

Friends of the Kaw



Mussels on the Kaw

This lesson was developed by Craig Thompson, Biologist, EPA Region 7

Overview: Presentation to students. Students will learn about mussel shells and how to identify different types. Basic mussel biology, including anatomy and ecology, will be presented. An emphasis will be placed on the fact that mussels are a vital part of the ecology of the Kansas River, but many species are endangered and losing them from the ecosystem will harm the river; in contrast, there are also introduced species that are creating problems.

Grades: 5-7 and 8-12

Objective:

- Students will understand the importance of mussels.
- Students will recognize the different types of mussels.
- Students will learn to be cautious of transporting introduced mussels when recreating.

Materials: A selection of mussel shells can be found on many sandbars along the river and can be made into a teaching collection for use with this lesson. We provide a species list and illustrations at the end of this lesson. Mussel pictures and identifications can be found in the *Critter Corner* section on the Friends of the Kaw website http://www.kansasriver.org/content/critter_corner

Method: Walk along a sandbar or stretch of the river looking for empty mussel shells with your students. Alternatively, place a variety of mussel shells collected from the Kansas River on a table for students to examine.

Instructor will: Present in a lecture format an explanation of the basic anatomy and ecology of mussels based on the outline and illustrations provided in this lesson. It is especially effective to pass around empty mussel shells during the lecture and tell the students that these are often found along the river and that they can begin their own collection.

Students will: Students will demonstrate an understanding that mussels are an important part of the aquatic ecosystem by describing what changes they would expect if all mussels were lost through extinction, compared to a river with a healthy population of mussels, compared to what would happen if large populations of introduced zebra mussels were to take over a system

Evaluation: Knowledge of basic anatomy will be demonstrated by having students draw a snail and a mussel and illustrate the main differences.

Students will demonstrate: An understanding of how the differences between snails and mussels lead to different lifestyles and ecology, and how that affects the river.

Resources: A set of lecture notes and illustrations are provided below, along with a list of mussel species that are found in Kansas. Photographs of mussels can be found on the *Critter Corner* section of our website http://www.kansasriver.org/content/critter_corner

The species list and illustrations are downloadable as separate files in Word and gif format on our *Teacher's Resources* page http://www.kansasriver.org/content/teachers_critter



For more information contact:

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Lecture Outline

What is mussel?

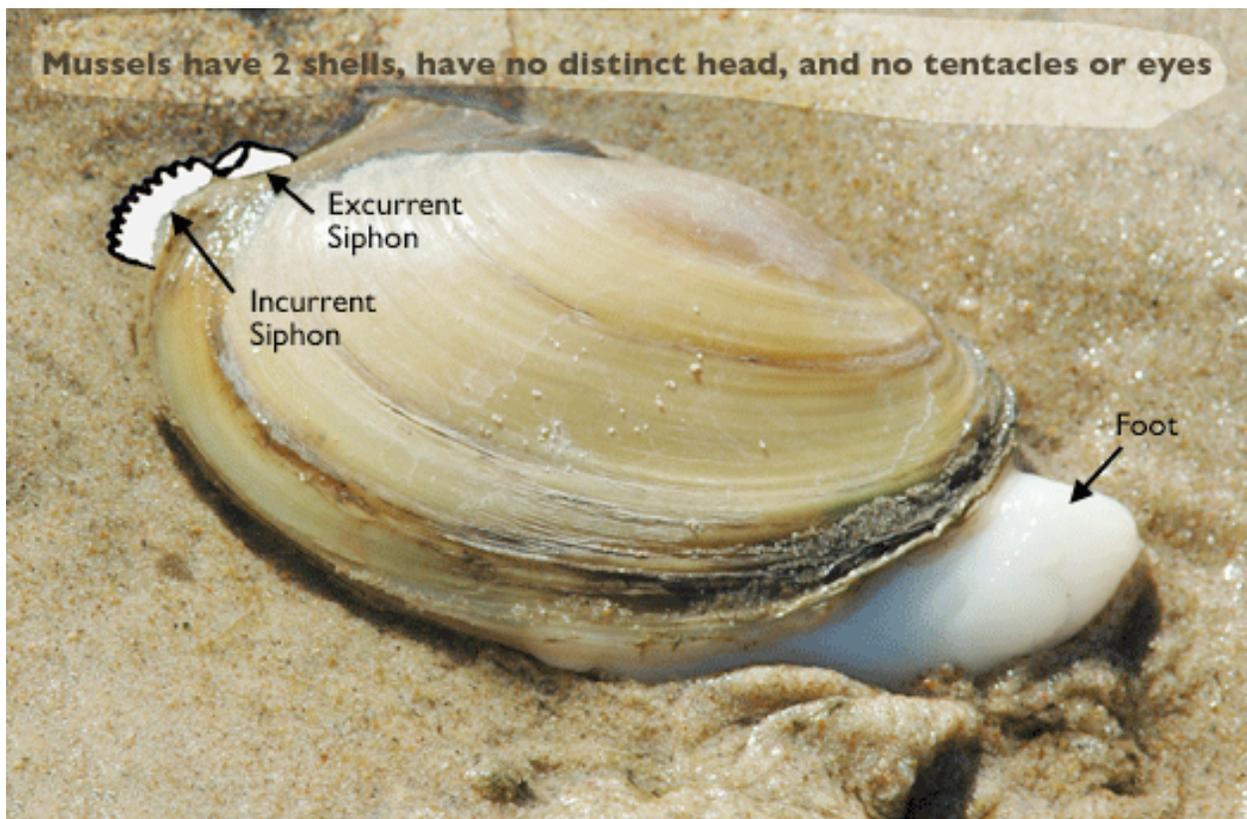
A mussel is an animal with two shells that are held together by elastic ligaments. Inside the shell they have soft bodies with two pairs of gills, a single foot for moving short distances and muscles for keeping their shells tightly closed

Where do they live?

Mussels live buried in silt, sand, gravel and rock substrates in the bottom of streams, rivers and lakes. They need fresh, flowing water to survive.

Mussels vs. snails (show photographs of both animals)

- Mussels have 2 shells, have no distinct head, and no tentacles or eyes
- Snails have one shell, have a prominent head, and tentacles





Parts of a mussel shell (show photograph of mussel)

There are 4 parts of a mussel shell (show photograph of mussel)

1. Anterior - This is the part of the shell where the mussel extends its foot (bottom of shell and in front).
2. Posterior - This is the part of the shell where the mussel uses tube-like siphons to bring water in and out of the shell (on top of shell and at the rear)
3. Dorsal margin (top of shell – like dorsal fin of fish, dolphin)
4. Ventral margin (bottom of shell)

Periostracum outer layer of the shell (or the skin) (show mussel shells with the following skin)

Some mussels have skin that has:

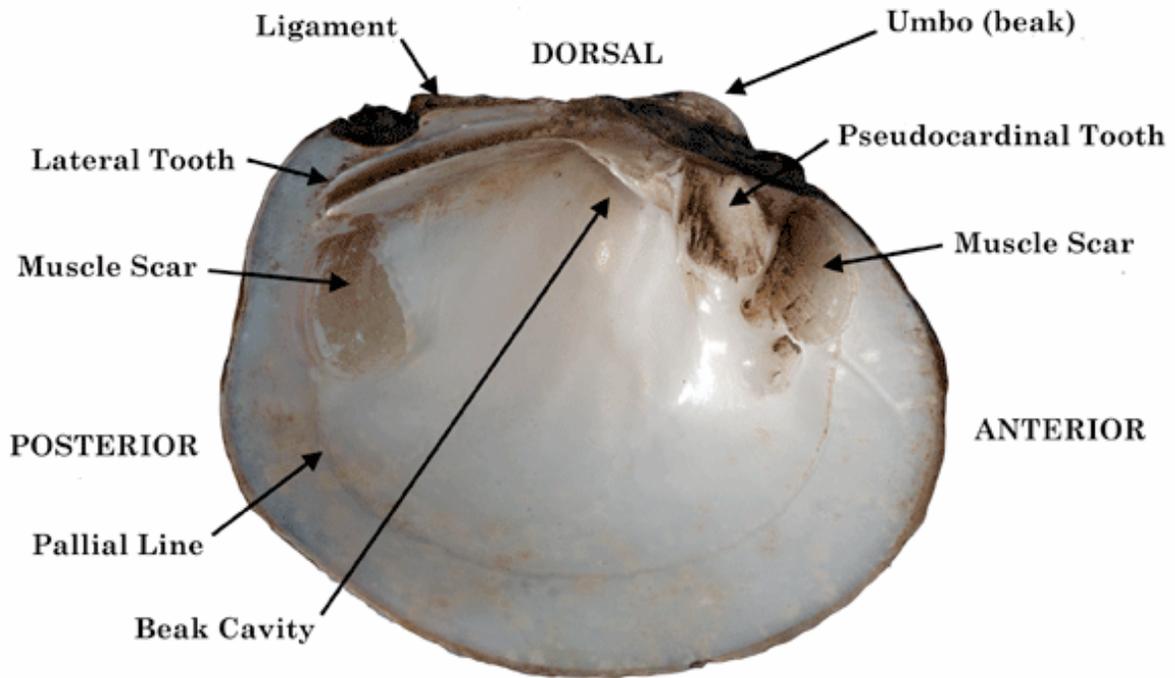
- small, round raised bumps – Pimpleback, Mapleleaf, Threehorn wartyback
- wrinkles – Threeridge, Washboard
- smooth – Pocketbook

Skin color can be Brown, Black, or Tan

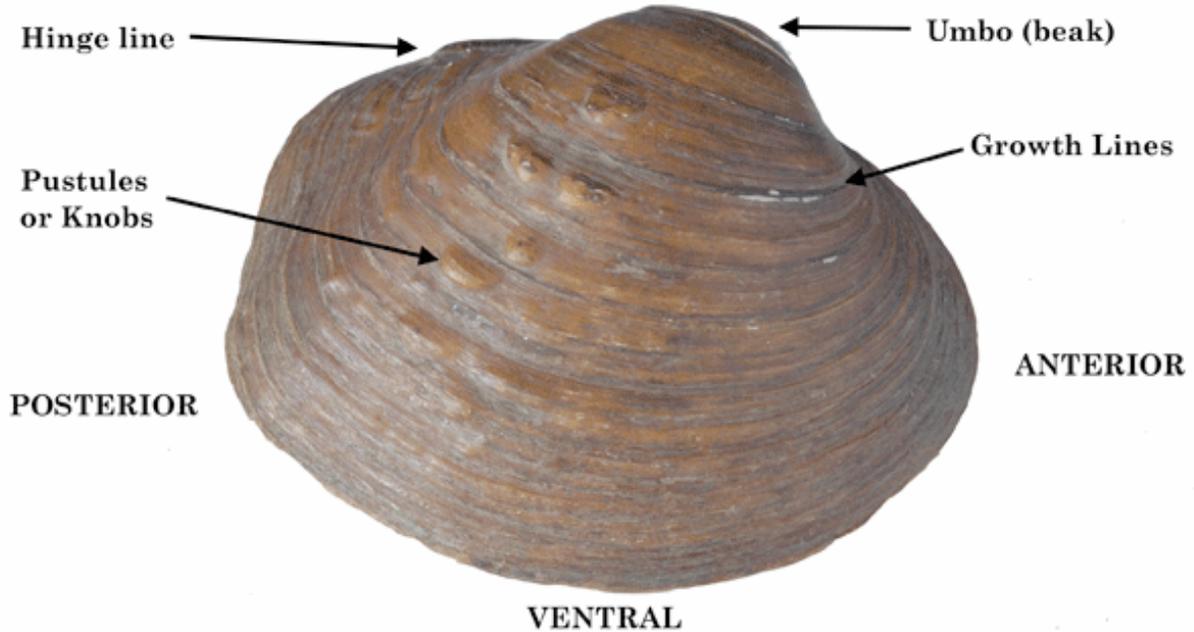
Inside of a mussel shell (show examples)

- Color - Purple, pink, white (inside color of shell called Mother of pearl)
- Teeth – teeth or no teeth (teeth used to hold the 2 shells together)
- Muscle scars – where the animal attaches itself to the shell

INSIDE OF MUSSEL SHELL



OUTSIDE OF MUSSEL SHELL



MORPHOLOGY OF A FRESHWATER MUSSEL SHELL

All mussels and clams are filter feeders (show photograph with tube-like siphons)

- Tube-like siphons bring water in and out of the shell.
- The mussel uses its foot to bury itself in place then sticks its tube-like siphons out of the shell to feed and breathe.
- One of the tubular siphons brings in water and then the other siphon brings it out.

The water that comes into the shell is filtered for food. The food that is filtered is microscopic algae, bacteria and detritus.

And mussels rely on dissolved oxygen from the water to breathe. Mussels have 2 gills to obtain this oxygen to breathe.

Life history of mussels

Mussels are parasitic in the early stages of life. They rely on a fish to survive the first couple of weeks of their life.

Young mussel larvae are called glochidia. Young mussels become attached to a fish's gills, skin or fins after being released from their mother.

The young mussel remains attached to the fish for 1-10 weeks and does little harm to the fish.

When the young mussel leaves the fish, it drops to the bottom of the stream, river and begins growing and developing into an adult.

Introduced mussel species

Asiatic clam (show examples)

Occurs in most streams, rivers and lakes throughout the state

Zebra mussel (show examples)

Started showing up in lakes in the state. Now populating El Dorado Lake and Walnut River in south central Kansas (near Wichita)

Both species are filter feeders. They do not use fish in their early life stages, but use the current to carry the young larvae downstream. Zebra mussels are able to attach themselves to solid objects like rocks.

LIST OF KANSAS FRESHWATER MUSSELS

Common Name	Scientific Name	Mussels occurring in Kansas River
Mucket (T/E)	<i>Actinonaias ligamentina</i>	
Slippershell mussel *	<i>Alasmidonta viridis</i>	
Elktoe (T/E)	<i>Alasmidonta marginata</i>	
Threeridge	<i>Amblema plicata</i>	
Flat floater (T/E)	<i>Anodonta suborbiculata</i>	
Giant floater	<i>Pyganadon grandis</i>	Yes
Paper pondshell	<i>Anodonta imbecillis</i>	
Cylindrical papershell	<i>Anodontoides ferussacianus</i>	
Rock pocketbook (T/E)	<i>Arcidens confragosus</i>	
Western fanshell (T/E)	<i>Cyprogenia aberti</i>	
Butterfly (T/E)	<i>Ellipsaria lineolata</i>	
Spike	<i>Elliptio dilitata</i>	
Snuffbox *	<i>Epioblasma tiquetra</i>	
Wabash pigtoe	<i>Fusconaia flava</i>	
Plain pocketbook	<i>Lampsilis cardium</i>	
Neosho mucket (T/E)	<i>Lampsilis rafinesqueana</i>	
Fat mucket	<i>Lampsilis siliquoidea</i>	Yes (weathered/relict shells)
Yellow sandshell	<i>Lampsilis teres</i>	Yes (weathered/relict shells)
Fluted-shell (T/E)	<i>Lasmigona costata</i>	
White heelsplitter	<i>Lasmigona complanata</i>	Yes
Fragile papershell	<i>Leptodea fragilis</i>	Yes
Black sandshell *	<i>Ligumia recta</i>	
Pondmussel	<i>Ligumia subrostrata</i>	Yes (weathered/relict shells)

Washboard	Megaloniaias nervosa	
Threehorn wartyback	Obliquaria reflexa	Yes (weathered/relict shells)
Hickorynut *	Obovaria olivaria	Yes (weathered/relict shells)
Round pigtoe	Pleurobema coccineum	
Pink heelsplitter	Potamilus alatus	Yes
Pink papershell	Potamilus ohioensis	Yes
Bleufer	Potamilus pupuratus	
Ouachita kidneyshell (T/E)	Ptychobranhus occidentalis	
Rabbitsfoot (T/E)	Quadrula cylindrical	
Monkeyface	Quadrula metanevra	
Wartyback	Quadrula nodulata	
Pimpleback	Quadrula pustulosa	Yes (weathered/relict shells)
Mapleleaf	Quadrula quadrula	Yes
Creeper	Strophitus undulatus	
Lilliput	Toxolasma parvus	
Pistolgrip	Tritogonia verrucosa	
Deertoe	Truncilla truncata	Yes (weathered/relict shells)
Fawnsfoot	Truncilla donaciformis	Yes
Pondhorn	Uniomerus tetralasmus	Yes
Ellipse (T/E)	Venustaconcha ellipsiformis	
Purple wartyback	Cycloniaias tuberculata	
Asiatic Clam	Corbicula fluminea	Yes (introduced species)

* Extirpated in Kansas (T/E) = Threatened or Endangered in Kansas