

Essential Question: How do we come to know and appreciate the river environment and our place in it?

Content Questions: What is a river habitat?
What basic needs does the river provide plants and animals?

grade **1**

First Grade River Biodiversity Overview

Content Question 1: What is a river habitat?

LESSON 1: What is a River Habitat?

- Students sing songs, recite poems and listen to books that introduce rivers and their habitat
- Students begin classroom model of a river

LESSON 6: River Field Trip

- Students observe animals living in and around the river
- Students help take care of the river by picking up litter

Content Question 2: What basic needs does the river provide plants and animals?

LESSON 2: Plants of the River?

- Students sing songs, recite poems and listen to books that introduce plants of the river
- Students continue to build classroom model of a river

LESSON 3: Animals That Make Their Home in the River

- Students sing songs, recite poems and listen to books that introduce animals that live in the river
- Students continue to build classroom model of a river

LESSON 4: Animals That Sometimes Live in the River

- Students sing songs, recite poems and listen to books that introduce animals that sometimes live in the river
- Students continue to build classroom model of a river

LESSON 5: Animals That Visit the River for Food and Water

- Students sing songs, recite poems and listen to books that introduce animals that visit the river
- Students continue to build classroom model of a river

Culminating Mural or Book Project



4

animals that sometimes live in the river

Essential Question: How do we come to know and appreciate the river environment and our place in it?

Content Question: What basic needs does the river provide plants and animals?



Goals

- Students will understand that some animals spend part of their life living in rivers and part of their life living on land, and be able to name at least one
- Students will be able to articulate how these animals depend on the river

Vocabulary

Nymph: The stage of animal between egg and adult. As a nymph grows, it loses its old skin many times until finally it turns into an adult. The nymph and adult look different.

Dragonfly: An insect that begins its life in the water as an egg and then a nymph. As an adult it no longer lives in the water, but will return to the water to lay its eggs.

Frog: An amphibian that spends part of its life underwater (tadpole) and the remainder of its life on land. Frogs stay near water to lay eggs and to keep their skin moist.

Materials

- Song: "River Song" from *Follow the River* by Lisa Trunbauer
- Poems:
 - "Follow the River" (included at the end of Lesson 1)
 - "Five Little Tadpoles", found at the end of this lesson
- River Books:
 - *Dragonfly* by Emery Bernheard
 - *All About Frogs* by Jim Arnosky
- Student river journals
- River Mystery Bag
- Pictures or toy models of a dragonfly nymph and adult and a frog tadpole and adult
- Index cards, 4 per student
- Copies of the **Frog and Damselfly Worksheet**, 1 copy per student, plus enough extra copies to cut up and give each student one card

Background Information

Many insects and amphibians begin their life in water and then emerge from the water to live on land as an adult. Common insects that begin their lives in the water include dragonflies, damselflies, mosquitoes and black flies. Students will be examining dragonflies. Amphibians that begin their life in the water include frogs, newts and salamanders. Students will be learning about frogs.

A dragonfly undergoes incomplete metamorphosis. (During incomplete metamorphosis the animal transforms from an egg to a nymph to an adult. This is in contrast to complete metamorphosis, which is undergone by butterflies, where the animal changes from an egg to a larva to a pupa and then to an adult.) The nymph hatches from an egg that is laid in water or on plants growing in water. The dragonfly nymph is a voracious hunter, eating other insects and even tadpoles and small minnows. As the aquatic nymph grows, it loses its old skin many times. After a year or more, it crawls out of the water onto a plant to emerge as an adult. The adult dragonfly then flies away. As adults, dragonflies are excellent flyers and have excellent vision. Dragonflies eat other insects, catching them as they fly. After several weeks the adult returns to the water to lay its eggs and continue this cycle.

Like all insects, the dragonfly has three body parts: a head, a thorax and a long thin-segmented abdomen. On the short thorax, there are three pairs of jointed legs. As the dragonfly matures, two pairs of long, delicate, transparent wings emerge on the thorax. On its head are 2 large compound eyes that take up most of the head.

Frogs are amphibians, cold-blooded animals that spend part of their lives underwater and the remainder on land. Adults have long, powerful jumping legs and a very short backbone. Most frogs have teeth. Frogs eat insects, catching them with their long, sticky tongue. They also eat small fish and worms. Like all amphibians, frogs spend their lives near water because they must return to the water to lay their eggs. Frog eggs are laid in the water. When they hatch into tadpoles, they breathe through gills and swim using their tail. As they mature, they lose their tail and develop lungs for breathing air. Tadpoles eat algae and small aquatic insects and worms.

Procedure Hook

Place the River Mystery Bag in front of the class where it is visible. In the Mystery Bag place the pictures or models of the dragonfly nymph and adult and the adult frog and tadpole.

Sing the song "River Song" from *Follow the River* by Lisa Trunbauer or recite the poem "Follow the River" (included at the end of Lesson 1)

Take the picture of the dragonfly adult and the frog out of the bag. Ask the students what these two animals have in common? To help students, bring out the pictures or models of the nymph and tadpole. (They both grow up in the water and then emerge to the land as adults).



Activity

KWL

- Re-visit the KWL chart and add any new items

BOOK AND POEM

- Let the students know that they will be learning more about frogs and dragonflies.
- Recite the poem "Five Little Tadpoles". Take out the book *All About Frogs* and show pictures making sure to note what frogs look like, what they eat, where they live and how they develop. Then take out the book *Dragonfly* making sure to note what dragonflies look like, what they eat, where they live and how they develop. Teach students the new vocabulary (nymph and tadpole).
- Talk about dragonflies and tadpoles and have the students answer the following questions:
 - Where do adult frogs and dragonflies lay their eggs? Why?
 - Where do baby dragonflies and frogs grow up? What do they eat?
 - Where do adult dragonflies and frogs live? What do they eat?
 - Do adult dragonflies and frogs ever return to the river? Why?
- Randomly pass out the cards of the adult and young dragonflies and frogs. Tell students that they need to find their match (adult and young). Once they find their pair they will label their cards with the correct name (adult, tadpole or nymph).

RIVER MODEL

- Call on student volunteers to add the dragonfly nymph and adult and the tadpole and adult frog to class river habitat.

RIVER CARDS

- Pass out 4 index cards to each student. Have them complete one for each of the stages of the animals they learned about. Have students cut out, paste and color the picture from the Frog and Dragonfly worksheet on the front of the card. Then the students should write a definition on the back. When they are finished have them place the cards in their river habitat envelope.

Reflection & Assessment

Have students write the next journal entry with this prompt: If you visited a river where would you find a dragonfly and a frog?

Use the **3-Point Journal Rubric** to assess entries



Reinforcement & Enrichment

- Discuss what you learned with family members.
- Share journal entry with family members.
- Teach song to family members.

Optional Activities

Print out the dragonfly worksheet from the Enchanted Learning Web Site (www.enchantedlearning.com/subjects/insects/dragonfly/Dragonflyprintout.shtml) and have students color it in and add it to their river habitat envelopes.

The study of dragonflies may connect to a unit on insects. A good video is See How They Grow Insects and Spiders -Sony Kids Video. This video features butterflies, ladybugs, grasshoppers and spiders. It is great for showing the complete metamorphosis many insects go through during their life cycle. This type of metamorphosis where eggs hatch into larvae which change into pupae which develop into adults) can be compared to the incomplete metamorphosis which dragonflies undergo (the egg develops into a nymph which develops into an adult).



State Standards

Illinois

2.B.1a Respond to literary materials by connecting them to their own experience and communicate those responses to others.

12.A.1b Categorize living organisms using a variety of observable features.

12.B.1a Describe and compare characteristics of living things in relationship to their environments.

12.E.1a Identify components and describe diverse features of the earth's land, water and atmospheric systems.

13.B.1a Explain the uses of common scientific instruments.

Indiana

English 1.5.1 Write brief narratives (stories) describing an experience.

English 1.7.6 Recite poems, rhymes, songs, and stories.

Science 1.4.4 Explain that most living things need water, food, and air.

Five Little Tadpoles



Five little tadpoles swimming near the shore.

The first one said, "Let's swim some more."

The second one said, "Let's rest awhile."

The third one said, "Swimming makes me smile."

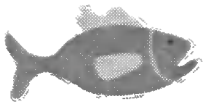
The fourth one said, "My legs are growing long."

The fifth one said, "I'm getting very strong."

Five little tadpoles will soon be frogs.

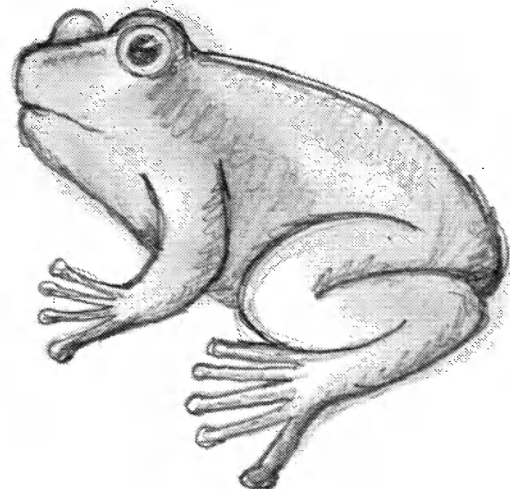
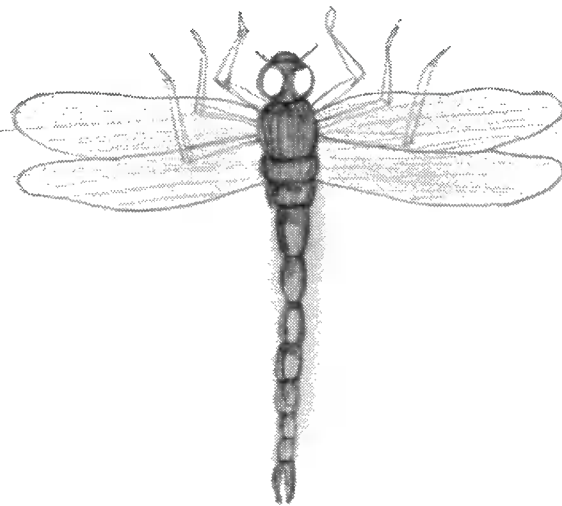
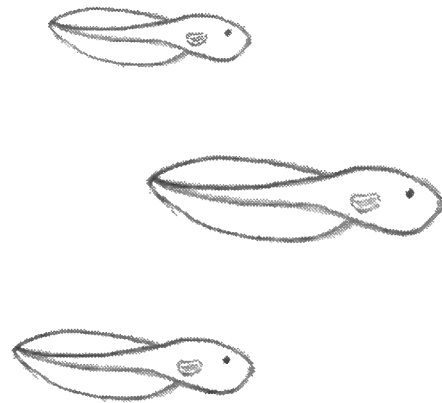
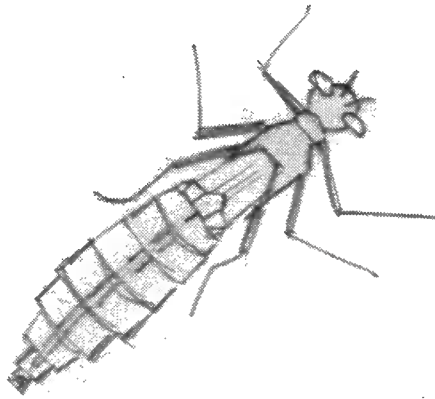
They'll jump from the water and sit on logs.

<http://www.canteach.ca/elementary/songspoems59.html>



LESSON 4: animals that sometimes live in the river

dragonfly & frog worksheet



5

animals that visit the river for food and water

Essential Question: How do we come to know and appreciate the river environment and our place in it?

Content Question: What basic needs does the river provide plants and animals?



Goals

- Students will understand that some animals visit rivers, and be able to name at least one
- Students will be able to articulate how these animals depend on the river

Vocabulary

Student generated list of animals

Materials

- Song:
 - "River Song" from *Follow the River* by Lisa Trunbauer
 - "Little White Duck" from Raffi in Concert
- Poem:
 - "Follow the River" (included at the end of Lesson 1)
- River Books, choose one of the following or one of your favorite river books which highlights the animals of the river:
 - *Look Closer River Life* by Barbara Taylor
 - *On the River ABC* by Caroline Stutson
 - *River Animals* by Francine Galko
 - *Signs Along the River* by Kayo Robertson
 - *Three Days on a River in a Red Canoe* by Vera B. Williams
- River journals
- Mystery Bag
- Pictures or models of some animals that visit the river for food and water. Possibilities include ducks, deer, raccoons and turtles
- Models of animals that visit the river for the class river model
- Blank index cards, 2 per student

Background Information

When we think about plants and animals that depend on rivers, we often just think of what lives in the river. But many plants and animals that do not live in the water, depend on the river as a source of water or food.

Animals, such as deer and raccoons, come to the river to drink. Raccoons and herons visit the river to find food such as frogs and fish and ducks paddle the river looking for algae and aquatic plants. Turtles swim the river and hang out on fallen logs. They search the river for food, which can include plants, aquatic insects and worms, small fish and dead and decaying matter.



Procedure Hook

- Sing the "River Song" from *Follow the River* by Lisa Trunbauer or recite the poem "Follow the River"
- Take the models or pictures out of the River Mystery Bag. Have students tell you what they know about each one. Ask students how they think the animals are connected to the river.

Activity

Begin with a review of the animals that the students have learned about. Highlight that they have learned about animals that live in the river throughout their entire life cycle (beavers and fish) and about animals that live in the river for some of their life cycle (frogs and dragonflies). Ask students if they think any animals that never live in the river could depend on the river.

BOOK AND POEM

- Read one of the suggested books or one of your favorites that talks about the variety of animals that depend on rivers. As you read, ask students why the various animals are found near rivers. Have students identify animals that only visit the river and explain how the river is important to them. You can make a list on the board, or under the KNOW section of the classroom KWL.
- Listen to and sing the song "Little White Duck". Discuss how each of the different animals depends on the river. Do they live in the river? Do they get food from the river? Do they drink water from the river?

RIVER CARDS

- Pass out 2 index cards to each student. Have students choose two of the animals that only visit rivers. Have students draw the animal on one side of the card and write a definition of the animals on the back.

RIVER MODEL

- Invite student volunteers to add the visiting river animals to the river model

Reflection & Assessment

Direct students to write the next journal entry with this prompt: Why do some animals visit the river? Why would you want to visit a river?

Assess using **3-point Journal Rubric**

Reinforcement & Enrichment

- Discuss what you learned with family members.
- Share journal entry with family members.
- Teach song to family members.



Optional Activity

Find worksheets on www.enchantedlearning.com of animals that visit the river. Have students color the pictures and add them to their River Habitat envelopes.

State Standards

Illinois

2.B.1a Respond to literary materials by connecting them to their own experience and communicate those responses to others.

12.B.1b Describe how living things depend on one another for survival.

12.E.1a Identify components and describe diverse features of the earth's land, water and atmospheric systems.

13.B.1a Explain the uses of common scientific instruments.

Indiana

English 1.5.1 Write brief narratives (stories) describing an experience.

English 1.7.6 Recite poems, rhymes, songs, and stories.

Science 1.4.4 Explain that most living things need water, food, and air.

6

field trip

Essential Question: How do we come to know and appreciate the river environment and our place in it?

Content Question: What is the river habitat?



Goals

- Students will observe nature carefully and respectfully
- Students will build a connection to their local river
- Students will be able to articulate what animals and plants depend on their local river

Vocabulary

River: A path of freshwater that is always moving and has land on both sides.

Habitat: A place where someone or something lives.

Materials

- Song: "River Song" from *Follow the River* by Lisa Trunbauer
- Poem: "Follow the River" (included at the end of Lesson 1)
- River Book: *Where the River Begins* by Thomas Locker
- River journals
- River Mystery Bag
- Sun hat
- Bottle with note and map
- Copies of **River Field Trip Worksheets**, 1 per student
- Clipboards or something else which students can write on, 1 per student
- Pencils, 1 per student
- Plastic binoculars, as many as possible (available from U.S. Toy Company)
- Magnifying boxes, 4 (square bug boxes with a magnifying lid are available from Acorn Naturalist www.acornnaturalists.com and larger two way microscopes are available from Nasco www.enasco.com)
- Plenty of parent volunteers!
- Waders are useful for adults collecting from the river



- Net for catching small aquatic animals (available from www.siue.edu/OSME/river or more expensive and rugged nets available from Forestry Supply Catalog www.forestry-suppliers.com)
- Collection trays (4 or 5): these can be any white plastic pan you don't mind getting dirty or they can be purchased from www.siue.edu/OSME/river
- First aid kit
- Hand sanitizers or hand wipes
- Trash bags
- Gloves (for picking up trash)

Background Information

What you and your students discover at the river depends on the site you visit, the time of year, how quiet and careful you are with your observations and some luck. But, the fact that every visit promises something new and different is part of what makes the outdoors such a fun and magical place.

During the spring migration, the more forested areas along the river are amazing places to watch birds. Encourage your students to be quiet. Break students into small groups with a chaperone if at all possible, so that the students are more likely to see animals.

It is often hard to see animals because they are really quite frightened of us. However, they often leave signs behind. Tree trunks cut off in a way that resembles the tip of a pencil means that beavers have been in the area. Branches and bark that have been scraped indicate that deer are around (male deer rub their antlers on branches and trunks). Muddy areas are good places to look for tracks, as are areas covered in fresh snow. Birds often move fast or are hidden in the foliage, but if you sit and listen, their calls often come through loud and clear. Scat (feces) is another indicator that animals have been in the area. Scat that looks like that of a small dog, but with fur in it could be that of a coyote. Three-eighth inch pellets are the scat of deer.

One thing you can be certain to find in a river are macroinvertebrates (small animals without a backbone that are visible to the naked eye). As part of your field trip you will be collecting these small creatures. Depending on the cleanliness of the river and the type of habitat available, you will find different types of macroinvertebrates. Midges, aquatic worms and sowbugs are present most anywhere. Dragonfly, mayfly and damselfly nymphs and caddisfly larvae are quite common in the more natural sections of the river. These macroinvertebrates are an important food source for many fish, reptiles, amphibians and birds.

Preparing for a river field trip takes advance preparation, so start planning early. Recruit parent volunteers. Ideally you want to have one parent volunteer for every 5 students. If possible prepare your parents ahead of time for the field trip. Unlike other field trips they may have chaperoned, this one is going to require that they lead the students in small group activities. At the very least prepare an information sheet on the field trip for the parents volunteers. Describe the basic

set-up of the field trip (students will be in small groups rotating to 4 different stations where they will engage in different activities). Describe each of the stations in detail and include the responsibilities of the parents (see Activity section for details.) Make sure the parents understand what the students are to do at each of the stations and what their role is. In addition, give each parent a list of the students in his/her group and a timetable for the day (when they should be at each station).

Procedure Hook

Before the start of class, fill the Mystery River Bag with a sun hat or visor and the first aid kit. Display the Mystery River Bag. Take out sun hat or visor and put it on. Then take out the bottle with the map and note. Show the map and reread the note excitedly. Let students know that today is the day they have been invited to the river.

Then take out the First Aid Kit and review the safety rules for the trip:.

- Students must stay in view of the teacher or chaperone at all times
- If students need to use the bathroom, they must ask a teacher or chaperone first and be accompanied by an adult
- No eating, drinking river water or putting hands in mouth
- No going in water

Activity

IN CLASS:

- Sing "River Song" from *Follow the River* by Lisa Trunbauer or recite the "Follow the River" poem
- Read *Where the River Begins* by Thomas Locker. Talk about the idea of exploration with your students. What do they hope to see, hear, touch, encounter or learn on their river field trip?
- Introduce the field trip to the students. Let them know that they will be in small groups and that each group will get to experience 4 different activities about the river. Pass out and review **River Field Trip Worksheets**.
- Divide the class into groups

AT THE RIVER:

- Organize students into groups with their chaperones.
- Organize the four different stations.



Bird Watching Station:

Materials: binoculars

Pass out binoculars and explain how they are used. Have the parent volunteer lead the children as they walk along the river looking for birds. It is not important that the parent volunteer or the students know the names of the birds. Instead, focus on describing the birds' characteristics and behaviors. Have students draw what they see on the **Birds Worksheet**.

Trash Time Station:

Materials: trash bags, gloves

With a parent guide, have the students discuss the problem of having trash along the river. Discuss ways to keep the river clean. Complete the worksheet on ways to keep the river clean. Before they begin collecting trash, have the children put on disposable gloves. Make sure they understand that they are not to pick up sharp objects like glass. As the students collect trash, they can record what they find on their **Trash Collection Worksheet**.

Macroinvertebrate Station:

Materials: nets, waders, collection trays, magnifying boxes

- This station is the most involved and should probably be led by the teacher or an outside river expert. The leader will be collecting macroinvertebrates (small animals with no backbone) from the river and sharing them with students. Ideally, the collector would wade into the water. If this is not possible, s/he can use a large net to scrape against the bottom and sides of the river. Then the volunteer should examine the net for anything moving and place all animals in the collection pans that have been filled with water.
- If the teacher or volunteer can wade into the river, pick up some of the rocks and look for macroinvertebrates (basically anything moving on the rock). You can also hold the net so that it touches the bottom of the riverbed, down stream from where you are standing. Then kick your feet in front of the net, thus dislodging the macroinvertebrates from the bottom sediment and sending them into your net. Fallen logs and leaf packs are also good areas to dip your net into to find macroinvertebrates. If there is a piece of wood in the water, look under the bark for hiding macroinvertebrates. Place all macroinvertebrates in the collection pans that have already been filled with water.
- Have the students sit around the specimen pans observing the macroinvertebrates. Ask them questions to lead them to look more closely. Do they have legs? How do they move? What color are they? Ask them questions to lead them to think critically about the role of macroinvertebrates in rivers. What do you think these animals eat? Who do you think eats them? Have students record their thoughts and observations on the **Macroinvertebrate Worksheet**.
- Place some of the macroinvertebrates in the magnifying boxes and let students take a closer look.



River Poem Station:

Materials: None

Have students sit near the river. Have the students sit on the ground, at least arms width apart. Have them look, listen and smell. Ask students to draw what they see, hear, touch, and smell on the **River Poem Worksheet**. When they are done, ask students to write and illustrate a poem about the river on their **River Poem Worksheet**.

BACK IN SCHOOL:

Go back to the KWL chart and add the students' thoughts and questions. Have students reflect on how being at the river made them feel.

Reflection & Assessment

Add last journal entry with the prompt: What do I know and how do I feel about the river?

Assess student worksheets and journal entry using the **3-point Journal Rubric**

Reinforcement & Enrichment

- Discuss what you learned with family members.
- Share journal entry with family members.
- Teach water song to family members.
- Write and illustrate a river story.

State Standards

Illinois

2.B.1a. Respond to literary materials by connecting them to their own experience and communicate those responses to others.

12B.1b Describe how living things depend on one another for survival.

12.E.1a Identify components and describe diverse features of the earth's land, water and atmospheric systems.

13.B.1.a Explain the uses of common scientific instruments.

Indiana

English 1.5.1 Write brief narratives (stories) describing an experience.

English 1.7.6 Recite poems, rhymes, songs, and stories.

Science 1.2.5 Demonstrate that magnifiers help people see things that they could not see without them.

Science: 1.4.3 Observe and explain that animals eat plants or other animals for food.

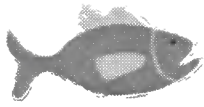
Social Science: 1.3.8 Give examples of natural resources such as water, trees, plants, and soil, and describe how people in the school community use these resources.



bird worksheet

Name: _____

SHHHH...quietly observe the birds in nature. Record what you see and hear. You may use words and pictures. Remember to label your drawings.



trash collection worksheet

Name: _____

Make sure you wear gloves and do not pick up any sharp items.

Record what you picked up:

Which items can be...

Recycled?

How does trash affect the river environment?

What can you do to help the river environment?



macroinvertebrate worksheet

Name:

Draw pictures of what you find. Try to answer questions about your findings:

A large, empty rectangular box with a black border, intended for drawing a picture of a macroinvertebrate found during a field trip.

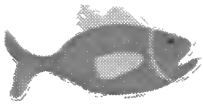
What color is it?

Does it have legs? How many?

How do you think it moves?

What do you think it does?

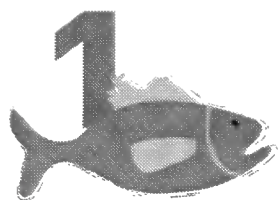
Your questions.....?



river poem worksheet

Name: _____

On this side of the paper draw a picture of what you see here in this river environment. Pay attention to color, shape, and texture. You may also record any sounds or smells you notice. Use this side to help you create a poem about the river on the other side of the paper.



culminating project

As a culminating activity, have your students create a river mural and or a class river book.

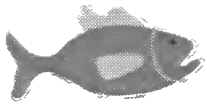


Mural

Have your students create a river mural. You can work in groups, or spread the paper out in the hall and have the whole class work as a group. Pass out and review **Class Mural Rubric** so students understand what is expected of them.

Class Book

Create a class book about your river experiences. You can purchase blank books (one source for these is Tree Top Publishers www.treetop.com) or make your own blank book. Each child should write about his/her experience on a page along with an illustration. Pass out and review **Class Book Rubric** so students understand what is expected of them.



class mural

Name _____

Date _____

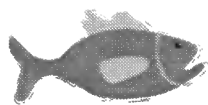
Each student will add the following 3 items to the class mural.

- A plant that you would see in or by the river.
- An animal that you would see in or by a river.
- A picture of something you would do at the river.



Criteria	1 point	2 points	3 points
River plant	Incomplete or inaccurate Messy	Accurately shows a plant found in or by a river. Accurately places the plant on the mural. Plant may lack detail or neatness.	Accurately creates a plant found in or by a river. Accurately places plant on the mural. Plant is detailed. Neat, attractive plant.
River animal	Incomplete or inaccurate Messy	Accurately shows an animal found in or by a river. Accurately places animal on mural. Animal may lack detail or neatness.	Accurately creates an animal found in or by a river. Accurately places animal on the mural. Animal is detailed. Neat, attractive animal.
River activity	Incomplete or inaccurate Messy	Accurately shows an activity to do in or by a river. Drawing lacks detail. Picture may need color.	Accurately shows an activity to do in or by a river. Drawing is detailed. Neat, colorful picture.

Comments:



class book

Name _____

Date _____

Each student will have a page to complete in the class book. Each of you will need to include in your picture:

- A picture of a plant that you would see in or by the river.
- A picture of an animal that you would see in or by a river.
- A picture of something you would do at the river.

Criteria	1 point	2 points	3 points
River plant	Incomplete or inaccurate Messy	Accurately shows a plant found in or by a river. Drawing lacks detail Picture may need color.	Accurately shows a plant found in or by a river. Drawing is detailed. Neat, colorful picture.
River animal	Incomplete or inaccurate Messy	Accurately shows an animal found in or by a river. Drawing lacks detail Picture may need color.	Accurately shows an animal found in or by a river. Drawing is detailed. Neat, colorful picture.
River activity	Incomplete or inaccurate Messy	Accurately shows an activity to do in or by a river. Drawing lacks detail. Picture may need color.	Accurately shows an activity to do in or by a river. Drawing is detailed. Neat, colorful picture.

Comments: