

CHANGING RIVERS

GRADES 3-5

This activity was designed as a companion for the music video “What Does A River Want To Do?”

BACKGROUND

“What Does A River Want To Do?” is a song about the countless things a river does for the living and nonliving things in and around it. There are so many different plants and animals that use and receive rivers' gifts that each has a unique perspective about the river. A fish may experience the river very differently than a bird, for example. In this way, it is crucial that we understand the importance of conservation in keeping rivers healthy so that the diversity of living and nonliving things reliant on the river continue to play their own unique and vital roles in the ecosystem. Much like the people living in each river's watershed, rivers around the world are unique, dynamic and ever-changing places.

DEFINITIONS

Dam: A barrier constructed across a waterway to control the flow of water

Meandering: To follow a winding, curving or turning path – as in a river

Erosion: The movement of small soil (sediment), sand and rock particles carried by water or wind

Deposition: The process of sediment, sand or rock particles being added to a land mass

Oxbow Lake: A curved lake that was originally a bend in a river but became separated when the river took a new, straighter course

River straightening: When humans reconstruct a river to get rid of bends and curves, usually to make transportation down the river easier and for flood control

OBJECTIVE

Students brainstorm ways in which rivers change throughout a river's life cycle. They make a list of how rivers can change by themselves and how humans might alter rivers, and then the class learns about real life examples of rivers in situations of change. The students will get to see photographs and discuss real accounts of what the consequences of changing rivers are in terms of ecology and life around the rivers, the changing utility of rivers to humans, the fluctuation of environmental stewardship, and possible consequences of human action in terms of conservation.

TEACHER PREPARATION

Examine and utilize pictures from the following:

- Sacramento River Bridge construction
<http://www.valcomnews.com/?tag=sacramento-river> (scroll to Clarksburg ferries photo)
<http://aerialarchives.photoshelter.com/image/I0000hCXi.218TZ8>
- Wisconsin – Franklin Dam
<http://www.wisconsinrivers.org/documents/dams/before&after%20pix.pdf>
- Washington - Glines Canyon Dam
<http://www.nps.gov/olym/historyculture/then-and-now-glines-canyon-dam.htm>
- Interactive dam activity
<http://dameffects.org/>
- Oxbow Lake formation illustration
<http://www.mbgnet.net/fresh/lakes/oxbow.htm>
- Angleton, TX Oxbow Lake formation
<http://googleearthtimemachine.blogspot.com/2012/07/angleton-texas.html>
- River Mirna river straightening in Croatia
<http://knowledge.allianz.com/climate/impacts/?704/how-humans-have-changed-the-earth-gallery>

INSTRUCTIONS

1. Explain that a river is a natural course of water, usually freshwater, flowing toward an ocean, a lake, a sea, or another river. Rivers come in all shapes and sizes, and they change naturally and by human influence over the course of time.
2. Have students make a list, in groups or individually, to come up with as many different ways as possible they think rivers can change throughout their lifetime.
3. Invite students to share their answers with the class, asking the students questions like how they think those actions or changes affect life in and around the river, how pollution in the river changes, how humans might be able to use the rivers differently after the change, and if the change is more conservation-friendly (protects life in and around the river and keeps the area healthy).
4. Then focus on these specific changes in detail as further examples, asking students what they think effects would be of these alterations before explaining them:

Bridge construction (human change):

Sacramento River before and after the bridge:

<http://www.valcomnews.com/?tag=sacramento-river> (scroll to Clarksburg ferries photo)

<http://aerialarchives.photoshelter.com/image/I0000hCXi.218TZ8>

Effects of bridge construction: People can travel easier and faster across bridges. Flooding may be a problem around bridges because water is slowed down. More oil and other chemical leaks from cars and construction equipment can get into rivers, which negatively affects plant and animal growth within the river. Trees and other vegetation may be cut down to clear out a space for a bridge, which may take homes away from wildlife.

Dam construction (human change):

Before and after example – Wisconsin’s Franklin Dam, <http://www.wisconsinrivers.org/documents/dams/before&after%20pix.pdf>

Washington’s Glides Canyon Dam, <http://www.nps.gov/olym/historyculture/then-and-now-glides-canyon-dam.htm>

Effects of dam construction: People can make electricity and dams provide water for agriculture. The chemistry of water is changed because temperature is often lower under/by a dam which affects what plants and animals can live there. Evaporation may be greater because more surface area is formed with the dam than the original river. Sometimes animals are separated from their own species by a dam - salmon is a common example.

Meandering (natural change):

Simple illustration, <http://www.mbgnet.net/fresh/lakes/oxbow.htm>

Example of Oxbow Lake formation resulting from meandering in Angleton, TX, <http://googleearth-timemachine.blogspot.com/2012/07/angleton-texas.html>

Effects of meandering: Sediment (soil) particles can be eroded and plants and animals may be forced to move as banks of the river changes. Oxbow lakes have been known to create an environment for more healthy native river species that rely on cooler, slower-moving waters. Humans may use oxbow lakes for different kinds of recreation rather than transportation found in a river.

River straightening (human change):

Picture examples from River Mirna in Croatia, <http://knowledge.allianz.com/climate/impacts/?704/how-humans-have-changed-the-earth-gallery>

Effects of river straightening: Humans can straighten the river so it forms an efficient path of transportation and interferes less with other development. When rivers are straightened, there are fewer obstacles to slow the flow of water, greatly altering the river’s hydrology. This oftentimes causes species to disappear by reduced streambank vegetation cover, lack of hiding spots, or faster flow of water, which leads to greater movement of sediment and consequential blocking of sunlight. There are usually more problems with flooding and sediment deposition at mouth of rivers with river straightening because more sediment is carried farther from where it is first picked up.