

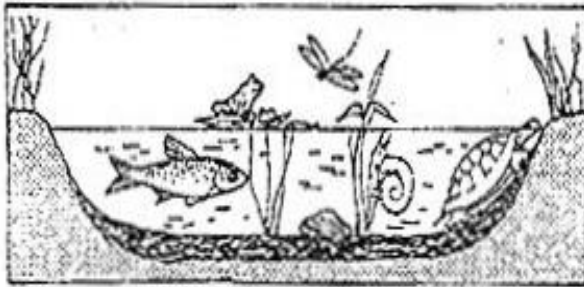
ECOLOGICAL SUCCESSION Practice

Succession, a series of environmental changes that occurs in all ecosystems, passes through are predictable. In this activity, you will place the stages of 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.

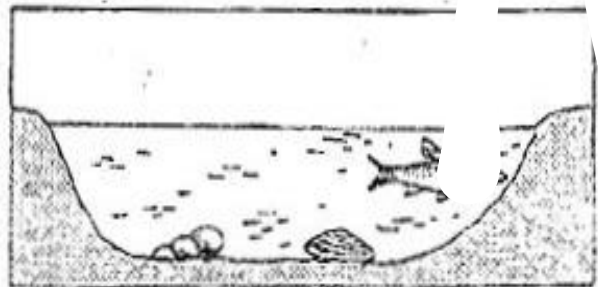
The evolution of a body of water from a lake to a marsh can last for thousands of years. The process cannot be observed directly. Instead, a method can be used to find the links of stages and then put them together to develop a complete story.

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

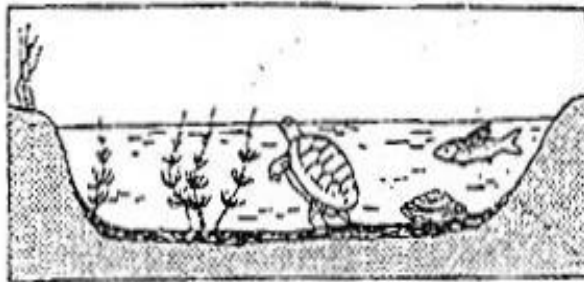
Pond A



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.

BCAD

2. Black bass and bluegill make their nests on sandy bottoms. In which pond would you find them?

Pond B

3. What will happen to the black bass and blue gill as the floor of the ponds fills with organic debris?

They would no longer be able to make their nests on the bottom so they would no longer reproduce.

4. Golden shiner and mud minnows lay their eggs on Chara (green algae). In which pond would you find them? Pond C

5. Some amphibians and crayfish can withstand periods of dryness by burying themselves in mud. In which pond(s) would they survive?

They would be able to survive in any of the ponds

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?

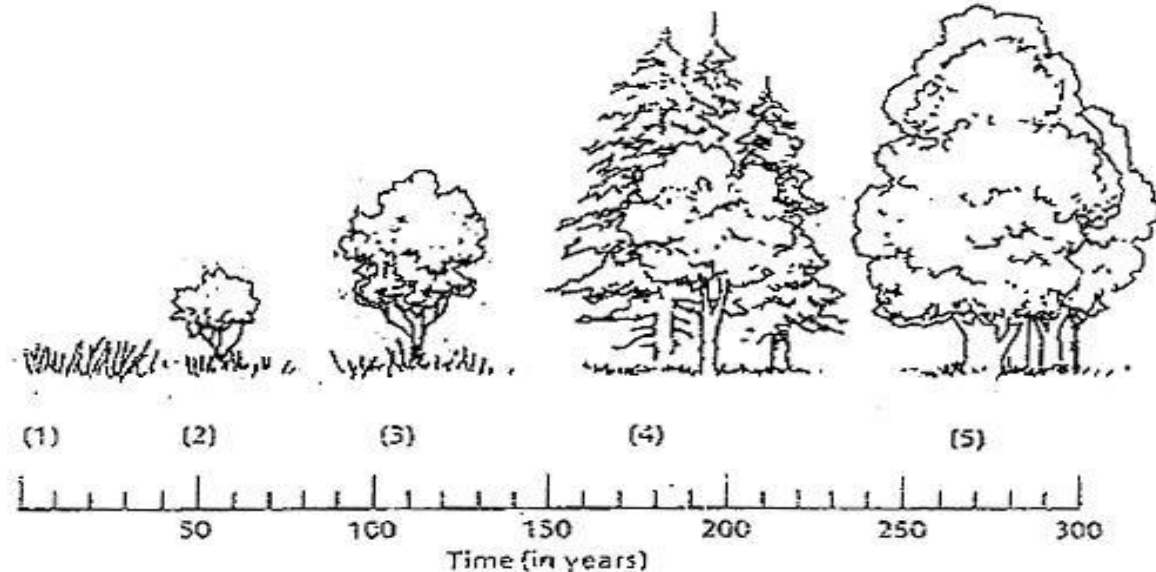
Pond A

7. In which pond will gill breathing snails be replaced by lung breathing snails that climb to the surface to breathe? Pond C

8. Some mussels require a sandy bottom in order to maintain an upright position. In which pond will they die out?

Pond C

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. Pioneer species are dominant

2. Small shrubs and bushes join the Pioneer species

3. Trees begin to grow

4. Faster growing conifers trees are the dominant species

5. Climax community with hardwood trees

10) For each of the words below, describe the difference between the two terms.

- A) Mutualism/parasitism *In parasitism only one species gains but in Mutualism they both do.*
- B) Parasitism/predator-prey *In parasitism the host stays alive for some time but in predation the prey dies right away.*
- C) Interspecific Competition/Intraspecific competition *Interspecific is between multiple species and intraspecific is between only one.*
- D) Exponential growth/logistic growth *Exponential growth will grow indefinitely but logistic growth will level out.*

11) Write the vocabulary term next to the definition

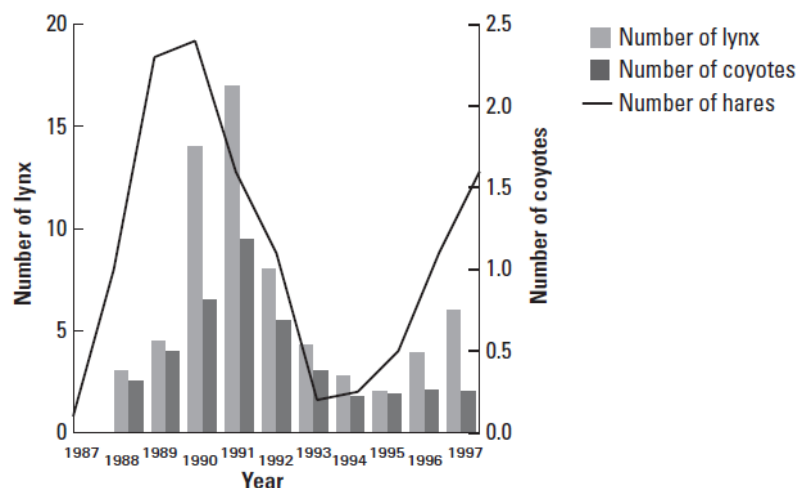
- A) A close relationship between two or more individuals of different species that live in close contact with one another. *Symbiosis*
- B) Type of symbiosis in which one individual benefits while the other is harmed. *Parasitism*
- C) Occurs when one organism captures and eats another organism. *Predation*
- D) Type of symbiosis in which both individuals benefit. *Mutualism*
- E) Occurs when two organisms fight for the same limited organisms. *Competition*
- F) Type of symbiosis in which one individual benefits while the other individual neither benefits nor is harmed. *Commensalism*

12) Next to each situation described below, write whether it is an example of interspecific competition or intraspecific competition.

- A) Two squirrels race up a tree to reach a hidden pile of nuts. *Intraspecific*
- B) A hyena chases off a vulture to feast on an antelope carcass. *Interspecific*
- C) Different species of shrubs and grasses on the forest floor compete for sunlight. *Interspecific*
- D) Brown bears hunting for fish on a river's edge fight over space. *Intraspecific*
- E) Male big horn sheep butt heads violently in competition for mates. *Intraspecific*

- 13) Combination graphs show two or more sets of data on the same graph. Scientists have been tracking the population numbers of snowshoe hares, lynx, and coyotes in northern Canada over many years. In this region, lynx and coyote are the primary predators of the snowshoe hare. The graph below shows the population numbers for all 3 animals over a 10 year period.

GRAPH 1. LYNX, COYOTE, AND HARE POPULATIONS



- A) As the population of snowshoe hares increases, what happens to the coyote and lynx populations?
As the hare population increases so do the lynx and coyote.

- B) Scientists have observed that the population of hares follows a pattern that occurs in an eight-year cycle. Over this time period, the population peaks and then crashes. Predict how snowshoe hare, lynx and coyote populations will change by extending the graph for the years 1998-2003. Extend the graph shown above.

Given the hare population bottoms out in 1993, it would peak again 8 years later. The lynx and coyote would grow at the same time but peak about a year later. Then all three populations would then decline.

Answer in complete sentences:

14) In competitive exclusion, who is competing and who gets excluded?

Two species that need the same resources are competing. The species that not able to compete as well gets excluded from the habitat and will either die off or adapt to new resources.

15) What does equivalent mean in math? How does that meaning relate to ecological equivalents?

Equivalents means that they are the same or equal to each other. In biology it means that two species that do not interest do the same things in different areas

Matching: Match each of the following terms to the correct statement. These are words that we may not have learned in class, but use your critical thinking and process of elimination to figure out the matching answers.

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| 16) <u>H</u> Obligatory mutualism | A) In interaction between two species that is helpful, but not essential. |
| 17) <u>D</u> Community | B) Close associations between two species during part or all of their life cycle |
| 18) <u>G</u> Realized Niche | C) The niche that would occur in the absence of competition |
| 19) <u>B</u> Symbiosis | D) The populations of all species in a given habitat |
| 20) <u>C</u> Fundamental Niche | E) When one species wins or loses with respect to some resource |
| 21) <u>A</u> Facultative Mutualism | F) An interaction that helps one species but does not affect the second species |
| 22) <u>F</u> Commensalism | G) A niche that is the result of constraining factors |
| 23) <u>E</u> Interspecific Competition | H) Each species must have access to the other in order to complete a life cycle |

Choice: Choose the most appropriate term for each evolution adaptation described.

- A) Mimicry B) Camouflage C) Chemical defense D) Moment-of-truth defenses

- 2) D A blending of body form, color, or behavior to the environment
- 3) C Leaves that contain dangerous or hard-to-digest repellents
- 4) A protection by pretending to be a dangerous organism.
- 5) C Predators learn to avoid oragnims that use this defense
- 6) D The use of one final trick to repel and attacker.

Matching: Match each for the following terms to the appropriate statement.

- | | |
|---------------------------------------|---|
| 7) <u>B</u> Resource partitioning | A) Species have equal access to a resource, but one is better at using it |
| 8) <u>E</u> Interference competition | B) A subdividing of resources that allows two species to coexist. |
| 9) <u>F</u> Competitive exclusion | C) Two species change over time due to close ecological interactions |
| 10) <u>C</u> Co evolution | D) Consumers that obtain energy and nutrients from living organisms. |
| 11) <u>A</u> Exploitative competition | E) One species restricts access of another species to a resource |
| 12) <u>D</u> Predators | F) When populations of two species coexist, the growth rate of both is suppressed |