

Freshwater mussels

The mussel program has 3 stations:

Station 1: Shells

Station 2: Feeding and reproduction

Station 3: Mussels and man

In this program, students move among stations, which allows smaller groups and greater interaction. This program is good for all age groups, including mixed ages.

Supplies for each station are:

Station 1: Shells

- a variety of freshwater mussel shells, including:
 - at least one with an intact hinge ligament
 - thick and thin shelled species
- a shell in cross-section to show growth lines and layers
- a poster (laminated it!) showing shells is nice to have
- live mussels are terrific (even *Corbicula*)!

Station 2: Feeding and reproduction

- a few shells and/or a live mussel
- a model of a clam on the half-shell (optional): an illustration can be substituted
- if at all possible, bring a laptop and show some of the amazing video clips from the Unio Gallery (Chris Barnhart; Missouri State):
<http://unionid.missouristate.edu/> The photos are also excellent!
- a graphic showing a mussel lifecycle. There are always some to choose from in the Internet. Here is a good one by Kyle Lukenbill on the Graf Lab page (U. Alabama): http://bama.ua.edu/~dlgraf/research_mussels.html

Station 3: Mussels and man

- a few shells and/or a live mussel
- shell buttons (nice varieties of vintage buttons are available on e-bay)
- freshwater pearls (also from e-bay) (kids especially like these!)
- shell(s) with bumps on the inside
- zebra mussel shells (and/or photographs); possibly *Corbicula* shells
- an graphic of dams and their effects is helpful

Station 1: shells

Where do freshwater mussels live? (Let kids answer questions)

- in Oklahoma: in town at pond at Sutton Urban Wilderness

- emphasize that they live locally!

- lots live in → rocky streams and rivers

mussels are most diverse in SE USA

they live on the bottom of ponds, lakes, streams,...

look at the variation:

1. thick shells and thin shells: Why?? (Let kids answer)
 - thin shells in lakes and ponds
 - thick shells in rivers and streams
2. variation in size, shape
 - ridges, knobs,... may help hold their place (in flowing water)
3. teeth on the inside
 - keep the 2 valves straight
4. layers of the shell
 - outside (protein): this has the color
 - middle
 - inner (nacre): often shiny
5. elastic hinge to open
 - Muscles between the shells to close

Have marine mussels and clams to compare

Quick activity: have students match up the 2 shells (which invariably become unmatched during the program)

Station 2: Feeding and reproduction

Mussels don't move much, so they can't go and find stuff to eat.

If you sat in a chair all day, how could you eat?

(note: there is nobody to bring you food)

Mussels have gills, so do fish

What does a fish use its gills for? (to get oxygen; to 'breathe' with)

So do mussels, but.....they also use the gills to feed.

A fish can bring water into its mouth, then across the gills and out

A mussel has an 'in' siphon (like a straw) that it brings water into the shell chamber, where it crosses the gills, then goes out through the 'out' siphon.

Then the water crossed the gills, small stuff is filtered out. And that is what it eats.

(bacteria and algae mostly)

(You can also go on the explain feces and pseudofeces, if you want – as ‘poop’ and ‘false poop’:

-not everything that is filtered is edible

Sand, floating junk,...

Stuff that can't be eaten goes one way on the gills, stuff that can be eaten goes toward the mouth (in furrow – cilia ‘highways’)

The stuff that can't be eaten gets bundled up with mucus and drops to the bottom of the mussel

Every once and a while the mussel will bring in lots of water – then blow it out the same way (the ‘in’ siphon) and carry the false poop with it

(note: the eaten food goes through the gut and the poop goes out the ‘out’ siphon)

Kids enjoy being mussels and blowing air in & out their hand-siphons (one hand can be the ‘in’ siphon; the other the ‘out’ siphon)

Reproduction

Mussels don't move much, so it's a bit hard finding a partner and finding a place for the baby mussels to live.

Males release sperm → filtered by female

Eggs develop in the gills (gill chambers)

Then it gets really weird (we use a poster showing mussel life history)

Mussels use fish to get around (fish swim)

Baby mussels (glochidia) are parasites on fish for a while

How do they get on fish? Any ideas?

One way for the baby mussels to get on the fish is for the mussel to go fishing:

Mantle → fish lure, which can be moved

When fish bites lure, glochidia are released → clamp on fish

Stay on fish (1 wk to 6 months)

Drop off as small mussels – start filter feeding

Station 3: Mussels and man

1. shells in button making
 - a. shells were used before plastics – shell, bone and wooden buttons were common

- b. still made, but usually with marine shells

catching mussels:

- drag chains with hooks or small metal balls on the end along the bottom
- if chain goes into shell, the mussel clamps the shell shut on the chain and can be hauled up by fisherman
- many chains are dragged at the same time

can also dive and look for mussels (to survey them or for research)

2. mussels in freshwater pearl industry

- hang in mesh bags from floats
- open up young mussel → put in small bits of flesh from another mussel
 - can also put in objects for mussel to coat
- mussel doesn't like the new stuff and coats it with shell
 - inner layer of shell ← shiny → pearl

This is a normal response to diseases, parasites, or 'splinters'
(- show shells with bumps on the inside)

3. conservation of mussels

-some mussels are very common; others are very rare

Why are they rare?

1. habitat changes
 - a. dams- change the water temperature, water flow and amount of food
2. pollution
 - a. fertilizers, chemicals, pesticides
3. sediment (dirty water)
 - a. from runoff (road and other construction; farm fields,...)
4. introduced species
 - a. zebra mussels
 - i. these are a different kind of bivalve
 - ii. attach on mussels
 1. filter the water first
 2. can cause mussels to dig out
5. fish they depend on for reproductions aren't there
 - a. fish may be rare or habitat altered, so that fish aren't present
6. overharvest
 - a. shell is used for marine pearl production
7. human activities
 - a. driving up and down streams and rivers (4-wheelers)