Biological Evolution and Classification

SCIENTIFIC EVIDENCE OF COMMON ANCESTRY

Blackline Masters

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IN N

Pliohippus

Horse leg

Horse skull

Equus

Horse leg

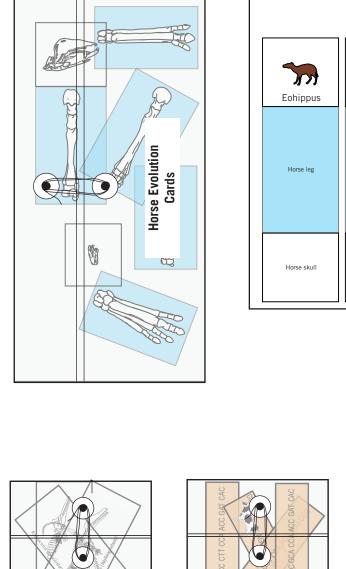
Horse skull

Horse Evolution Sheet

Merychippus

Horse leg

Horse skull

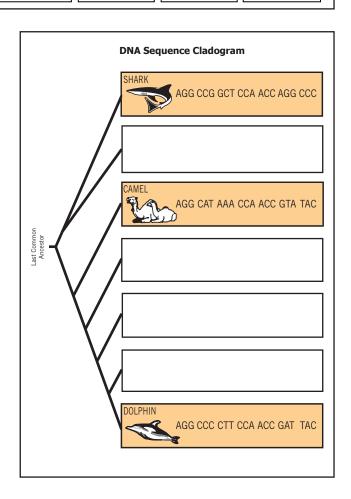


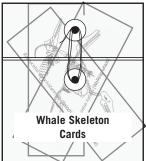
Station Information: Scientific Evidence of Common Ancestry

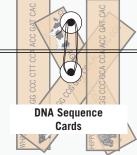
Oligohippus

Horse leg

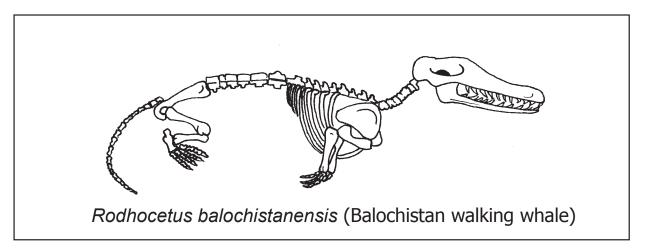
Horse skull

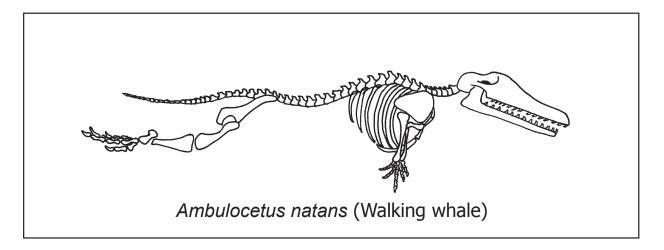


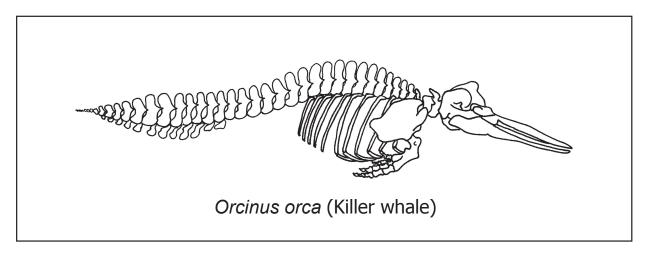




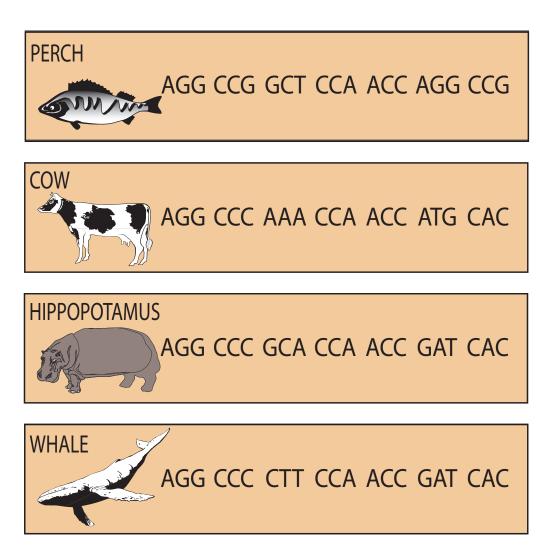




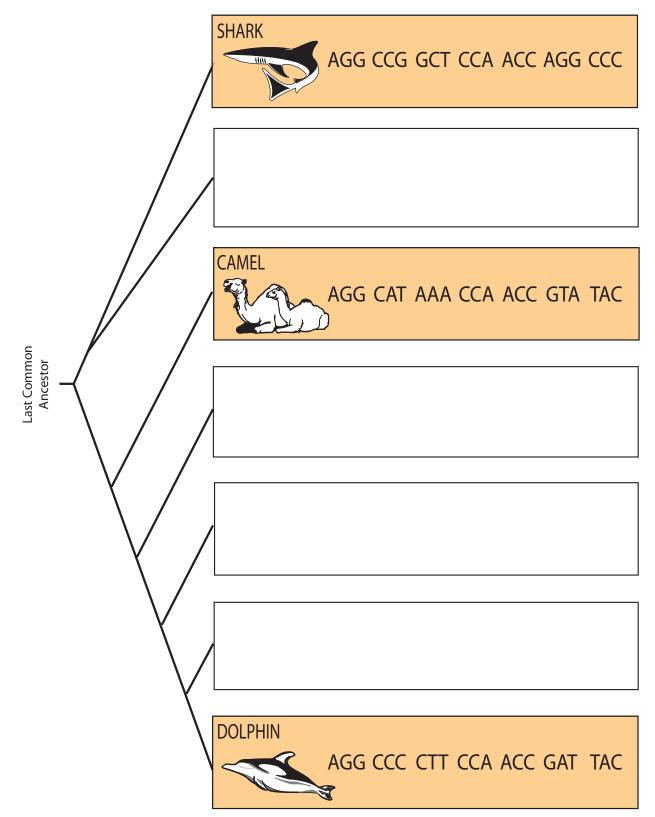




DNA Sequence Cards



DNA Sequence Cladogram



Horse Evolution Cards

Equus	Horse leg	Horse skull
Pliohippus	Horse leg	Horse skull
Merychippus	Horse leg	Horse skull
Oligohippus	Horse leg	Horse skull
Eohippus	Horse leg	Horse skull

Horse Evolution

Biological Evolution and Classification SCIENTIFIC EVIDENCE OF COMMON ANCESTRY

Student Pages

Purpose

The purpose of this activity is to reinforce your understanding of the theory of evolution and some of the scientific evidence that supports this theory, including fossil records of organisms and similarities among characteristics of organisms.

Before You Begin

Check to see that all the items are present and organized according to the Station Information sheet. If you notice a problem, notify your teacher immediately.

Materials

- Whale Skeleton Cards (1 set per station)
- DNA Sequence Cards (1 set per station)
- DNA Sequence Cladogram (1 per student plus 1 for the station)
- Horse Evolution Cards (1 set per station)
- Horse Evolution sheet (1 per station)

Activities and Questions

Essential Question

What information can be gained by examining the fossil remains of the ancestors of modern organisms?

Discuss the essential question with your teammate(s) and record your answer.

1. Pull out the Whale Skeleton Cards and arrange them in order from the oldest fossil to the most recent skeleton. What evidence did you use in deciding how to order the cards?

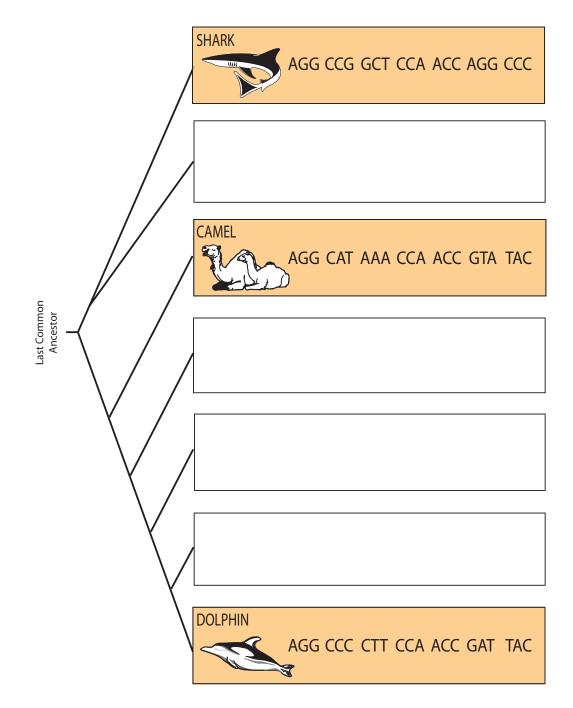
2. What do the fossil remains of earlier whales indicate about changes in the whales' habitats over time?

3. If two different species have homologous structures, what does this tell you about their evolutionary history?

4. Find the DNA Sequence Cards and the DNA Sequence Cladogram. Notice that the DNA sequences for the shark, camel, and dolphin already appear on the cladogram.

Examine the DNA sequences of the animals on the DNA Sequence Cards and compare them to the DNA sequences of the shark, camel, and dolphin. The more closely the DNA sequences match, the more closely related the organisms are to each other. Based on the results of your comparison, place the cards for the fish, cow, hippopotamus, and whale in the correct places on the cladogram.

Record your placements on the cladogram.



5. Examine the DNA Sequence Cladogram and determine which organisms are most closely related based on their homologous structures. Justify your answers.

6. Sometimes organisms that do not have a common ancestor may have analogous structures (similar anatomies). Examine the cladogram and determine which organism(s) share analogous structures with the perch and the shark. Describe the analogous structure(s) and explain why these similarities could exist in organisms that do not share a common ancestor.

7. Locate the Horse Evolution Cards. Arrange these cards on the Horse Evolution sheet to show changes that have occurred in the anatomy of the horse from its most ancient ancestor to modern horses. Explain why you arranged the cards in the order you selected.

8. Examine the evolutionary changes in the anatomy of the horse that the completed Horse Evolution sheet illustrates. Describe the major changes you observe.

9. Now that you have completed these questions, return to the essential question. Would you like to modify or change your answer? Write any modifications to your answer below.

Note: Because other students are going to do the activity after you, be sure to put all the materials at the station back as you found them. Sometimes there will be materials that need to be renewed or replaced. If you need assistance or have any questions, ask your teacher.

I Need to Remember . . .

Complete this part after class discussion of this station.

I need to remember		

Glossary

Analogous structures

Analogous structures are structures found in different species that are anatomically similar due to adaptations to environmental factors.

Anatomical

Anatomical refers to the structure and organization of an organism.

Cladogram

A cladogram is a tree-like diagram showing evolutionary relationships among organisms.

Evolution

Evolution is the change in the traits of organisms or populations of organisms from generation to generation.

Fossil

A fossil is a mineralized remain or preserved impression of an organism that lived in a past geological time.

Homologous structures

Homologous structures are structures found in different species that are anatomically similar due to common ancestry.