

## Mussel Life Cycle Activity:

### Objective:

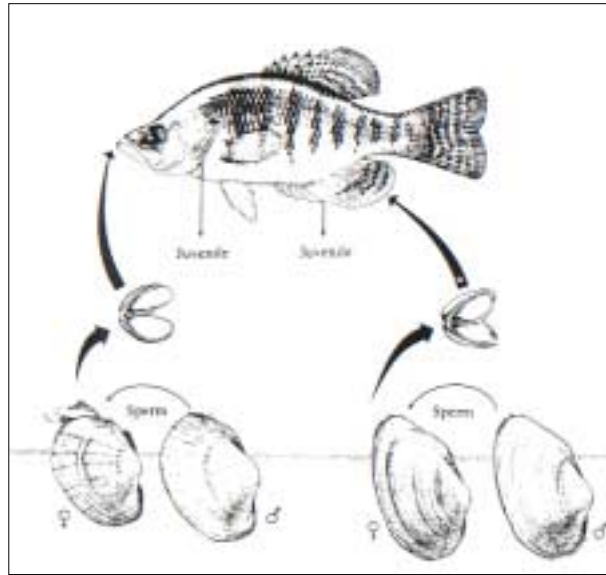
Students will be able to describe the life cycle of the mussel, explain how it uses another animal in the cycle, and predict how that cycle can be impacted by habitat change or degradation.

**Grade Levels:** 4-8

**Time Required:** One class period

### Motivation:

Sometimes the survival of a species depends on the presence or absence of other species of animals in the same habitat. The freshwater mussel is one such example. Its survival depends on the presence of one or more species of fish on which the mussel larvae attach themselves for a period of their life. This interdependence teaches us about the delicate balances that exist in nature. Scientists can monitor the numbers of these mussels and fish in a river to keep track of this balance. If the water quality or other related characteristic of the habitat changes, the mussel may not be able to complete its life cycle. By being aware of these life cycles, students may become more knowledgeable stewards of nature.



(from Cummings and Mayer 1992: 2.)

### Online Resources:

Illinois State Museum's Web modules:

<http://www.museum.state.il.us/exhibits/harvesting/>

Department of Natural Resources Web site:

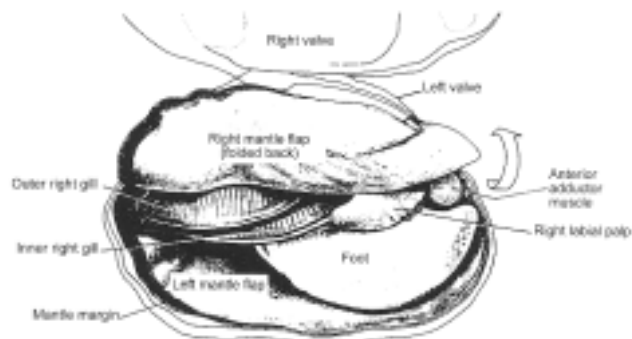
<http://dnr.state.il.us/lands/education/mussels/intro.htm>

### Materials:

Mussel cycle diagram

Mussel anatomy diagram

Photographs of musseling on the Illinois River from the *Harvesting the River Online Presentation* section of the ISM web site.



<http://www.museum.state.il.us/RiverWeb/harvesting/index.html>

**Discussion:**

Teacher will take students orally through the mussel anatomy and mussel life cycle diagrams, describing the reproductive cycle and its reliance on one or more species of fish.

**Examination of the gills of the mussel:** Look at the gills of the mussel in the diagram (or in a real mussel). This breathing organ is used by the mussel as the means to expel the larvae.

**Expelling of larvae from the gills of the mussel:** The gills expel the larvae into the water, where they float on the current, shells open, until they touch something, when they close their shells. Sometimes they have attached themselves to the gills or fins of their host fish, but most often they have attached themselves to something else and die. Only a small percentage of larvae survive.

**Attachment of the larvae to the fish:** The larvae attach themselves to the gills or fins of the fish, where they are covered up and undergo metamorphosis into the juvenile state. After two weeks to two months, the juveniles drop off the fish and settle into the bed of a lake or river.

**Questions:**

**What is the advantage of the larvae being attached to an organism rather than floating around in the river?** The best theory for the elaborate life cycle of the freshwater mussel is species dispersal. Without fish hosts, mussels would have great difficulty dispersing their offspring upriver or from one river system to another. Over time, the geographical ranges of mussel species would shrink to nothing. Mussel larvae do receive protection and nutrition from their hosts, but dispersal is more important. (It is interesting to note that zebra mussels, a non-native exotic species), which have free-floating (veliger) larvae that do not attach themselves to hosts, are quite successful in nature (with the aid of humans) even though their larvae are exposed to predators after being expelled from the parent.)

**What difficulties are caused by this method of reproduction for the survival of the mussel species?** (If a species depends upon another species, there is danger when the other species is threatened.)

**What happens if there are no fish?** (If there are no fish, the mussel cannot reproduce at all.)

**Assessment:**

Students should be able to point out the gills of the mussel on the diagram or mussel, tell how the gills expel the larvae into the water, tell how the larvae attach themselves to a host fish, how the larvae grows on the fish, and how the juvenile mussels drop off the host. They should also be able to explain the difficulties for survival with this method of reproduction cycle.

**Illinois State Board of Education Goals Addressed:**

**Science: Late Elementary:**

**12.A.2a** Describe simple life cycles of plants and animals and the similarities and differences in their offspring.

**12.B.2a** Describe relationships among various organisms in their environments (e.g., predator/prey, parasite/host, food chains and food webs).

**12.B.2b** Identify physical features of plants and animals that help them live in different environments (e.g., specialized teeth for eating certain foods, thorns for protection, insulation for cold temperature).

**12.B.3b** Compare and assess features of organisms for their adaptive, competitive and survival potential (e.g., appendages, reproductive rates, camouflage, defensive structures).

**13.B.2e** Identify and explain ways that technology changes ecosystems (e.g., dams, highways, buildings, communication networks, power plants).

**13.B.3e** Identify advantages and disadvantages of natural resource conservation and management programs.