

# Ecological Succession Worksheet

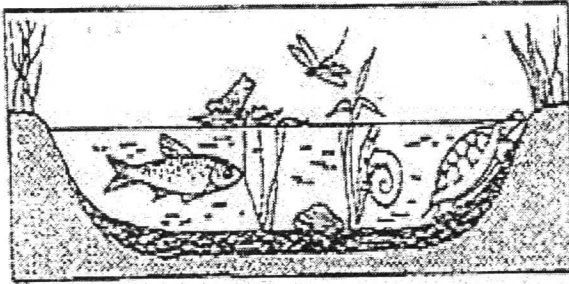
Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

Succession, a series of environmental changes, occurs in all ecosystems. The stages that any ecosystem passes through are predictable. In this activity, you will place the stages of succession of two ecosystems into sequence. You will also describe changes in an ecosystem and make predictions about changes that will take place from one stage of succession to another.

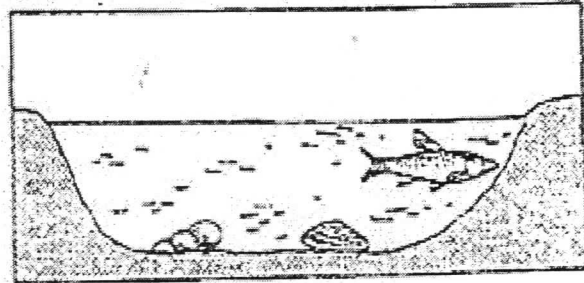
The evolution of a body of water from a lake to a marsh can last for thousands of years. The process cannot be observed directly. Instead, a method can be used to find the links of stages and then to put them together to develop a complete story.

The water level of Lake Michigan was once 18 meters higher than it is today. As the water level fell, land was exposed. Many small lakes or ponds were left behind where there were depressions in the land. Below are illustrations and descriptions of four ponds as they exist today. Use the illustrations and descriptions to answer the questions about the ponds.

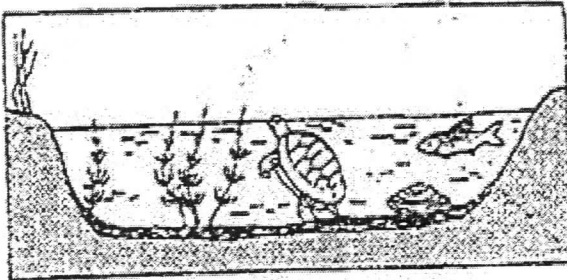
**Pond A**



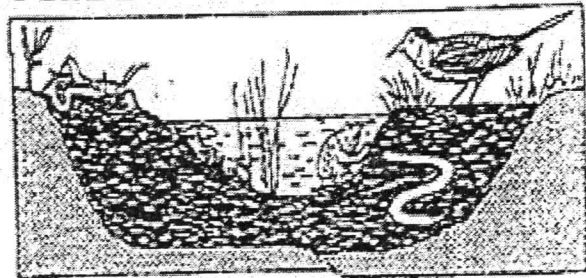
**Pond B**



**Pond C**



**Pond D**



## **Pond A:**

Cattails, bulrushes, and water lilies grow in the pond. These plants have their roots in the bottom of the pond, but they can reach above the surface of the water. This pond is an ideal habitat for the animals that must climb to the surface for oxygen. Aquatic insect larvae are

abundant. They serve as food for larger insects, which in turn are food for crayfish, frogs, salamanders, and turtles.

**Pond B:**

Plankton growth is rich enough to support animals that entered when the pond was connected to the lake. Fish make nests on the sandy bottom. Mussels crawl over the bottom.

**Pond C:**

Decayed bodies of plants and animals form a layer of humus over the bottom of the pond. Chara, branching green algae, covers the humus. Fish that build nests on the bare bottom have been replaced by those that lay their eggs on the Chara.

**Pond D:**

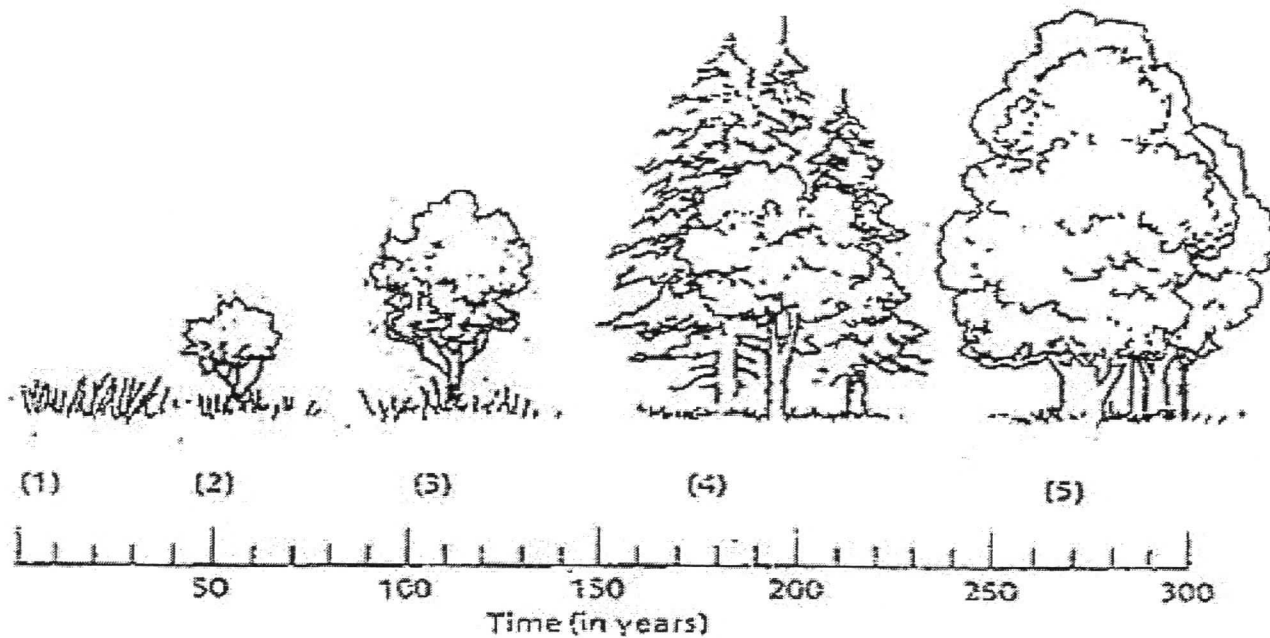
The pond is so filled with vegetation that there are no longer any large areas of open water. Instead, the pond is filled with grasses. The water dries up during the summer months.

**Questions:**

1. Write the letters of the ponds in order from the youngest, to the oldest.
2. Black bass and bluegill make their nests on sandy bottoms. In which pond would you find them?
3. What will happen to the black bass and blue gill as the floor of the ponds fills with organic debris?
4. Golden shiner and mud minnows lay their eggs on Chara (green algae). In which pond would you find them?
5. Some amphibians and crayfish can withstand periods of dryness by burying themselves in mud. In which pond(s) would they survive?
6. Dragonfly nymphs spend their early stages clinging to submerged plants. Then, they climb to the surface, shed their skins, and fly away as dragonflies. Which pond is best suited for dragonflies?

7. In which pond will gill breathing snails be replaced by lung breathing snails that climb to the surface to breathe?
3. Some mussels require a sandy bottom in order to maintain an upright position. In which pond will they die out?

The climax community in the area of Arkansas is an oak-hickory forest. After the ponds are filled in, the area will undergo another series of stages of succession. This is illustrated below. Briefly explain what is happening in the diagram.



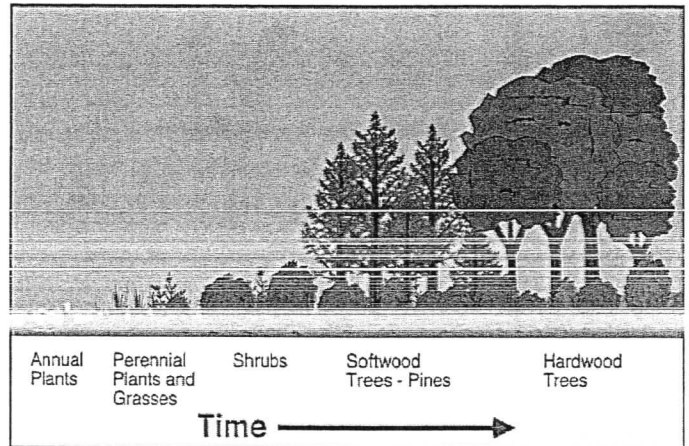
- 1.
- 2.
- 3.
- 4.
- 5.



Name: \_\_\_\_\_ Hour: \_\_\_\_\_

## Part 1: Background Reading

Ecosystems are constantly changing in response to natural and human disturbances. As an ecosystem changes, older inhabitants gradually die out and new organisms move in, causing further changes in the community. This series of predictable changes that occurs in a community over time is called **ecological succession**. Ecological succession is slow and gradual; it occurs over a period of *many* years.



As ecological succession occurs, types of species (both plants and animals) present in a community will change in response to changing environmental conditions. Examples of such environmental conditions include fires, climate change, and human activities, such as clearing forests in order to plant farm fields.

The first species to colonize an ecosystem are called **pioneer species**. Pioneer species such as *lichens* (a fungus + algae), mosses, and *bacteria* help break up bare rock and form a base of soil that can be used by plants. As environmental conditions change, the pioneers are replaced by **early successional species** such as herbs, grasses, wild flowers, and low shrubs.

Over time, this second set of species is replaced by yet *another* set of species. As time goes on, larger trees begin to grow in the environment and “shade out” the grasses and herbs.

As each plant community changes, so do the animal communities. Animal species have adaptations that make them best suited for particular environments and habitats. The plants that are found in a given habitat will determine which animals can live there.

## Part 2: Connecting Ideas

### **Your Task:**

Imagine that Mt Clemens High School has been abandoned. There is no one to mow the grass, clean the hallways, or maintain the buildings. In the boxes provided, do the following:

1. **DRAW** the MCHS football field as it is today and as you predict it will look after the number of years listed to the left.

2. **LIST** some of the types of plants and animals that you think would be present at each of these time increments.

<b>Time</b>	<b>Drawing</b>	<b>Plants/Animals</b>
<b>Today</b>		
<b>10 Years from now</b>		
<b>50 Years from now</b>		
<b>200 Years from now</b>		

### Part 3: Applying Our Understanding

1. What is ecological succession?
2. How is primary succession **different from** secondary succession?
3. How is primary succession **similar to** secondary succession?
4. What is the first group of organisms to colonize an area called?
5. Which species are able to live on bare rock?

6. What situations/conditions lead to the start of primary succession?

7. What situations/conditions lead to the start of secondary succession?

8. **Think and Predict:** A windstorm in a forest blows down all of the large trees in one part of the forest. Soon, sun-loving plants (like grasses and wildflowers) sprout up in the new clearing.

A) What type of succession is this?

B) What might this patch of forest look like in 5 years?

C) What might this patch of forest look like in 100 years?