# Freshwater Mussel Lesson Plan

Introduce several mussels with interesting names:

- Purple wartyback, heelsplitter, elephant ear, spike, fat pocketbook, mucket, etc.
- Show example shells of each
- Ask kids if they know what builds and lives in these shells

*!!! FRESHWATER MUSSELS !!!*

Who knows what a freshwater mussel is?

- Animal or Plant?
- Vertebrate or Invertebrate?
- Mollusk – like oysters, octopus, squid, clams, snails

Where do freshwater mussels live?

- Freshwater mussels live on every continent except Antarctica
    - North America has the most species at almost 300 species
    - How many live in your state? (Find out how many mussels live in your state -- check state natural resource agency website or natural heritage database)
- In freshwater ecosystems
    - Streams, rivers, lakes, swamps/wetlands
- Where in freshwater ecosystems do they live?
    - Burrow into the substrate (bottom of the stream, river, etc.)
        - Gravel
        - Mud
        - Sand

How long do they live?

- Most live between 10 and 40 years
- Some mussels in Siberia live over 100 years
- How do we know how old they are?
    - Growth rings (annuli) can be counted like tree rings

*Note: Pass around a shell that has clearly defined rings that kids can hold and touch.*

Does a mussel move?

- Yes! But they only have one foot
- They open their shell a little bit and stick their foot out to crawl a few inches at a time

Does any one know what might eat an animal with such a hard shell?

- Muskrats (aquatic rodents) dive for mussels and use their claws to pry open their shells
- Fish that live on the bottom of a stream like catfish or carp eat juveniles with weaker shells

What do freshwater mussels eat?

- Fish, turtles, leaves? No - freshwater mussels eat microscopic plants and animals called plankton
- They also eat bacteria and detritus (dead plant and animal pieces)

How do freshwater mussels eat? (Use a funnel, hose or siphon, and a food strainer for demonstration)

- Freshwater mussels do not hunt or search for their food; they wait for it to come to them
- Freshwater mussels filter feed by sucking water in through a siphon (kind of like a little hose)
- Water passes over gills where food particles get filtered out and carried by little hairs called cilia to the mouth

*NOTE: HAVE KIDS POUR CUPS OF WATER CONTAINING PASTA, RICE, OR COUSCOUS INTO A FUNNEL THAT DRAINS TO A STRAINER. TELL THEM THAT THE STRAINER REPRESENTS A MUSSEL'S GILLS.*

*OR*

*SET UP A SIPHON THAT DRAWS FROM AN AQUARIUM CONTAINING PASTA OR RICE AND EMPTIES THROUGH A STRAINER. THIS WILL ALLOW KIDS TO OBSERVE PARTICLES BEING VACUUMED OUT OF THE WATER.*

How are baby mussels made? (i.e. how do freshwater mussels reproduce?)

- Mussels need fish to produce young mussels
- A male mussels releases sperm
- A downstream female draws sperm in the same way that she eats
- The sperm fertilizes eggs and in the female and fertilized eggs grow into larvae called GLOCHIDIA
- Mussels attract a certain species of fish using a lure that looks like a small fish or insect (ask kids if they know what a fishing lure is)
- Fish try to eat the lure thinking that they are getting a meal but end up with a mouth full of GLOCHIDIA
- Microscopic GLOCHIDIA attach to the fish's gills, fins, or skin and feed off the fish until they are big enough to live on their own
- After several weeks or months, juvenile mussels fall off of the fish and live on their own in the substrate

*NOTE: USE THE MUSSEL LIFE-CYCLE DIAGRAM AS A VISUAL AID FOR THIS SECTION. FISHING LURES CAN BE USED TO EXPLAIN MUSSEL LURES. SEVERAL GOOD PICTURES OF MUSSEL LURES WOULD BE HELPFUL, TOO.*

FRESHWATER MUSSELS ARE IMPERILED

- 35 species are extinct
- 70% of the freshwater mussels species in North America are imperiled
- 71 of the world's 300 endangered or threatened species live in N. America

Why are there fewer freshwater mussels now than there were 100 years ago?

- Habitat Loss
  - Dams
  - Dredging
  - Riparian development
- Pollution
  - Sewage
  - Roadside dumps
  - Industry
- Sedimentation
  - Poor agricultural and forestry practices that cause erosion
  - Bridge and road construction
- Invasive Species
  - Zebra mussels
  - Asian Clams

What can you do to help freshwater mussels?

- Don't pollute
- Recycle
- Tell others about freshwater mussels

Supplies Needed:

1. Mussel shells (best if you have mussels with interesting names or shapes)
2. Funnel
3. Bucket of water
4. Rice
5. Short hose or siphon
6. Strainer
7. Couscous, pasta, rice (or replace with something else you think can represent mussel food floating or suspended in water)
8. Life cycle diagram (attached)
9. Fishing lures
10. Pictures of mussel lures
11. A tank with a few live mussels (optional)

Questions:

1) Where do mussels live?

2) What is substrate?

3) How many mussels live in N. America?

4) What is a GLOCHIDIA?

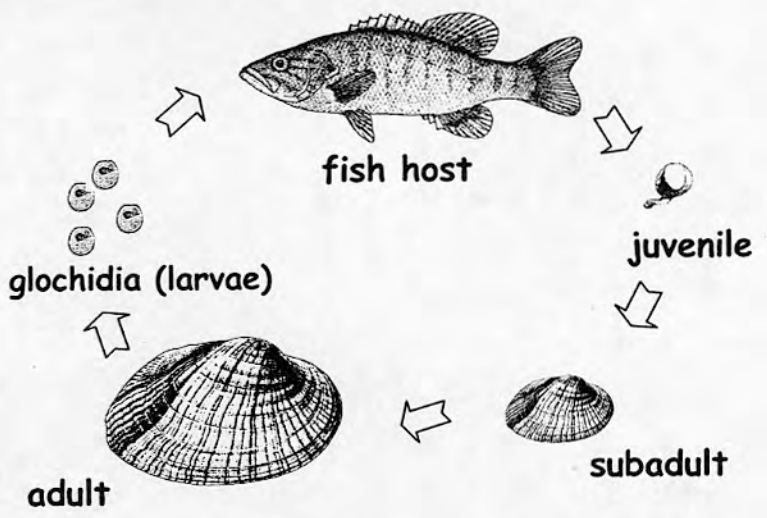
5) How do you tell the age of a mussel? How old was the mussel that was passed around?

## Fun Mussel Facts

- Mussels are invertebrates with two hard shells, like clams.
- Some mussels use a lure to attract their host fish.
- Mussel larvae are microscopic - they're smaller than a grain of salt!
- Mussels can filter a gallon of water an hour!
- Mussels eat algae and bacteria.
- Freshwater mussels are the most endangered group of animals in the United States.
- There are 37 threatened and endangered mussel species in VA.
- You can age mussels by counting their growth lines just like trees.
- Some mussels can live over 100 years!

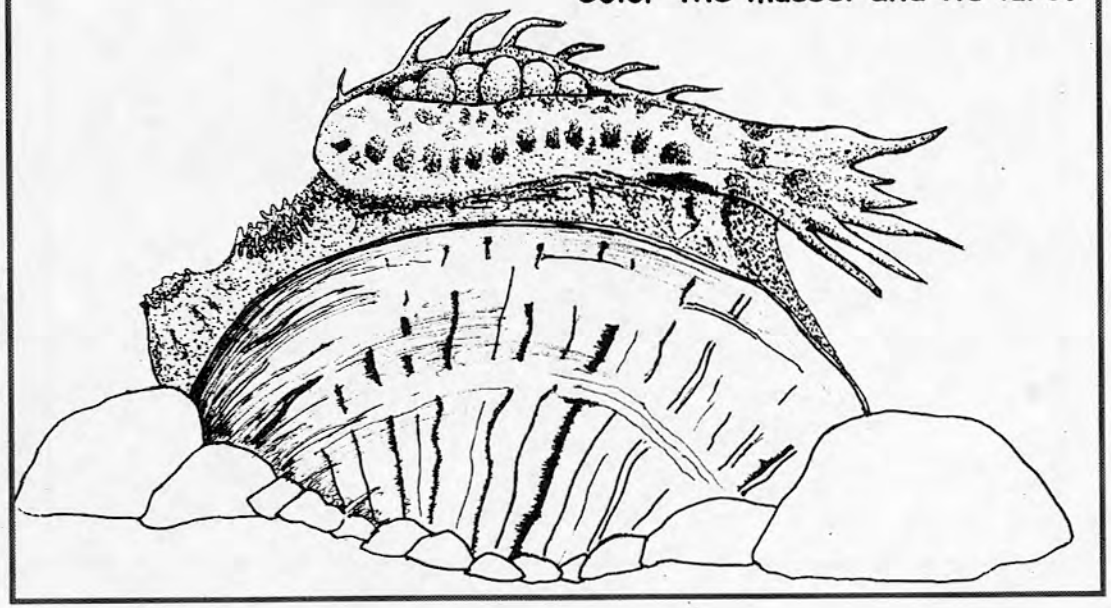

Aquatic Wildlife
Conservation Center
Phone: 276-783-2138
www.dgif.virginia.gov/awcc/


## Mussel Life Cycle




**Freshwater mussels have a complicated life cycle that requires a fish to complete.**

**Color the mussel and its lure.**



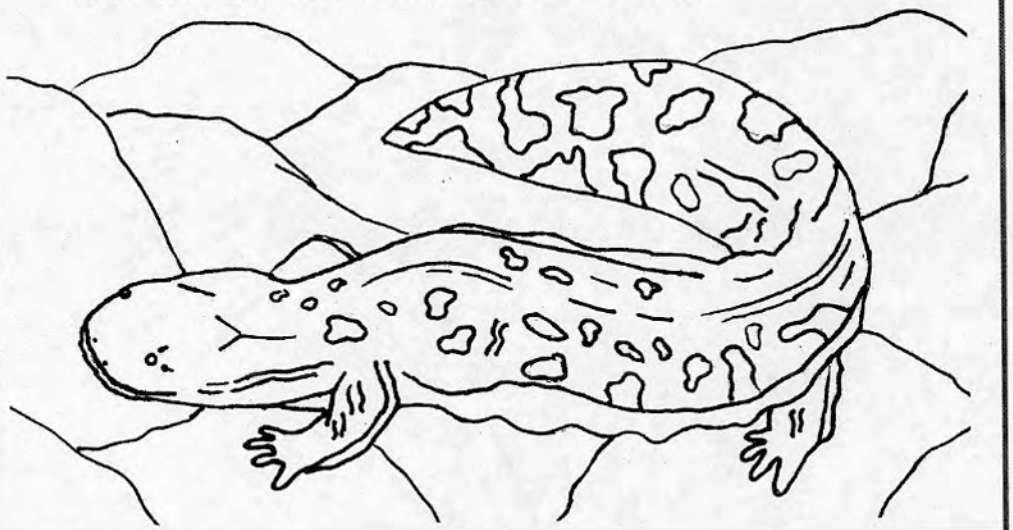
## Hellbender Word Find

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V | R | L | J | C | M | X | K | S | S | H | H | S | U | C |
| V | I | R | G | I | N | I | A | O | G | E | E | G | A | X |
| Q | T | J | L | W | W | G | F | K | N | L | C | G | N | R |
| L | Q | A | D | U | A | A | Y | H | U | L | O | E | L | W |
| N | O | I | T | A | D | E | R | P | L | B | S | J | C | B |
| B | X | J | A | E | U | Q | E | N | N | E | Y | S | G | E |
| P | A | U | T | R | C | V | D | N | O | N | S | E | I | T |
| O | C | R | I | S | U | P | N | B | I | D | T | A | L | A |
| W | L | L | B | L | B | F | A | L | T | E | E | V | L | R |
| E | I | E | A | I | K | D | M | M | A | R | M | R | S | T |
| L | N | O | H | M | V | V | A | R | L | R | F | A | L | S |
| L | C | H | A | E | K | G | L | C | U | P | E | L | G | B |
| J | H | X | L | B | P | S | A | Y | P | O | I | V | C | U |
| W | C | X | T | U | G | Z | S | X | O | B | F | J | I | S |
| L | W | K | H | K | A | Z | Z | Y | P | Y | O | U | C | R |

### Word List

CLINCH
POWELL
RIVER
HELLBENDER
SALAMANDER
EGGS
LARVAE
LUNGS
GILLS
SUBSTRATE
HABITAT
ECOSYSTEM
SLIME
PREDATION
POPULATION
VIRGINIA

**Color the hellbender on the river bottom.**



## Fun Hellbender Facts

- Hellbenders have lots of nicknames, including: water dog, grampus and snot otter.
- Hellbenders have three rows of teeth- two rows on the top jaw and one on the bottom.
- Hellbenders have relatives in Japan and China that can grow up to four feet long!
- The hellbender's slimy skin is slippery making it difficult for predators to catch them.
- All salamanders, including the hellbender, have smooth skin and no claws.

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