

Canon Paleo Curriculum

Unit: 3 Evolution

Lesson Plan 10

Name _____
Class _____
Period _____

How Do Fossils Show Change?

Most organisms live, die, and decompose. They leave no traces of having lived. Under certain conditions, an organism's remains or tracks may be preserved as a fossil. Fossils give clues about how an organism looked and where it lived. They are often used by scientists as evidence of change.

A fossil is any remains of a once living thing. Fossils may only be the outline of some plant, animal, or other organism that is preserved in rock. Sometimes, entire skeletons of animals that lived millions of years ago are found.

OBJECTIVES

In this activity, you will:

- a. examine diagrams of fossil horses and present-day horses shown in their surroundings.
- b. examine diagrams of the structure of the front foot of fossil horses and present-day horses.
- c. note the changes in horses that have taken place over time.

KEYWORDS

Define the following keywords:

adaptation

Equus

fossil

Hyracotherium

natural selection

MATERIALS

metric ruler

colored pencils: red, blue, green, and yellow

PROCEDURE

Part A. Change in Size With Time

1. Examine the diagrams in Figure 1 of *Uyacothe-rium*, *Miohippm*, *Merychippm*, and *Equus*.
2. Use the diagrams to **fill** in Table 1.

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Part B. Changes in Bone Structures With Time

The changes in horses over the last 55 million years have been shown by studies of large numbers of fossils. The earliest kind of horse was small and had teeth that were adapted to browsing on young shoots of trees and shrubs. The present-day horse is much larger and has larger teeth that are adapted to grazing on the tough leaves of grasses. Early horses were adapted to living in wooded, swampy areas where more toes were an advantage. The single-hoofed toes of the present-day horse allow it to travel fast in the plains.

1. Examine the diagrams in Figure 2. They show fossils of the front foot bones and the teeth of horses. The foot bones at the upper right of each diagram indicate the relative bone sizes of each kind of horse.

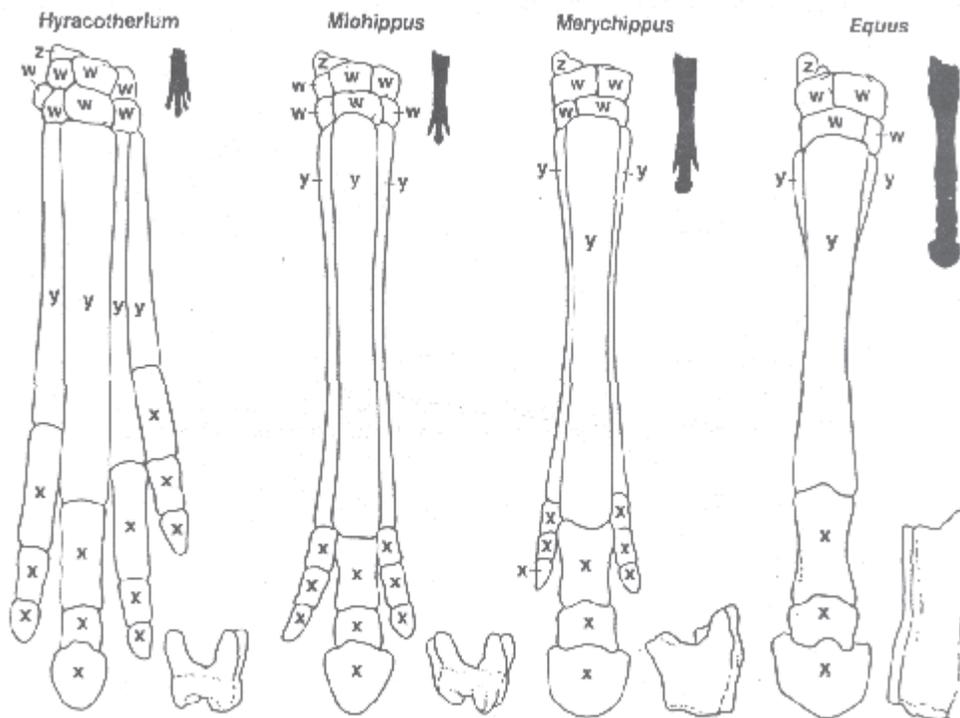


FIGURE 2. Forefoot bones and teeth of horses

2. Look for and color the following kinds of bones for each fossil horse.
 - a. Color the toe bones red, these are marked for you with an x.
 - b. Color the foot bones blue, these are marked with a y.
 - c. Color the ankle bones green, these are marked with a w.
 - d. Color the heel bones yellow, these are marked with a z.
3. Using the diagrams in Figure 2, make measurements to fill in Table 2.

Table 2. Evolution of the Horse

Kind of horse	<i>Hyracotherium</i>	<i>Miohippus</i>	<i>Metychippus</i>
<i>Equus</i>			
Number of toes			
Number of toe bones			
Number of foot bones			
Number of ankle bones			
Number of heel bones			
Total number of foot bones			
Length of foot (measure inset diagrams) (mm)			
Height of teeth (mm)			

QUESTIONS

1. What changes occurred in the surroundings of horses from *Hyracotherium* to *Equus*?
2. What change occurred in the shape of the horse from *Hyracotherium* to *Equus*?
3. What changes occurred in the size of the horse from *Hyracotherium* to *Equus*?
4. As the surroundings changed, what happened to the teeth of the horse?
5. Describe the overall changes in foot length, number of toes, and size of toes in the horse over time.
6. How would natural selection have caused changes in the size, feet, and teeth of the horse?

Table 1. Evolution in the Horse

Horse	Miohippus	Merychippus	Merychippus	Equus
Size	38CM	65CM	100CM	140CM
Type of surroundings	Swamp dense forest	dry with trees and dhrubs	grasslands	grasslands

QUESTIONS

1. What changes occurred in the surroundings of horses from *Hyracotherium* to *Equus*?
the land became drier forest and heavy vegetation replaced by grasses and plains
2. What change occurred in the shape of the horse from *Hyracotherium* to *Equus*?
early horses were small and had curved backs
today's horses are much larger with straight backs
3. What changes occurred in the size of the horse from *Hyracotherium* to *Equus*?
the height increased from 38 cm to 140cm
4. As the surroundings changed, what happened to the teeth of the horse?
the teeth became larger and flatter as adaptation to grazing
5. Describe the overall changes in foot length, number of toes, and size of toes in the horse over time.
the foot increased in length, ankle bones decreased, Number of toes decreased, sign of side toes became shorter than the central toe which became larger
6. How would natural selection have caused changes in the size, feet, and teeth of the horse?
adaptation to a change in the environment would have given an advantage to horses that had them these horses would have had a greater chance of surviving than horses not adapted.