



Exploring River Environments

Objective: Students will investigate and assess a river eco-system.

Materials:

Backpack
Porkpie hat
Sunglasses and case
Water bottle
Laminated river background board
Poster tac
Subject study cards (set of 8)
Research Notes chart (one copy per student)
Paper and pencils
Organism artwork samples (**Note:** the plants and animals provided in these drawings are but a small sample of the multitude of life forms that reside around a river environment)
Living Things of the River organism and environmental information

Background:

A river is a natural-moving stream of fresh water. The source of the water for rivers and streams comes from the water cycle. The moisture that has fallen on the Earth as rain or snow evaporates as water vapor. The water vapor eventually condenses and falls back to Earth as rain or snow. The water runs off or seeps into the soil and cracks in the rocks, then bubbles out as a spring further down the slope. This natural-moving flow of water - the river - then makes its way back to the ocean and sea.

The source of a river starts in higher elevations and moves downward to lower elevations until it reaches the sea. As the water of the stream moves downward in elevation from its source, it begins to cut a channel and erode its banks. The streams of water erode the land faster upstream where the water tends to flow faster than downstream.

The upper course of a river can be very steep with the water flowing rapidly downhill. It quite often erodes itself a deep, steep-sided, V-shaped valley. Rapids and falls can often be found here. It joins other streams, eventually growing wider and slower as it reaches the foothills and lowlands. It picks up and carries rocks, soil, and vegetation in the current, depositing them when the current slows.

As the river flows out onto the flatter land, it slows down and does not have the cutting power of the higher section. It drops some of the rocks and soil it has been carrying. The erosive power of the river eats into its banks. The sideways erosion widens the valley and the river meanders like a wriggling snake. In wide valleys, the flat area that is on both sides of the river channel is called the floodplain. It is called the floodplain because when the river is full, it will flow over its banks, and cover this area with water. When water spills out of a flooded river channel, sediment is dropped on the flooded land. These wide, flat floodplains are covered with fertile soil producing land that is suitable for raising crops.

When the river enters into a large body of water, an ocean, or lake, it loses the strength of its current and can no longer carry its load of soil and dirt. It drops the sediment that was eroded along its course. The deposited sediments form a delta. When the river enters into the delta, its fresh water meets and mixes with saltwater. This mixture supports different species of plants and animals.

Grade Level:

4-6

Subject Areas:

Science

Setting:

Classroom

Skills:

Observation, Inference,
Research, Analysis,
Investigation

Prior Preparation:

Would be helpful to know what a watershed is and the basics of the water cycle.

Vocabulary:

Food Chain
Food Web
Ecosystem

South Dakota Education Standards for 4th grade:

Science

Indicator 3: 4.L.3.1.

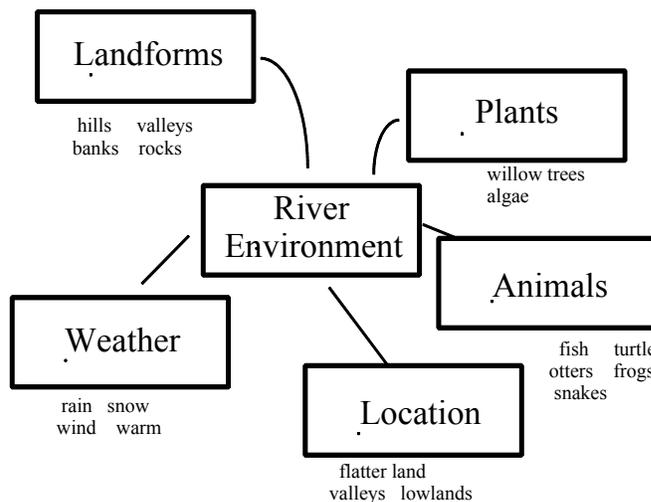
The river and its surrounding area are rich environments for many plants and animals, both large and small. Plants grow along the banks of the river; fish and other animals feed on them and find shelter among their roots and stems. The river otter can often be found frolicking on the banks and making slides in the mud. The weasel and the muskrat hunt among the vegetation for food. The beaver often cuts down the trees along the banks of the streams to make their lodges. Above the water, tall plants provide hiding places and nesting locations for birds and small animals. The kingfisher makes its swift dive from an overhanging limb to spear an unsuspecting fish found in the river. High above the river, hawks and eagles circle looking for their next meal of fish and other aquatic animals. The microscopic algae that float on the surface of the water provide food for insects and fish.

In almost any spot on and around large boulders found in rivers, algae, larvae, eggs, small insects and fish are found. Rocks provide an ideal hiding place for many smaller fish and animals which are hunted by larger creatures. Crayfish, snails, and clams can usually be found on the downstream side of a rock where the current is slower.

A river plays an important role in the vitality of the surrounding land. It provides a source of fresh water, transportation, recreation, protection, and food for countless living things. This is an environment that must be protected from pollution and overuse.

Procedure:

- Make copies of the “Organism Artwork Samples” and the “Living Things of the River” organism and environmental information sheets. You may want to cut apart the Living Things sheets into sections based on the subject study cards.
- Dress the part for a hiking trip by putting on the sunglasses and hat for protection, shoes for hiking and the backpack to store your water bottle.
- Play a game in which students guess where on Earth you are planning to go. Tell them they will ask 20 total questions in order to determine where your trip will be. Inform them that they can only ask questions to which you can respond with yes or no.
- Once they have guessed where you are going, have them sit quietly for one minute and think about a river. Give them a few minutes to write their thoughts and past experiences down on a piece of paper. Have each student share their information.
- Record the student’s knowledge into a web that includes landforms, weather, and location. Add another part to the web labeled plants and animals (see drawing). Have small groups of students brainstorm a list of plants and animals they think might live there. Record their ideas into the web (this activity will give you insight and help to inform you of any naive conceptions).



- Display the laminated river backdrop scene. Identify the landforms and review what students know about the land. Referring to the web, highlight the different groups to be studied: land, mammals, insects,

fish, reptiles, amphibians, birds, plants, trees. Subject study cards are included. Explain that the class will work together to gather information and share about this environment. Divide the class into small groups of 3-5 students. Give each group a subject study card.

- Inform each team that they are to become “experts” in their subject study card area. Hand out copies of the “Organism Artwork Samples” and the “Living Things of the River” environmental and organism information. Take a trip to the library and computer resources area to gather more information from which each member of the group will do a presentation. Tell each group their presentations will be done as a puppet show. Encourage them to add music, sounds, costumes and commercial puppets to make the presentations more interesting. Provide enough time for groups to study, draw and practice their presentations. **Note:** the “Organism Artwork Samples” are scaled to fit the laminated backdrop. Students can use these drawings to scale other pictures they create that will be added to the backdrop throughout their presentations.
- Make copies of the “Research Notes” chart and hand out to each student prior to the beginning of presentations.
- At presentation time, provide the backdrop scene and have the “land” give the first presentation. Following the land presentation, have each team member come up to the environment and add the organisms to the backdrop scene as his/her learning is shared. Audience members can use the “Research Notes” chart to record facts about the organisms or to record class notes that can be used to test students at a later time.
- Once all items have been added to the backdrop scene and the river eco-system has been discussed, introduce the concept of the food chain. Have students give you a few simple food chains (three to five links). Point out that all energy comes from the sun and that the food actually starts with plants (producers) and ends with some animals (consumers). Make sure to record their ideas on the chalkboard.
- When students understand the chain idea, introduce food webs by making connections between the chains they identified. Emphasize that all the plants and animals in an environment affect each other. Have students brainstorm answers to the following questions:
 - What happens to the balance if one animal or plant dies out?
 - What happens if one plant or animal overpopulates the environment?
 - What happens if the water, air, and/or ground are polluted?
 - What can we do in our daily lives to help care for this environment?

Vocabulary:

Food Chain - the feeding relationship between different living things in a particular environment or habitat

Food Web - consists of many food chains, it shows the many different paths plants and animals are connected

Ecosystem - includes all of the living things (plants, animals and organisms) in a given area, interacting with each other, and also with their non-living environments (weather, earth, sun, soil, climate, atmosphere).

Extensions:

- Direct students to write a story about “A Day in the Environment.” What do they see, hear, feel, do? They can write their story from the viewpoint of one of the organisms of that environment in which they become the plant or animal and describe a day in its life.
- Using the “Research Notes” chart, have students write story problems for others to solve. Example: *A mouse has four times as many offspring as a cougar. If a cougar has three babies, how many does the mouse have?”*
- Hold a “Make Your Mask” day in your class. Invite students to make paper mache animals masks or use face paint to decorate their faces to look like one of the animals in a river environment. During the construction, encourage students to discuss the features of their mask and why their particular animal needs those features for survival.