

Investigating Common Descent

Summary

In this activity students will build models of DNA sequences from the hemoglobin proteins of humans, gorillas, chimpanzees, ape, and a common ancestor, Using that information they will hypothesize evolutionary relationships between the organisms.

Time Frame

1 class periods of 60 minutes each

Group Size

Small Groups

Materials

- [student sheet](#)
(attached)
 - [overhead 1](#)
(attached)
 - [overhead 2](#)
(attached)
- video on chimps or gorillas (optional but helpful)
prepared "DNA" strips made from 80 colored paper clips per group of 4 students (32 red, 22 black, 16 green and 10 white)* colors are optional but should match the worksheet. The strips need to be pre-made by a class or student assistant
books

Student Prior Knowledge

Students should understand the structure of DNA and basic genetics.

Instructional Procedures

Obtain needed supplies. Have a class or student assistant build the strips so that each group of four has the following:

*This is a model of DNA constructed from hypothetical data, since we have not yet found DNA for a common ancestor. The other sequences are real.

Show the video or clips from the video. Another option would be to look at Internet sites showing chimp or gorillas. Display the overhead (below) and have students generate answers about the similarities and differences between humans and the great apes.

Pass out student sheet

Give each group of four students a set of "DNA". Explain that it is a gene for hemoglobin.

Read through the background and purpose with the students. You may want to have them go to their books and look at examples of cladograms. You may also want to do one together with a familiar animal such as the cat or dog family.

Allow students to make their predictions

Have students complete the lab by reading through and completing the procedures with their groups

Answers to Analysis Questions:

1. All 3 are similar. But the chimpanzee and the gorilla are more similar to each other than to the

human. Of the chimp and gorilla, the chimp DNA is closer to the human than the gorilla.

- 2. The 3 are most likely closely related the chimp and gorilla closest. The chimp being more closely related to the human than the gorilla.*
- 3. Answers will vary*
- 4. DNA from other proteins or similar molecules in the organisms could be studied.*
- 5. Gorilla*
- 6. Gorilla and Chimpanzee*
- 7. No, additional data and research is needed to support the hypothesis. We would have to compare much more DNA.*
- 8. A, humans and apes have a common ancestor. Both share similarities with the common ancestor but both have differences also.*
- 9. A, chimpanzees and humans have a common ancestor. Humans did not directly evolve from chimpanzees but they are more closely related, the break between the two is more recent.*
- 10. The hemoglobin data supports this showing the similarities between the base pairs in the DNA sequence.*
- 11. The criteria we used in this lab was genetic or molecular DNA evidence. Scientists can also use structural similarities, embryo analysis, and fossils.*

Answers to Conclusions:

Answers will vary but should be detailed and deal with major conceptual ideas.

Bibliography

Lesson Design by Jordan School District Teachers and Staff.

Authors

[Utah LessonPlans](#)