Concept 1

Primate Relationships and Origins

Objectives ∞ Activities ∞ Assignments ∞ Questions

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|  | The purpose of this concept is to elicit an understanding of primate relatedness, phylogeny, and how specific characteristics are beneficial for life in an arboreal environment. |

## Objectives

1. Summarize and differentiate between “evolving from monkeys” and divergence from a common ancestor

2. Define ancestral and derived traits and be able to categorize them through the scope of human evolution

3. Describe trends that take shape in the human lineage and make inferences about what encouraged them

4. Relate our own body mechanics to our arboreal origins

5. Recall the chronological sequence of major events

## In class activities

* Discussion of the “March of Progress” which encourages students to make predictions about our origins
* Clicker question
* Phylogeny dissection and discussion in lecture

## Assignments

* Have students create and present their own phylogeny with traits
* Assign a video that shows similarities in body mechanics from arboreal origins, genetics, and/or behavior

## Questions

1. Contrast the concepts of being “evolved from” chimpanzees and sharing a common ancestor.
2. What is the name for the lineage that done not include the chimpanzee lineage and is composed of only species in the direct human lineage?
3. Is the “March of Progress” an accurate representation of evolution? Defend your answer.
4. When did the human lineage diverge from the chimpanzee lineage?
5. What is the name for the lineage that describes all the great ape species and includes humans?
6. What percentage of our DNA is shared with chimpanzees?
7. How are our hands and arms adapted for living in trees?
8. What ancestral traits do our eyes retain from our arboreal origins and what is the purpose of this trait?
9. Describe anatomical characteristics that would be beneficial in an arboreal environment.

Concept 2

Characteristics and Trends in Hominin Evolution

Objectives ∞ Activities ∞ Assignments ∞ Questions

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|  | The purpose of this concept is to understand the overarching trends in hominin evolution and the selective pressures that encouraged their development. |

## Objectives

2. Define ancestral and derived traits and be able to categorize them through the scope of human evolution

3. Describe trends that take shape in the human lineage and make inferences about what encouraged them

4. Relate our own body mechanics to our arboreal origins

6. Extrapolate the benefits of bipedalism

7. Explain how fossil evidence can demonstrate if an organism walks upright

## In class activities

* Setting the stage by discussing how the landscape of Africa shifted and catalyzed a departure from life in the trees
* Clicker question
* Skull demonstration that explains the shift in the foramen magnum and changes in detention (video attached)

## Assignments

* Have students create their own 3D printed skulls from The Human Evolution Materials Teaching Project

[3D Files and PDFs – Human Evolution Teaching Materials Project (hetmp.com)](https://www.hetmp.com/3d-files-and-pdfs/)

## Questions

1. Describe the changes that took place in the landscape of Africa to catalyze early hominins leaving the trees.
2. Define forest fragmentation?
3. What are the advantages of bipedalism?
4. Explain why we see a shift in the length of our arms and legs.
5. What are two ways a change in diet and behavior altered the shape of our skull?
6. What can the angle of the foramen magnum tell about a fossil?
7. Describe a trend we see in the hominin lineage and what we think encouraged that shift.
8. What changes do we see in the hominin birth canal? Explain why this occurred.

Concept 3

Specific Fossils in Hominin Evolution

**Objectives ∞ Activities ∞ Assignments ∞ Questions**

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|  | *The purpose of this concept is to examine specific fossils and the characteristics that are associated with them. This concept also serves to provide a timeline of hominin evolution.* |

**Objectives**

2. Define ancestral and derived traits and be able to categorize them through the scope of human evolution

5. Recall the chronological sequence of major events

7. Explain how fossil evidence can demonstrate if an organism walks upright

8. Demonstrate an understanding of the traits unique to specific fossils

**In class activities**

* Explain hominin timeline diagram
* Clicker questions
* Discuss traits through the lens of specific fossils

**Assignments**

* Assign the Interactive Timeline and Family Tree from The Smithsonian

Interactive Timeline <https://humanorigins.si.edu/evidence/human-evolution-interactive-timeline>

Family Tree <https://humanorigins.si.edu/evidence/human-family-tree>

**Questions**

1. What parts of Ardipithecus’ body give us clues they still spent a lot of time in trees? Explain.

2. Which hominins did NOT make and use tools?

3. Contrast the ancestral size of our brain with our brain’s size today.

4. Which hominin used fire at will?

5. How did the migration out of Africa encourage different body forms for Homo sapiens and Neanderthals? Describe the Neanderthal body form.

6. Which fossil is older Ardipithecus or Australopithecus?

Concept 4

Behavior, Learning, and Persistent Evolution

**Objectives ∞ Activities ∞ Assignments ∞ Questions**

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|  | *The purpose of this concept is to understand characteristics in the hominin lineage and how they relate to social behaviors. This concept ends by driving home the point that evolution is a dynamic and continual process.* |

**Objectives**

2. Define ancestral and derived traits and be able to categorize them through the scope of human evolution

3. Describe trends that take shape in the human lineage and make inferences about what encouraged them

9. Attempt to predict how Neanderthals went extinct

10. Understand that evolution is a dynamic and continual process

**In class activities**

* Explain the difference between using tools and creating tools
* Clicker question
* Discuss examples of collective learning
* Ask students to posit what led to Neanderthal extinction and discuss

**Assignments**

* Have students create and present their own projectile to present to the class then have the class collectively work on a projectile to illustrate the benefits of collective learning

**Questions**

1. What parameters must be met for collective learning to take place?

2. What is the benefit of collective learning?

3. How is creating tools different from using them?

4. How are advanced tools different from simple tools? What is the primary purpose of simple tools?

5. Describe some ways that we know Neanderthals and Homo sapiens interacted.

6. How many years did Neanderthal and Homo sapien existence overlap?

7. Explain five possible ways Neanderthals may have gone extinct.

8. Is lactose intolerance a derived or ancestral trait?

9. Is the hominin lineage done evolving?