

Unit 9

Human Evolution

Description

Modern humans and chimpanzees have both diverged from the common ancestor they shared four or five million years ago, and *Homo sapiens* are now the only living representative of what was once a multibranching bush of hominid species. One of several legacies that is revealed by studying genetics of modern humans is a remarkably small amount of genetic variation within our species; this results from one or more population bottlenecks at sometime in the past.

Menu of Unit Activities

Note: All activities, handouts, solutions, and tips can be found in the Appendix of this guide.

Activity 1: What's the Relationship? (15 minutes + 30 minutes of video)

A discussion of the terms and concepts used in human evolution that is a preview to watching the video.

Activity 2: Molecular Clock (60 minutes)

A molecular clock is constructed using sequences that represent humans, baboons, and chimps. The clock is then used to calculate divergence times.

Activity 3: Genealogies (15 minutes)

Construction of genealogies to trace inheritance of mitochondrial DNA and Y chromosomes.

Activity 4: Icelandic Perspectives (25 minutes)

Small groups debate the issues surrounding the use of genealogical information for commercial and research purposes.

Activity 5: Roots (15 minutes)

A group discussion on companies and non-profit organizations that use DNA testing to determine ancestry.

Before the Session

Facilitator: Copy and assemble the following activity materials. (See the Activities section in the Appendix of this guide for master copies of transparencies and handouts, plus Tips and Suggested Answers.)

Activity 1: What's the Relationship? requires:

- One copy of the List of Terms per person (master copy provided)
- One copy of the Human Evolution online text chapter (available online at <http://www.learner.org/channel/courses/biology>)

Activity 2: Molecular Clock requires:

- One piece of graph paper per person
- One copy of the Worksheet of Instructions and Sequences per person (master copy provided)
- Transparency of Molecular Clock (master copy provided)
- Tips and Suggested Answers
- One copy of the Human Evolution online text chapter (available online at <http://www.learner.org/channel/courses/biology>)

Activity 3: Genealogies requires:

- Transparency of the Example Genealogy and Questions (master copy provided)
- Tips and Suggested Answers

Activity 4: Icelandic Perspectives requires:

- One copy of the Discussion Questions per person (master copy provided)

Activity 5: Roots requires:

- One copy of the Discussion Questions per person (master copy provided)
- Transparency of More Quotes and Perspectives (master copy provided)

Facilitator: Make sure that the room has these supplies:

- pens or pencils and paper
- overhead projector and markers
- VCR and TV
- black/white board with chalk or markers

Session Activities and Video

Activity 1a: What's the Relationship?—Pre-Video Discussion (10 minutes)

- Read the Setup.
- Arrange into pairs and pass out the List of Terms.
- Spend 10 minutes discussing what the terms might mean and how they relate to each other.

Facilitator: Stress that these are not necessarily terms everyone will know. The point of the exercise is to make educated guesses about the terms and to begin thinking about the topics in this unit.

Video (30 minutes)

- Watch the Human Evolution video.

Activity 1b: What's the Relationship?—Post-Video Discussion (5 minutes)

- As a group, go over the terms and concepts again. Briefly define or explain them. Any that are still uncertain can be looked up in the Human Evolution online text chapter.

Activity 2: Molecular Clock (60 minutes)

- Read the Setup.
- Arrange into pairs and have each person take a piece of graph paper and a Worksheet of Instructions and Sequences.
- Spend 10–15 minutes working on Part 1. As a group, compare answers and discuss any questions or discrepancies.
- Begin working on Part 2. When everyone has finished Exercise A, look at the transparency of the Molecular Clock as a group. Compare the clocks made by the pairs with the example on the transparency.
- When everyone has completed the entire exercise, spend a few minutes as a group discussing the results generated by each pair.
- Answers to Part 2 can be found in the Tips and Suggested Answers.

Activity 3: Genealogies (15 minutes)

- Read the Setup while looking at the transparency of the Example Genealogy.
- Each person will draw their genealogy or work with the example on the transparency.
- After a few minutes to make the genealogies, as a group, discuss the questions. Compare the group's conclusion with the one in the Tips and Suggested Answers.

Session Activities and Video, cont'd.

Activity 4: Icelandic Perspectives (25 minutes)

- Read the Setup and arrange into teams of four. Each team of four will divide into two pairs. One pair will choose to represent a company like Decode and the other pair will represent the community of citizens whose genetic information and genealogy is being researched.
- Each person should take a copy of the Discussion Questions.
- Spend 10 minutes working in pairs, with each pair deciding how the questions would be answered by the group they represent.
- Spend 10 minutes in teams of four debating the questions, with each pair presenting their perspective to the other side.
- As a group, spend a few minutes discussing the overall conclusions of the individual teams.

Activity 5: Roots (15 minutes)

- Read the Setup.
- Have each person take a copy of the Discussion Questions.
- As a group, discuss the questions. After discussing each question, put the transparency of More Quotes and Perspectives on the overhead projector for additional information.

Summary (5 minutes)

- If time permits, as a group or in pairs, define the major ideas or “take home” lessons of this unit and its applications.