



## Human origins: the prehistoric human race

### Description of activity

*Human origins: the prehistoric human race* is a game to be played, in conjunction with the *DNA Interactive* ([www.dnai.org](http://www.dnai.org)) resources, to help students learn about human evolution and the effect modern science is having on our perception of human origins. This activity can be used with both middle school and high school students.

### Learning outcomes

Students will:

- Work in groups to research questions of anthropology and molecular biology;
- Practice oral presentation skills; and
- Understand how DNA science is used to research evolution and human origins.

### Assumptions of prior knowledge

Students should know that DNA carries the genetic code. They should also be familiar with the organization of chromosomes and the existence of the mitochondrial genome.

### Misconceptions

Students may hold the common misconception that humans "evolved from apes," rather than understanding that our species and modern great apes evolved from a common ancestor.

Also, students may think that the design of this game board is the predominant theory of human evolution. This game board represents only one of a number of possible links that may be drawn between hominid species. More information can be found at [www.becominghuman.org](http://www.becominghuman.org).

### Implementing the lesson

Become familiar with the *DNAi* web site and how to navigate through it. Provide students with information about navigating the site, and how to play animations and video clips.

For both the pre- and in-class activities, students will need access to computers with Internet access. Speakers are optional: many of the animations and videos on *DNAi* have sound, but the transcripts are also available.

### Before class:

Print out the three sections of the game board and tape them together. Assemble and tape the paper game die. Find objects that can be used as game pieces - anything that can be used to distinguish one group from another - such as Monopoly pieces, colored discs, numbered blocks etc. One game piece is required for each group of three students.

Print out the complete sets of questions and answers, or use the *Question Builder* program provided for this activity to print out the questions for Levels 1, 2, and 3 that are appropriate for your class. Follow the directions on the screen to view and select the questions you want. *Question Builder* can generate quiz and answer sheets with as few or as many questions as you want (note: the results are html pages, not PDF files; you can save a copy of your work by cutting and pasting into a Word document, or use the "Save as . . ." command in the *File* menu).

Make a copy of the question sheets you printed or copied for each student and a copy of the answers for you. Also make a copy of the sheet with the "Time Out" cards. Print and cut up one copy of the question and Time Out sheets to use as question cards in the board game. (Hint: laminate the cards for future use).



## Pre-game activity:

Give each student a copy of the question sheets. During class or as a homework activity, have students use [www.dnai.org](http://www.dnai.org) > **Applications** > **Human Origins** to answer the questions. To play the game, students must become familiar with the questions, the answers, and how to navigate the *DNAi* site. They won't have access to their answers during gameplay. The question sheets contain hints for students to find answers in the *DNAi* site.

## Running the game:

Divide students into groups of three. Have each group pick a game piece to start. One person in each group of three, the "player," should sit near the game board. The other two should be sitting in front of computers with Internet access and their screens set at [www.dnai.org](http://www.dnai.org) > **Human Origins**. The students rotate roles at each turn.

The rules of the game are laid out on the page ("*Human origins: running the prehistoric human race*"). Hand out one copy of these rules per group. As the game play proceeds, each group has a chance to evolve by answering questions printed on the game cards. After picking a card, the player reads the question aloud. The player can then choose to answer the question, or to call upon one or both of their "relatives" to hunt through the *DNAi* site for the answer.

The group should be kept to a time limit (between 30 seconds and 2 minutes, depending on the difficulty). Other groups can also use this time to gather the answer in a bid to out-compete the evolving team. When the time has run out, the player must clearly answer the question in complete sentences. If you, the "selecting agent" (sometimes known as Mother Nature), consider their answer unacceptable, players from other groups may be allowed to answer.

As the selecting agent, you choose a scoring system. Suggestions follow:

- Two (selective) pressure points (ie. two rolls of the die) for an immediate correct answer.
- Zero points for an incorrect answer.
- One point (and roll of the die) for a correct answer using the *DNAi* site.
- One point (and roll of the die) for a correct answer from a rival species.

The first team to evolve into modern humans wins!

## Further explorations

*Create your own questions*

After the game has been played, have each group design a question card to add to the *Question Bank*. Each question must have a hint from one of the animations or videos on [www.dnai.org](http://www.dnai.org), and should require critical thinking in order to be answered properly.

## Glossary

Anthropology

Archeology

Australopithicine

Common ancestor

Cro-magnon

Evolution

Haplotype / haplogroup

Hominid

Mitochondrial DNA

Morphology



Neandertal / Neanderthal

Paleoanthropology

Primate

### **Resources**

#### **Web**

Cold Spring Harbor Laboratory (2002). *DNA From the Beginning: an animated primer on the basics of DNA, genes, and heredity*, [www.dnafb.org](http://www.dnafb.org)

Institute of Human Origins (2001). *Becoming Human*, [www.becominghuman.org](http://www.becominghuman.org).

Woodrow Wilson National Fellowship Foundation (2002). *Leadership Program for Teachers: Teacher Resources > Core Websites*, [www.woodrow.org/teachers/Teacher\\_Resources/CORE/core.html](http://www.woodrow.org/teachers/Teacher_Resources/CORE/core.html)

#### **Video/DVD**

*DNA Interactive* (2003). NTSC version produced by Cold Spring Harbor Laboratory and Red Green & Blue Company; funded by Howard Hughes Medical Institute. Available at [www.dnai.org](http://www.dnai.org)

#### **Books**

Micklos, David A., Freyer, Greg A., and Crotty, David A. (2003). *DNA Science: A First Course, (2<sup>nd</sup> Edition)*, Cold Spring Harbor Laboratory Press, New York.

Watson, James D., with Berry, Andrew (2003). *DNA: The Secret of Life*, Alfred A. Knopf, New York.

#### **Activity pages include:**

Student worksheets: playing the Prehistoric Human Race (game rules).

Templates: game board; the die.

Complete question sheets.

Complete answer sheets.

\*Note: to select and print only the questions appropriate for your class, use the "Question Builder" program in the Teacher Guide.