Name _____ Class _____ Period _____

29–2 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.

INTERPRETATION

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

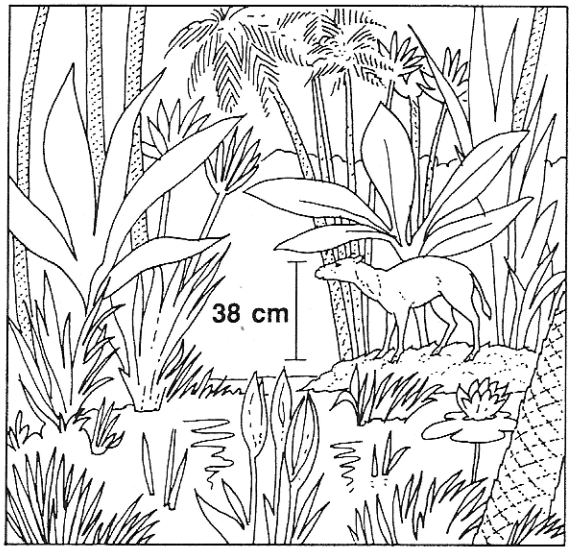
PROCEDURE

Part A. Change in Size With Time

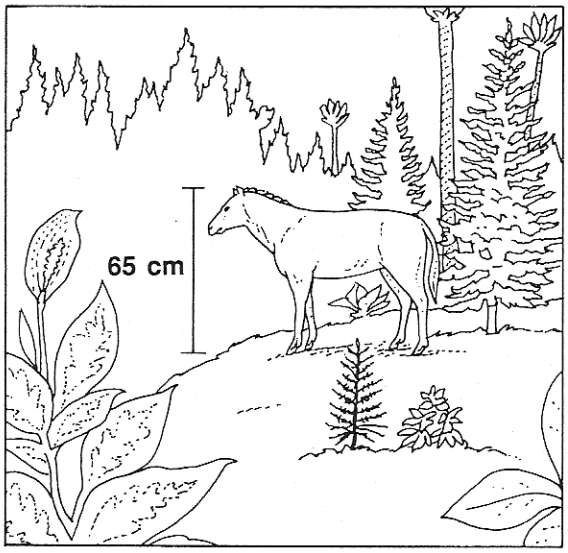
1. Examine the diagrams in Figure 1 of *Hyracotherium, Miohippus, Merychippus,* and *Equus*.
2. Use the diagrams to fill in Table 1.

Table 1. Evolution in the Horse

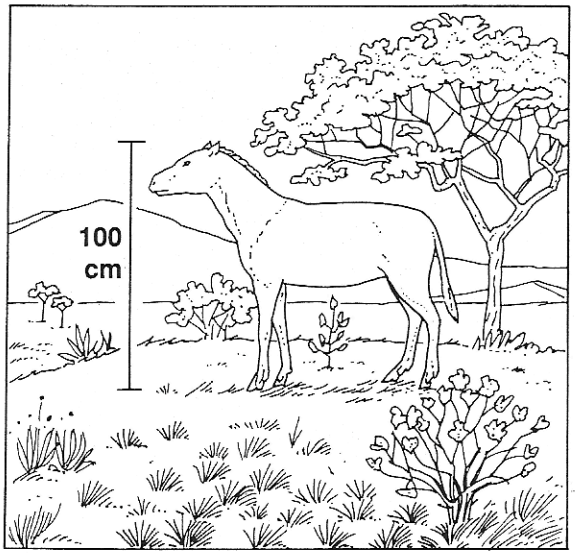
Horse	*Hyracotherium*	*Miohippus*	*Merychippus*	*Equus*
Size				
Type of surroundings				



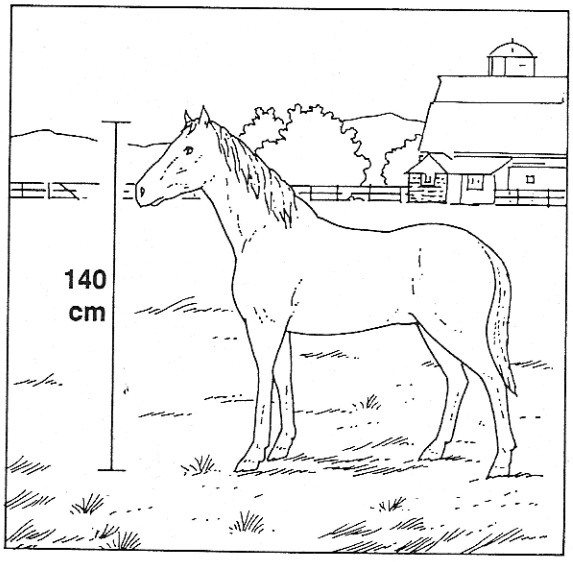
Hyracotherium
55 million years ago



Miohippus
30 million years ago



Merychippus
13 million years ago



Equus
Today

FIGURE 1. Evolution of the horse

Name _____ Class _____ Period _____

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.

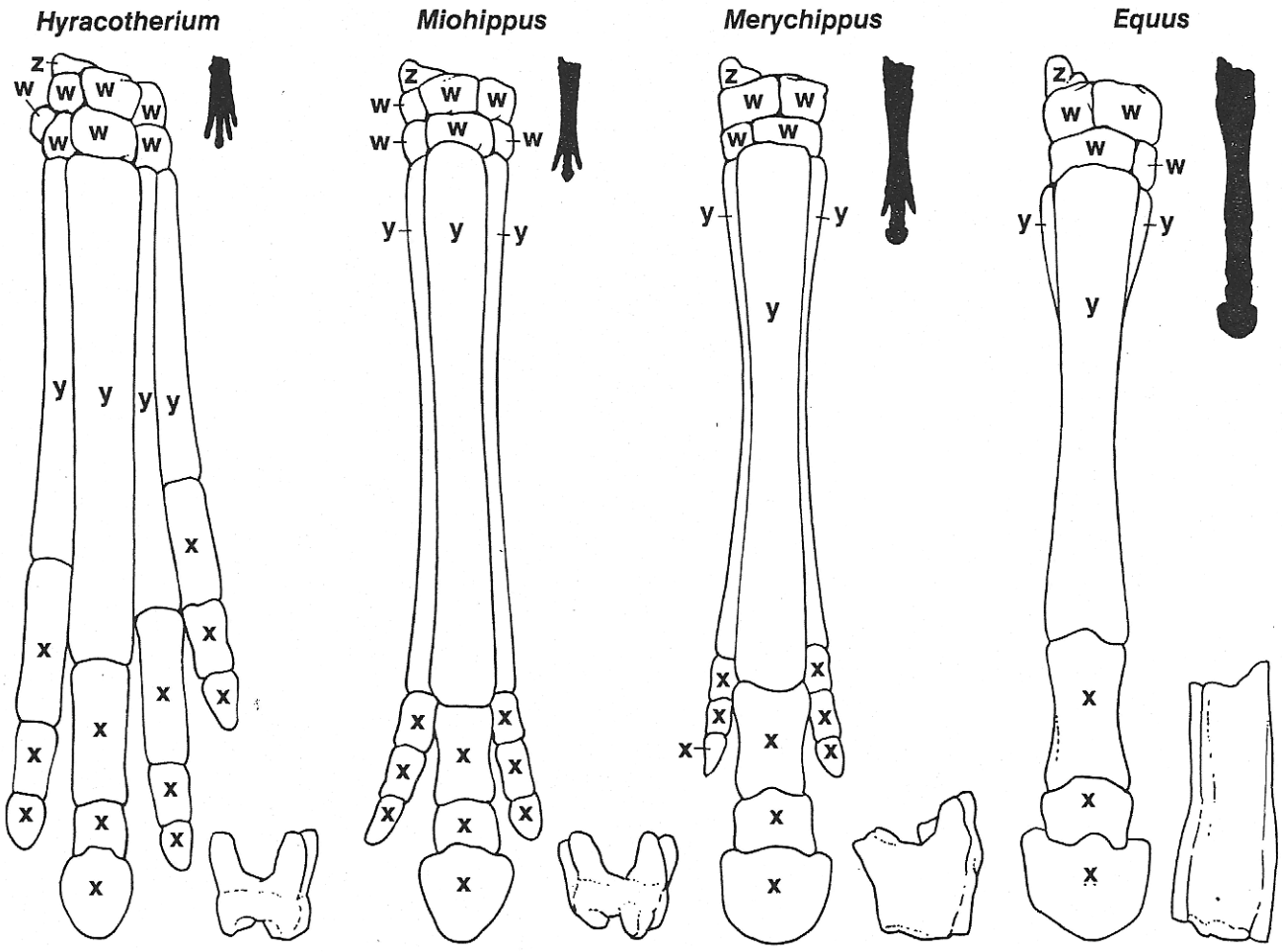


FIGURE 2. Forefoot bones and teeth of horses

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	*Hyracotherium*	*Miohippus*	*Merychippus*	*Equus*
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?