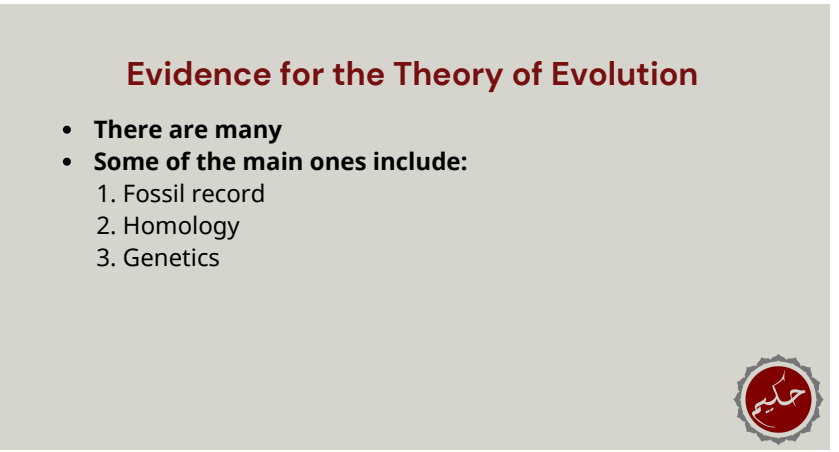
- **Slide 2.39.** Evidence for the Theory of Evolution
- **Slide 2.40. 1.** Fossil Records
- **Slide 2.41. 1.** Fossil Records
- **Slide 2.42. 2.** Homology
- **Slide 2.43. 2.** Homology
- **Slide 2.44. 2.** Homology
- **Slide 2.45. 3.** Genetics
- **Slide 2.46. 3.** Genetics
- **Slide 2.47.** Is Neo-Darwinism *qaṭ̓ī* or *ẓannī*?
- **Slide 2.48.** Questions to Think About
- **Slide 2.49.** Human Exceptionalism
- **Slide 2.50.** Adamic Exceptionalism
- **Slide 2.51.** What Can We Accept?
- **Slide 2.52.** Let us Look at the Principles of Evolution
- **Slide 2.53.** And Allah, the Exalted, Knows Best!

Instruction/ Teacher Facilitation

In the previous lessons, we discussed the two big factors in the concept of evolution; the age of the earth (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 of evolution.

Now that we have defined the concept of evolution, particularly Neo-Darwinism, and looked at its key principles, let us look at the evidence presented in favor of evolution.

Slide 2.39: Evidence for the Theory of Evolution

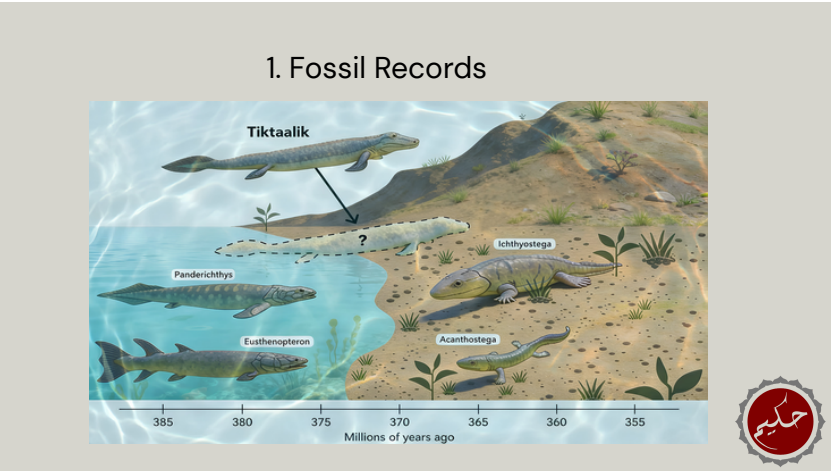


When examining Neo-Darwinism through an Islamic lens, we would ask: Is Neo-Darwinism qaṭ̓ī or *ẓannī*? In order to answer that, we have to first look at the data or evidence.

Slide 2.40: 1. Fossil Records

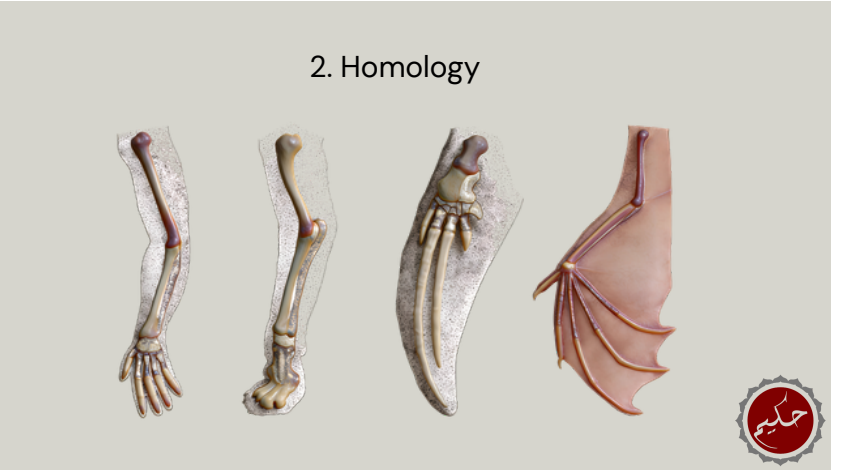
Evidence for the Theory of Evolution is primarily derived from fossil records, homology and genetics.

Slide 2.41: 1. Fossil Records



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).

Slide 2.42: 2. Homology



Homology: Homology refers to the similarity of the structure, physiology, or development of different species of organisms.

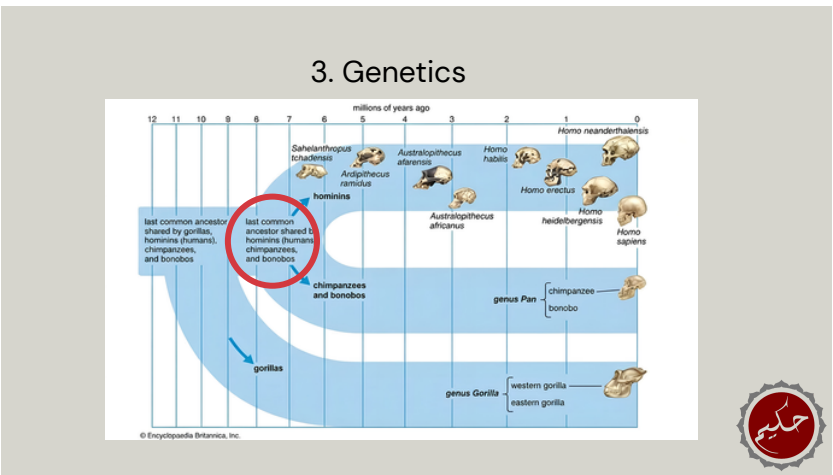
A common example of homologous structures is the forelimbs of vertebrates, where the wings of bats and birds, the arms of primates, and the front flippers of whales, (along with the forelegs of four-legged vertebrates like dogs and crocodiles) are all derived from the same ancestral tetrapod structure.

Slide 2.43: 2. Homology

Slide 2.44: 2. Homology

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.

Slide 2.45: 3. Genetics



Genetics: Genetic variations that alter gene activities or protein functions 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 genetics reveals similarities within species and across various species.

- Genetics allows for better placement on phylogenetic trees and homology as well.
- When genetic changes occur, 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.

Slide 2.46: 3. Genetics

3. Genetics

Watch Video:
DNA Evidence That Humans & Chimps Share A Common Ancestor: Endogenous Retroviruses

Stated Clearly

DNA Evidence: Endogenous Retroviruses

Watch the Video - **DNA Evidence That Humans and Chimps Share a Common Ancestor: Endogenous Retroviruses**
[For detailed explanation and response to this video, see **Supplemental Material: Question Bank** on p.147.]

Slide 2.47: Is Neo-Darwinism *qaṭʿī* or *ẓannī*?

Is Neo-Darwinism qaṭʿī or ẓannī?

https://www.nature.com/articles/514161a

The main question, or concluding question, then is whether Neo-Darwinism is *qaṭʿī* or *ẓannī*?

As 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 are still 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.

Student Activity:

Have students read the article: Kevin Laland, Tobias Uller, Marc Feldman, et al., "**Does Evolutionary Theory Need a Rethink?**" Nature 514 (2014): 161–164.

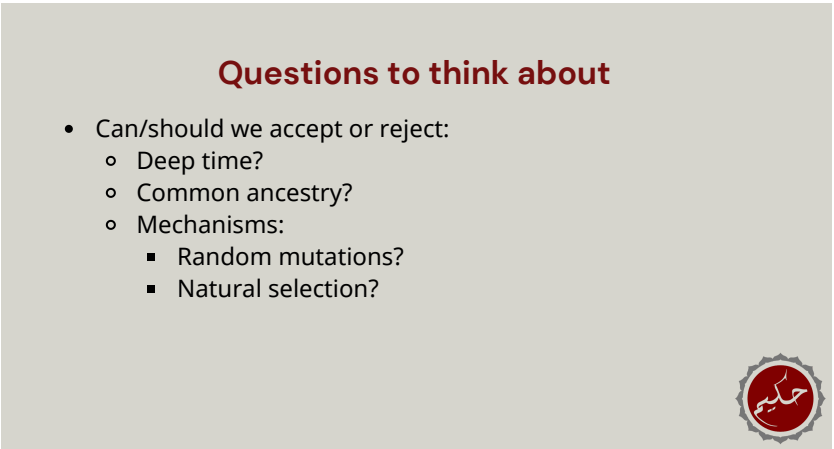
Students should be instructed to read the article looking for proofs for Neo-Darwinism and proofs against Neo-Darwinism (or proof that it needs to be revised).

This will help students to sift through information and research to determine if this is a ẓannī 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.]

Evolutionary Theory Article

Islam and Evolution with Professor Shoaib

Slide 2.48: Questions to Think About



We can conclude that Neo-Darwinism and its principles are *ẓannī* (probabilistic) and NOT *qaṭʿī* (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.

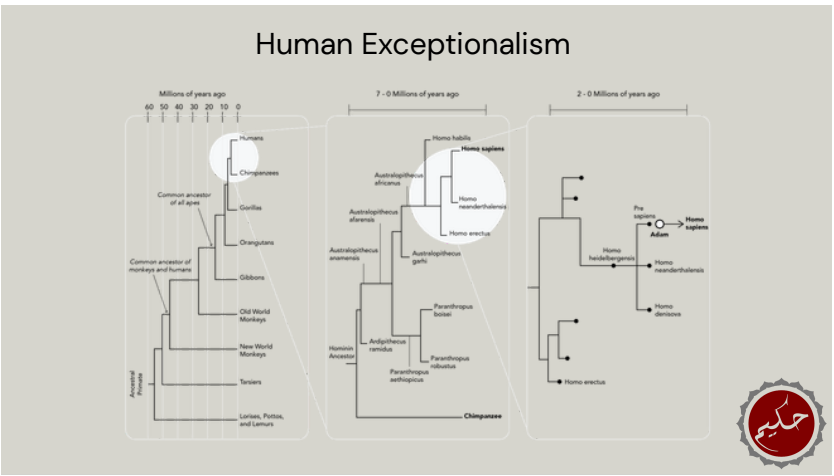
Conclusion: What Can We Accept?

We would need some *qaṭī* knowledge to be able to decide what can be considered to be true.

If we do not find any clear verses or *ḥadīth* (graded as certain knowledge) regarding these topics, we would then need to make sure that it does not go against what is mentioned.

- The concept of *insān* is NOT the same as the concept of homo sapiens. The distinctions of humans and animals are evident.
- The revelatory sources present a clear difference (*al-Ḥayawān* versus *al-Ḥayawān an-Nāṭiq*).
- 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 (what revelation is silent about it).

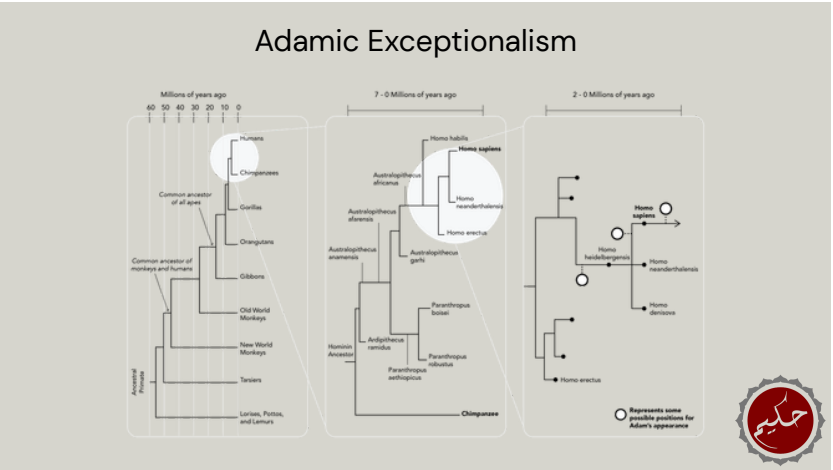
Slide 2.49: Human Exceptionalism



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, and, from a theological perspective, a soul.

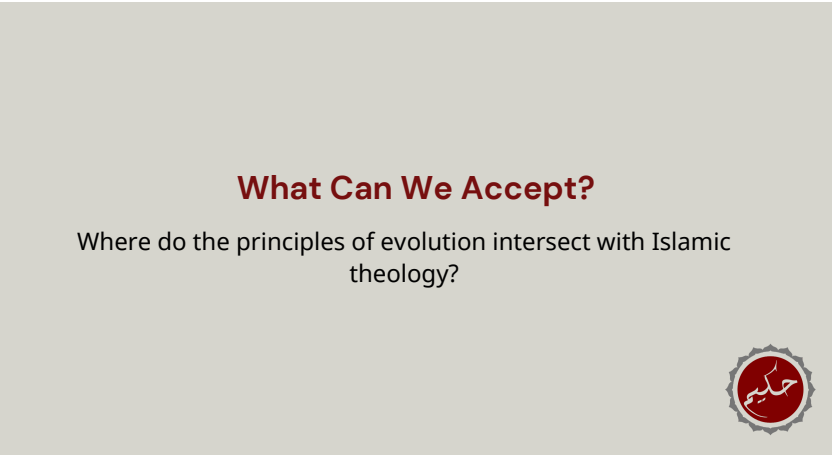
Slide 2.50: Adamic Exceptionalism



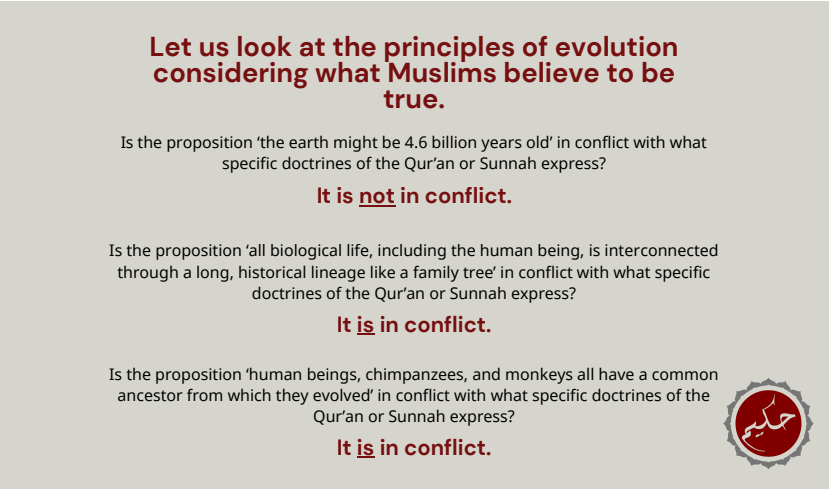
Adamic Exceptionalism: maintains Adam (pbuh) (and Ḥawwāʾ (pbuh)) as direct divine creation, but postulates that their descendant humans could have interbred with other hominids (who may have existed on earth resulting from the evolutionary processes).

[For further explanation and discussion, refer to the **Supplemental Material: Comprehending "Human Exceptionalism"** on p. 139.]

Slide 2.51: What Can We Accept?



Slide 2.52: Let us Look at the Principles of Evolution



Q&A

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 Qur'an 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 Qur'an and Sunnah?

A: YES, it is in conflict because human creation is detailed differently from clear Qur'anic texts.

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 because Adam (pbuh) was divinely created, not "evolved."

As we learned, there are clear Qur'anic statements that Adam (pbuh) 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 observational data).

We need to continually look at how certain are the pieces of evidence and what assumptions are being made about them.

Slide 2.53: And Allah, the Exalted, Knows Best!

A 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 do not need to have an answer immediately either. This should be a general principle with how scientific projects work anyway, as it takes time to research, get data, test that data, compare that data, and so on. Now that we have established that the concept of evolution is *ẓannī*, and if one is distraught and would like to have some level of certainty, the only resort is looking for *qaṭī* knowledge derived from scriptural statements (Quran and Sunnah) that are of the highest grade of authenticity and clear in meaning (not all are).

Note: If discussions of microevolution versus macroevolution come up, because human beings do undergo evolution in the sense that they have been "changing" since the time of Adam (pbuh) then this extra portion can be covered formally in class as well. [See **Supplemental Material: Microevolution versus Macroevolution** on p. 138.]