

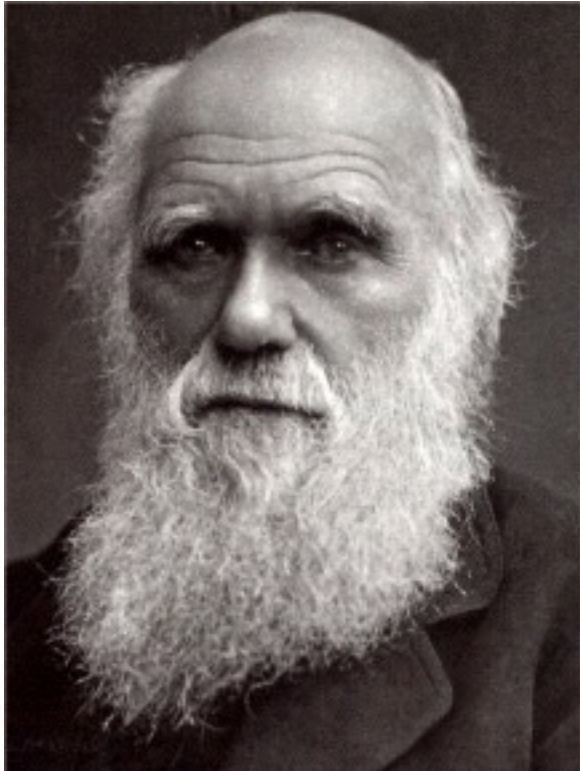
Anthro 101: Human Biological Evolution

Lecture 1: Intro & Scientific Method

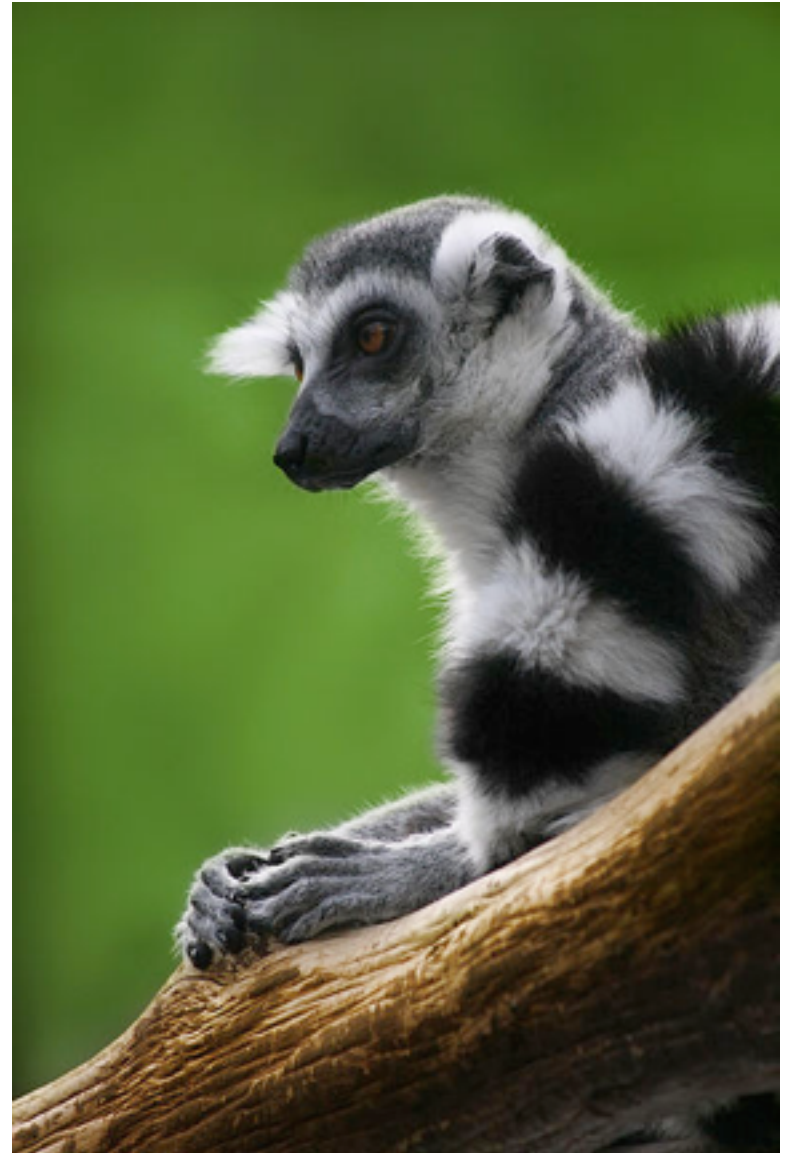
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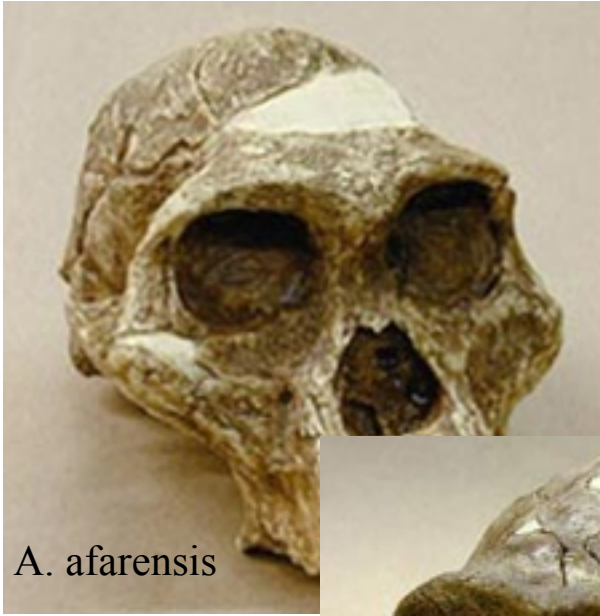
Anthropology: Study of Humans + How Evolution Works



How Does Evolution Works in Other Primates?



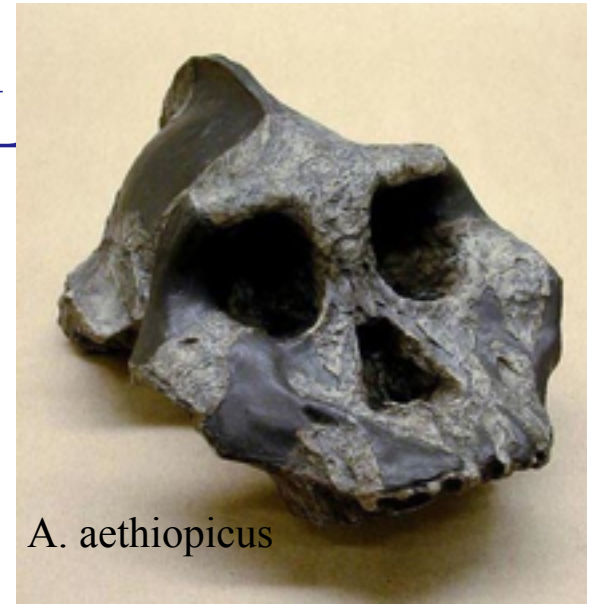
What is the History of Life



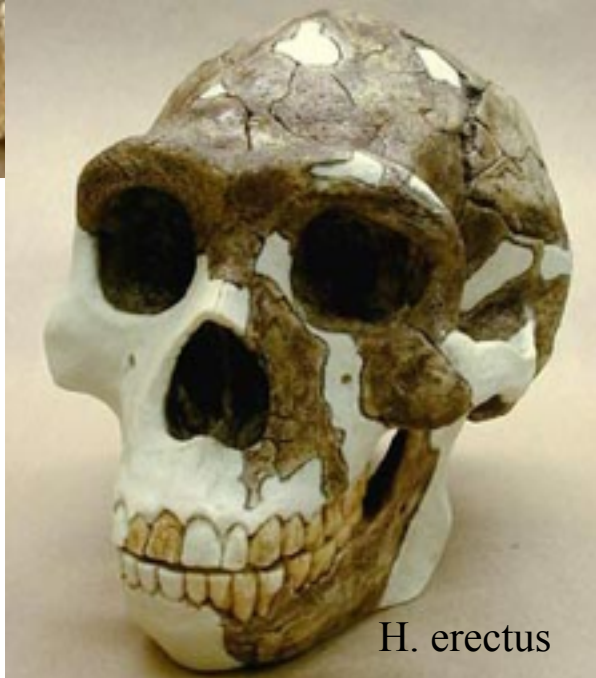
A. afarensis



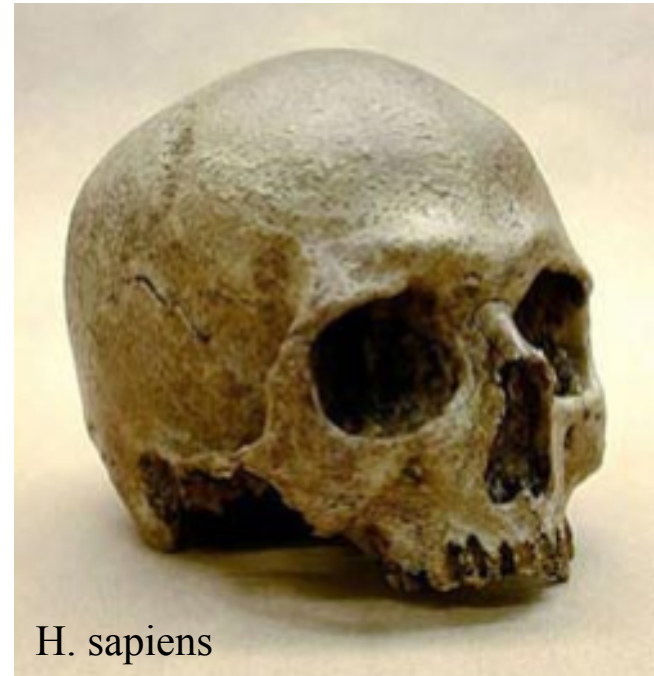
A. africanus



A. aethiopicus



H. erectus



H. sapiens

How did Evolution shape hominin adaptations?

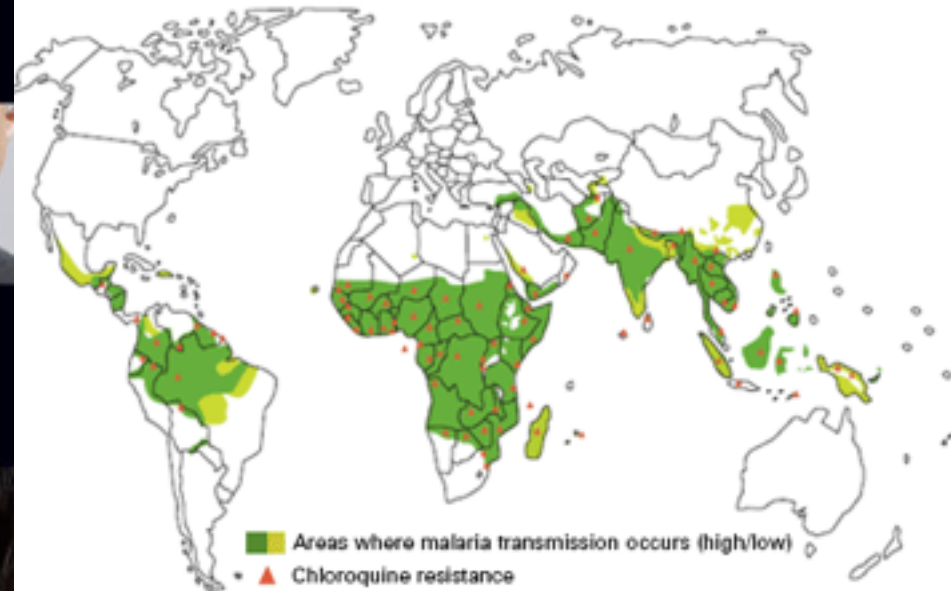
- Bipedality
- Tool use



- Behavior
- Culture

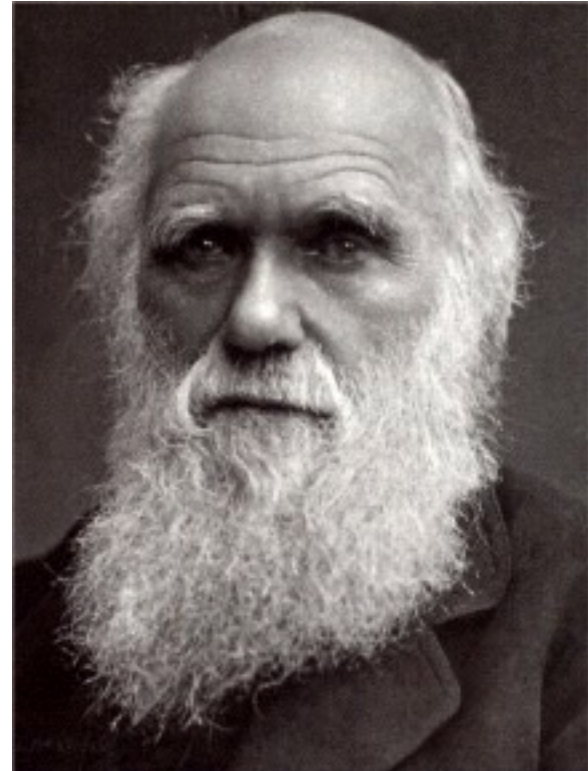


How does Evolution shape human minds, bodies, & behavior in modern humans?



To understand why we are the way we are, we need to know

- How the scientific method operates



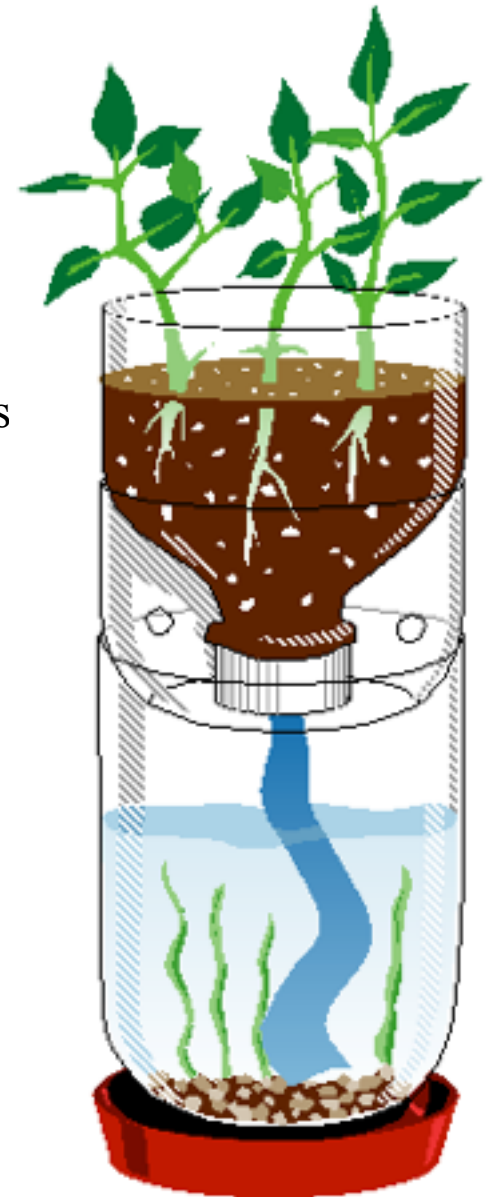
What is Science?

- Process of explaining natural phenomena through observation and experimentation
 - ♦ Measure observed phenomena
 - ♦ Test hypotheses
 - ♦ Follow the Scientific Method



What is a hypothesis?

- provisional explanations requiring verification or falsification through testing
 - proposes a causal relationship between two variables
 - Predict how X will affect Y
- **(X) Independent** variable(s) – things that are
 - Water, sunlight, soil
- **(Y) Dependent** variable(s) – things that are affected
 - Height of plant
 - Thickness of roots
 - Number of leaves



The Scientific Method

- Question
- Read
- Hypothesis
- Methods
- Collect data
 - ♦ Rigorous & replicable
 - ♦ Quantitative
 - ♦ Statistics
 - ♦ Falsifiable
- Relate back to your hypothesis



Repeat!

The process of science generates a theory

- broad statement of scientific relationships
- underlying principles
- substantially verified through the testing of hypotheses
- A broad explanatory statement of scientific fact

- It guides the formation of hypotheses to explain things observed in the world
- It has been supported by repeated and varied testing of related hypotheses

- **Hypothesis** - narrow focus explaining the relationship between a few specific phenomena

A theory

IS

- A theory is backed by lots of evidence
- A theory is a statement of scientific fact
- A theory is open to evaluation and testing
- A theory has the potential to be falsified/revised

IS NOT

- A theory is NOT a hunch or a guess
- A theory is not an absolute
- A theory is not unknowable or immeasurable

Any proposition that is stated as absolute or doesn't allow for the possibility of falsification is not a scientific hypothesis.

Why we use the scientific method

- Testable (falsifiable) hypotheses
- Replicable methods
- Competition and collaboration among scientists

- New theories gain acceptance
 - ◆ Explain odd findings that older theories can't explain
 - ◆ Lead to new TESTABLE predictions
 - ◆ Lead to new discoveries

- All results and theories open to debate & refinement

Creationism & Intelligent Design

- Biblical explanation for the origin of the universe, species, humans
 - ♦ relies on faith in bible not evidence
 - ♦ Not open to testing = absolutes
- Argue that evolution is an unproven theory
- Intelligent Design = creationism
 - ♦ No testable predictions regarding the designer or creator
 - ♦ Try to disprove or discredit evidence for evolution
 - ♦ Personal incredulity
 - ♦ Irreducible Complexity

Your Assignment

- Break up into groups of 5- 6
- Read handout
- Answer; Why is science important when people make claims that cannot be supported?
- Tell me about the claim that has been made in the article. How can the scientific method prove or disprove this claim?
- Is the Claim true or untrue? Explain to the class