A Tiny Beaver Book

Subjects: Science and Language Arts

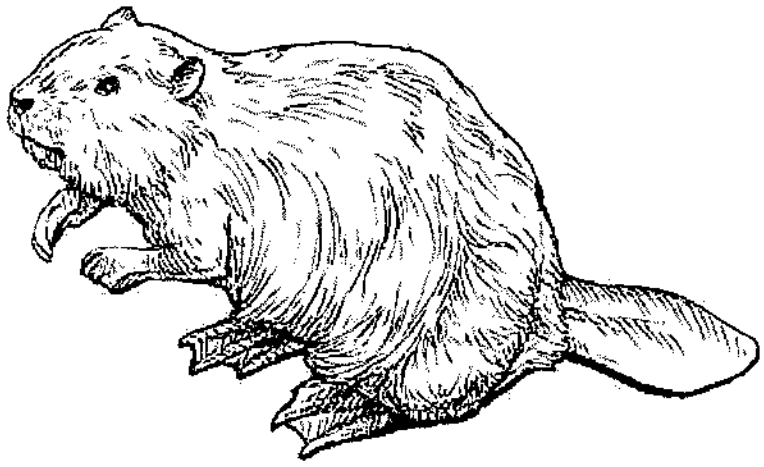
Objectives: *Science:* Students will be able to identify stages in a beaver's life.
Language Arts: Students will be able to use factual information to write a fictional story.

Materials:

- writing and coloring materials
- paper bag or 12" X 18" construction paper for each child
- directions for making a tiny book (following page)
- scissors

Procedure:

1. Review the biology of beavers.
2. Ask students to write a story which reveals events of a beaver's life. (being born, surviving winter, finding a home, food, etc) Everyday events that could occur should be included.
3. After students are finished writing their rough drafts, peer edit.
4. Each student should, then, make a tiny book either from a paper bag or a 12" X 18" piece of construction paper.
5. Students should create a cover on the front with title and author. The middle pages should contain their story and illustrations. On the back of the book, students should write a short summary of the story.
6. Be sure to allow students time to share their stories with classmates and younger book buddies!



Directions for Making a Tiny Book

Materials:

☐ scissors

☐ paper bag or 12" X 18" construction paper

Directions are written for using a paper bag. If using construction paper, you can start with step three.

Steps One & Two:

- Lay the paper bag flat and take apart the bottom of the bag.
- Cut down one side of the bag on a fold and then cut off the bottom section.

Step three:

- You'll have a long rectangular sheet.
- Fold the bag over longways so that the corners meet. Crease well and then unfold. Fold the paper over in the other direction, again placing the corners together. Do not unfold.

Step four:

- Take the *folded* side in your hand and fold in half one more time. Crease well and unfold so that you're at the previous step.

Step Five:

- Cut from **folded** side on the crease to the center.

Step Six:

- Open to full sheet. Fold lengthwise. Push outer edges together so a diamond forms in the middle of the book.

Step Seven:

Fold completely and crease well.

Note: After the writing and illustrating are complete, you may want to tape together the edges that do not have folds.

Think Like a Beaver

Timeframe
1-2 Fifty minute class periods

Target Audience
Elementary School (4th-6th)

Materials
- Ecosystem Cards
- Seed trays or long Tupperware containers
- Wood/popsicle sticks
- Sand, Rocks, Clay

Contact:
SMILE Program
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http://smile.oregonstate.edu/

Description

Students will create a model beaver dam and demonstrate changes in the ecosystem community pre-and-post dam. Students will hypothesize about changes that they would expect to see to the ecosystem after the beaver dam is built.

Objectives

Students will:

- Learn basic characteristics of the beaver
- Gain an understanding of Oregon's fur trade as it relates to beavers
- Discuss ways in which the removal of beavers may have impacted the ecosystem

Guiding Questions

How does the use of natural resources affect people and the environment?

- How and why do people use natural resources?
- What factors influence how we use our natural resources?
- In what ways can people use resources sustainably?

Background Information

One of the most notable traits of the beaver (aside from its large size!), is its ability to transform its environment to suit its needs. Most animals have at least some effect on the environment around them, but few animals (except for humans) have as much of an impact on their environment as the beaver does. In fact, a single family of beavers can in a matter of weeks turn a small, rushing stream into acres of deep, still, interconnected ponds, creating a complex wetland that would otherwise not exist.

Besides humans, beavers are the only species on earth that know how to construct dams. Scientists often refer to beavers as the

engineers of the animal world. But unlike humans, who must be taught how to design and build dams, beavers know instinctively how to interweave sticks to create a strong and durable structure and how to seal a dam with mud to hold water. They are born knowing how without ever having done so.

There are many ways that beaver dams can have a positive impact on the ecosystem. Beaver dams create ponds that provide the beavers with refuge from predators. Additionally, since beavers store their food underwater in piles or "catches", they have access to food throughout the winter. They also provide habitat that wouldn't otherwise exist for many other species. Ducks, geese, herons, turtles, and frogs are just a few of the species that benefit from the deep and wide waterways that beavers create. Beaver dams provide woody debris in which juvenile fish can hide from predators. Beaver dams help young trout and salmon survive their first vulnerable year. The accumulated detritus (leaf litter) in the water supports aquatic insect populations which are an important food for fish, amphibians, waterfowl, bats and songbirds.

Next Generation Science Standards

DISCIPLINARY CORE IDEAS:

ETS1.B: Developing Possible Solutions

ETS1.C: Optimizing the Design Solution

PERFORMANCE EXPECTATIONS:

5-ESS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

3-5-ETS1-3. Plan and carry out fair tests which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Activity Introduction

Let students know that they are going to do an activity to learn more about beaver dams and their affect or impact on the ecosystem. Ask students what they already know about beavers? Dams? Have them watch one of the videos listed under resources to learn more about beavers and their dams. Now it's their your to think like a beaver!

Activity

1. Break students into groups of 3-4 with a long container (i.e. Tupperware or seed tray) and have them partially fill it with sand.
2. Have students create a stream/river ecosystem using the sand. (For more in-depth learning about creating a stream/river ecosystem see "Home, Home in a Stream")
3. Once students have finished, hand out the "Ecosystem Cards" and have students make predictions about which organisms they would most expect to find in the stream ecosystem. Have them separate out the predicted stream organisms, and group these apart from the others (Hint: have them think about how the beaver changes the habitat, and then relate that to the information provided on each card. Consider how beavers change

water flow and temperature, sediments on the bottom (rocks vs. mud), vegetation along the banks, and the presence of food and predators).

4. Go back to the model and have students choose a spot along their river to build a beaver dam. Have them discuss a design with their group before they start building. Once they have a design plan they can choose from materials such as popsicle sticks, collected sticks, clay, and small rocks to construct their dam.

5. When students have completed their model dam, have each group present their design to the class and then test their dam by pouring water from a bucket down the river path. Ask: How did your dam work? What adjustments to your design do you need to make? Have students make changes to their dams and conduct a second test.
6. Have students observe and note the changes to the ecosystem. How is the pond ecosystem different than the river ecosystem?
7. Have students revisit the stream community they formed out of the "Ecosystem Cards". What changes would they make based on the new pond ecosystem? Which species might be added after the beaver dam is built? Will some species possibly be lost? Note that some species could be present in both habitats. Have them create a new community for the beaver pond using their cards and have them predict whether they think that the existing organisms would increase, decrease, or stay the same post beaver dam. Again, consider how the beaver changes the habitat and then relate that to the information given on the cards.
7. Lastly, using the new community, have students group cards together based on whether they are producers, consumers, or decomposers. To remind students of PCD's sing the food chain song.

Discuss

- How do you think the changes the beaver made to the ecosystem affected the food web?
- What changes might we see in the organisms that live here?
  - Are there any new organisms? A loss of any organisms?
  - Would you expect to see more or less fish? invertebrates? birds? amphibians?
- How is a beaver dam different from a human dam? Would a human dam have the same affect or impact on the ecosystem?

Resources

http://opb.pbslearningmedia.org/resource/tdc02.sci.life.colt.beaver/beavers/

https://www.youtube.com/watch?v=yJjaQExOPPY

http://opb.pbslearningmedia.org/resource/eng06.sci.engin.design.littledam/building-a-dam-like-a-beaver/

THANKS TO THE FOLLOWING CONTRIBUTORS:

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Food Chain Song

CHORUS:

Predator and prey,
Producers and decay
Are in the food chain; a chain, chain
Trees are producers, cause they're the sun users in the food chain;
a chain, chain
They make food from the sun and the cycle has begun in the food chain;
a chain, chain
Everybody now...

CHORUS.

Beaver comes around and eats the trees down in the food chain; a chain, chain
But the cycle doesn't stop 'cause beavers aren't the top of the food chain;
a chain, chain
Everybody now...

CHORUS.

Cougar likes to eat a little beaver meat in the food chain; a chain, chain
And it really makes his day to eat some beaver prey, food chain; a chain, chain
Everybody now...

CHORUS.

Cougar lifts his tail and scats on the trail in the food chain; a chain, chain
For the insects that's a deal, cause scat's a gourmet meal in the food chain;
a chain, chain
Everybody now...

CHORUS.

The cycle never ends, it just begins again in the food chain; a chain, chain
So eat your food my friend but remember where it's been... in the food chain;
A chain, chain
Everybody now...

CHORUS.

Stonefly Larva

Stoneflies live among stones in clear, cool, well oxygenated water. Some are predators and others consume leaves.

Pacific Giant Salamander

Pacific giant salamanders lay their eggs under large boulders underwater and need cool temperatures. Stoneflies are a large part of their diet.

Tailed Frog

Tailed frog tadpoles have a strong suction cup on their mouth so they can graze algae from rocks in fast currents.

Torrent Salamander

Torrent salamanders need cold water temperatures and lay their eggs under boulders. They are common around waterfalls.

Reticulate Sculpin

Reticulate sculpin are well camouflaged to live among cobble and boulders. They eat aquatic insects that drift past them, especially mayflies and stoneflies.

Caddisfly

Caddisflies make cases from sand and pebbles to protect them from predators. Many species eat leaves and need well oxygenated water.

Bullfrog

Bullfrogs lay eggs on the water surface in a large mass. Adults eat insects and small animals.

Pacific Chorus frog

Pacific chorus frogs lay their eggs on aquatic vegetation, such as cattails. Adults eat insects.

Rough-Skinned Newt

Rough-skinned newts lay eggs attached to sticks or vegetation in slow-moving water. They eat insects and are very toxic as adults.

Bass

Bass are nonnative in Oregon and they like warm water and tolerate poor water quality. Bass are predators and eat anything they fit in their mouths.

Sunfish

Sunfish are nonnative in Oregon and they live in warm, slow-moving waterbodies. They are predatory.

Stickleback

Stickleback males make a nest of aquatic weeds and sticks that they use to attract a female to lay eggs.

Giant Water Bug

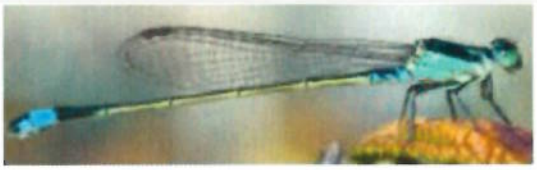
Giant water bugs are predators and they perch on aquatic vegetation waiting for unsuspecting prey. They sometimes feed on chorus frog tadpoles and newt larvae.

Dragonfly nymph

Dragonflies are predators and they perch on aquatic vegetation waiting for unsuspecting prey. They eat a range of insects and amphibians.

Damselfly

Damselflies are sometimes very common in wetlands. They are predators and eat other insects. They typically lays eggs on vegetation.



Water boatmen

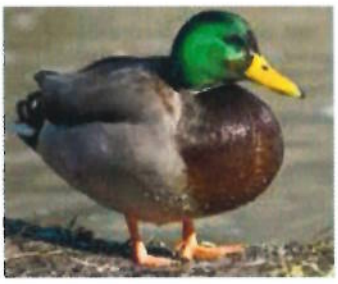
Water boatmen swim in the water column in slow-moving water, where they hunt for insects.

Red-winged black bird

Red-winged blackbirds make nests in cattails or bullrush at the water's edge.

Duck

Ducks typically dabble at the bottom of the water on soft sediments, where they find organic matter and small organisms to eat.



Bullrush

Bullrush need muddy sediments, slow water, and high nutrients to grow well. They provide habitat to many species.

Cattail

Cattail need muddy sediments, slow water, and high nutrients to grow well. They provide habitat to many species.

Western Pond Turtle

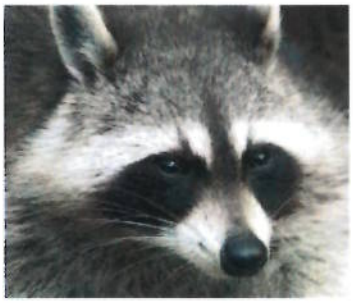
Western pond turtles eat invertebrates and commonly bask on logs at the water's edge.

Beaver

Beavers need trees to build their lodge, which changes the aquatic habitat for other species.

Racoon

Racoons are generalist predators that eat fish, invertebrates and other small animals. They also eat some berries and plant matter.



Cuttthroat Trout

Cutthroat trout are happy in either fast or slow water, as long as it is clean and cool. They mostly eat insects.

Signal Crayfish

Signal crayfish can be found in either fast or slow moving water. They can live under rocks or among plants.

Aquatic Beetle

Aquatic beetles are found in all types of water bodies. Some are predators and others eat plants.

Midge

Midge larvae are the most common aquatic insect in habitats that have slow, warm water.

Mayfly

Some mayfly larvae have a flat body so they can attach to rocks in fast moving currents. They graze on algae.

Brook Lamprey

Brook lampreys live in gravel and sand and they filter small particles that drift in the water current. They make nests out of gravel to lay eggs in.

Garter Snake

Garter snakes feed on amphibians that emerge from the water, especially chorus frogs and newts. They are immune to newt toxin.

Romping Rodents

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

Here are some rodents that live in Idaho. Find them in the puzzle.

BEAVER
BOG LEMMING
BUSHY-TAILED WOODRAT
COLUMBIAN GROUND SQUIRREL
DEER MOUSE
FLYING SQUIRREL
GOLDEN-MANTLED GROUND SQUIRREL
HOARY MARMOT
IDAHO GROUND SQUIRREL
KANGAROO RAT
LEAST CHIPMUNK
MEADOW VOLE
MUSKRAT
POCKET GOPHER
POCKET MOUSE
PORCUPINE
RED SQUIRREL
ROCK SQUIRREL
SAGEBRUSH VOLE
YELLOW-BELLIED MARMOT