

Subjects/Target Grades
Science and Social Studies
Grades 7-12

Duration/ Location
30- 45 minutes
Classroom setting

Materials

Per class

- Movement of Sediment
- Sediment in the Stream
- Lower Grand River Watershed Topography

Per small group

- plastic shoe box
- mixture of sand and gravel
- cup of water
- Stream and River Patterns student activity page

Lesson Two Elaborate: Managing Excess Sediment - pages 10 & 11 from Lesson 2

Activity Overview

Students will build a model of sources and movement of sediment to better understand how sediment gets into a stream or river and how it moves.

Lesson Procedure

1) Using what they have observed about the different sizes of particles in sediment, have students predict which type of particles will move the fastest in a flowing stream. To test the prediction, they will create a model of a stream through the guided inquiry activity, *Stream and River Patterns*. This is easily done by placing a mixture of sand and gravel in a container such as a plastic shoe box. Create a hill with the mixture, slightly prop the container up on the hill side, and add water to the top so the water flows downhill.

2) Return to the observations of the soil separation test and begin to put the pieces together. Some questions you may want to consider to shape the discussion are:

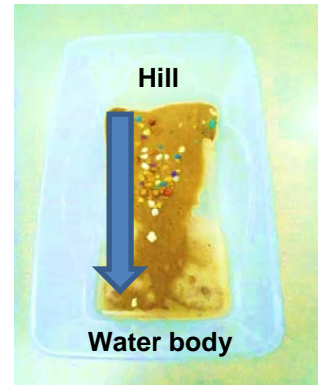
- Do small particles behave differently in fast-moving water (either the river channel or the sediment jar) than large particles?
- Where is the water moving the fastest in their rivers and where is it moving the slowest?
- How does the velocity (speed) of the water current affect the sediment load; in particular, the types of sediment that might be suspended?
- How does the velocity (speed) of the water current affect deposition; in particular, when different types of sediment might be deposited?
- What would happen if you changed the slope?
- How does your model compare to real rivers and streams?

3) The *Movement of Sediment*, *Sediment in the Stream*, and *Lower Grand River Watershed Topography* teacher resources can be used to illustrate the discussion points.

Vocabulary Terms

Erosion– the process by which sediments are transported by wind, water, ice, or gravity. Different from weathering, it is the active movement of these sediments from one place to another.

Deposition- buildup of sediment



Sample model of a stream (J.Vail)

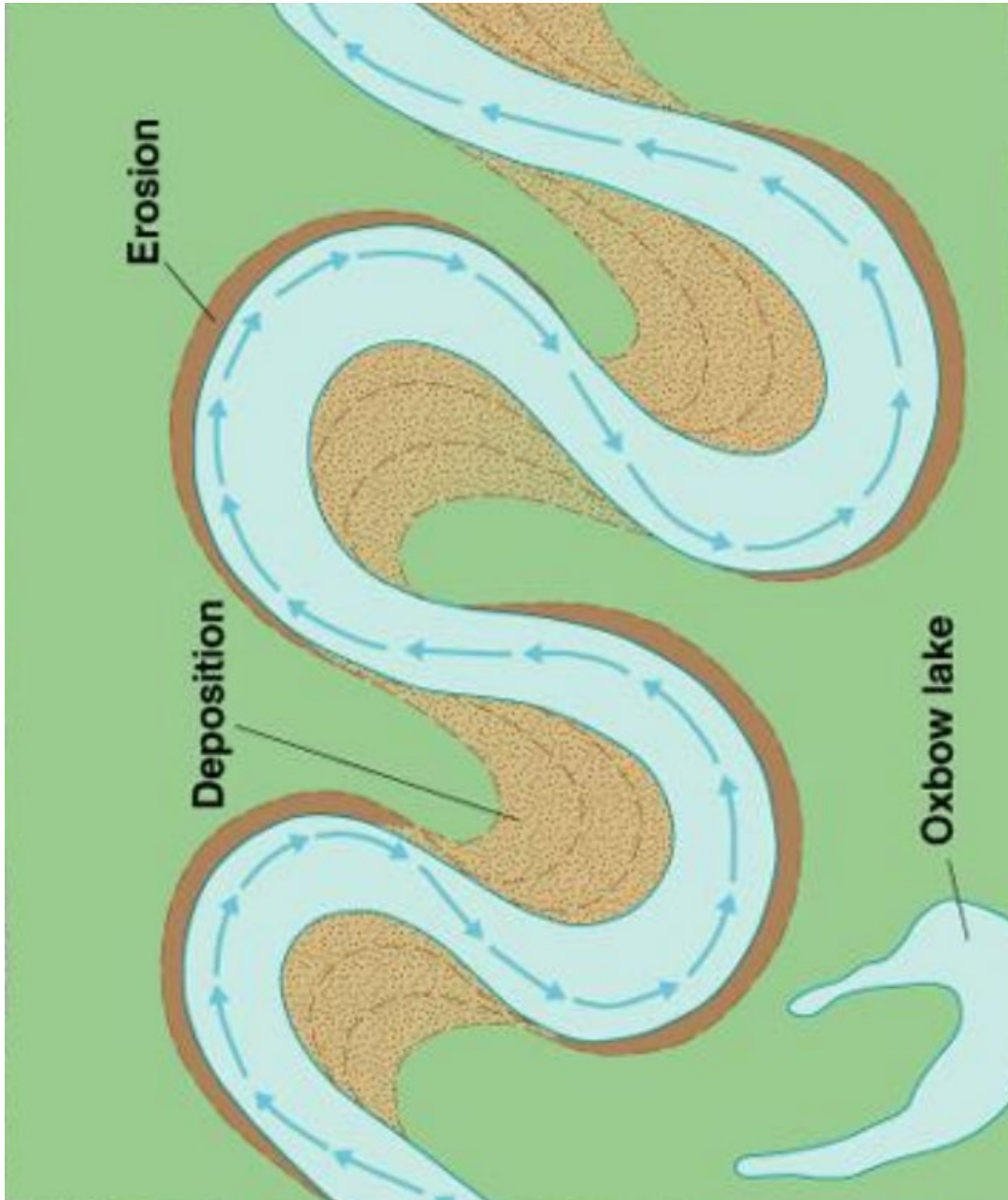
Stream and River Patterns

You and your team will be creating a model of a stream or river to show sediment movement. Put a book or other item underneath one end of a plastic container to create a slope. Make a hill with a mixture of sand, gravel, and clay at the elevated end of a plastic container. Perform the actions, create labeled drawings, and make observations. Use the terms **erosion**, **deposition**, **runoff**, **infiltration**, and **slope** in your drawings and observations and indicate how the each of the different types of earth materials moved.

Action	Drawing of the Model	Observations
1. Sediment movement – low flow - slowly add water to the hill		
2. Sediment movement – high flow - rapidly add water to the hill		
3. Sediment load reduction - create and test a design that will slow down the movement of sediment off of the hill		

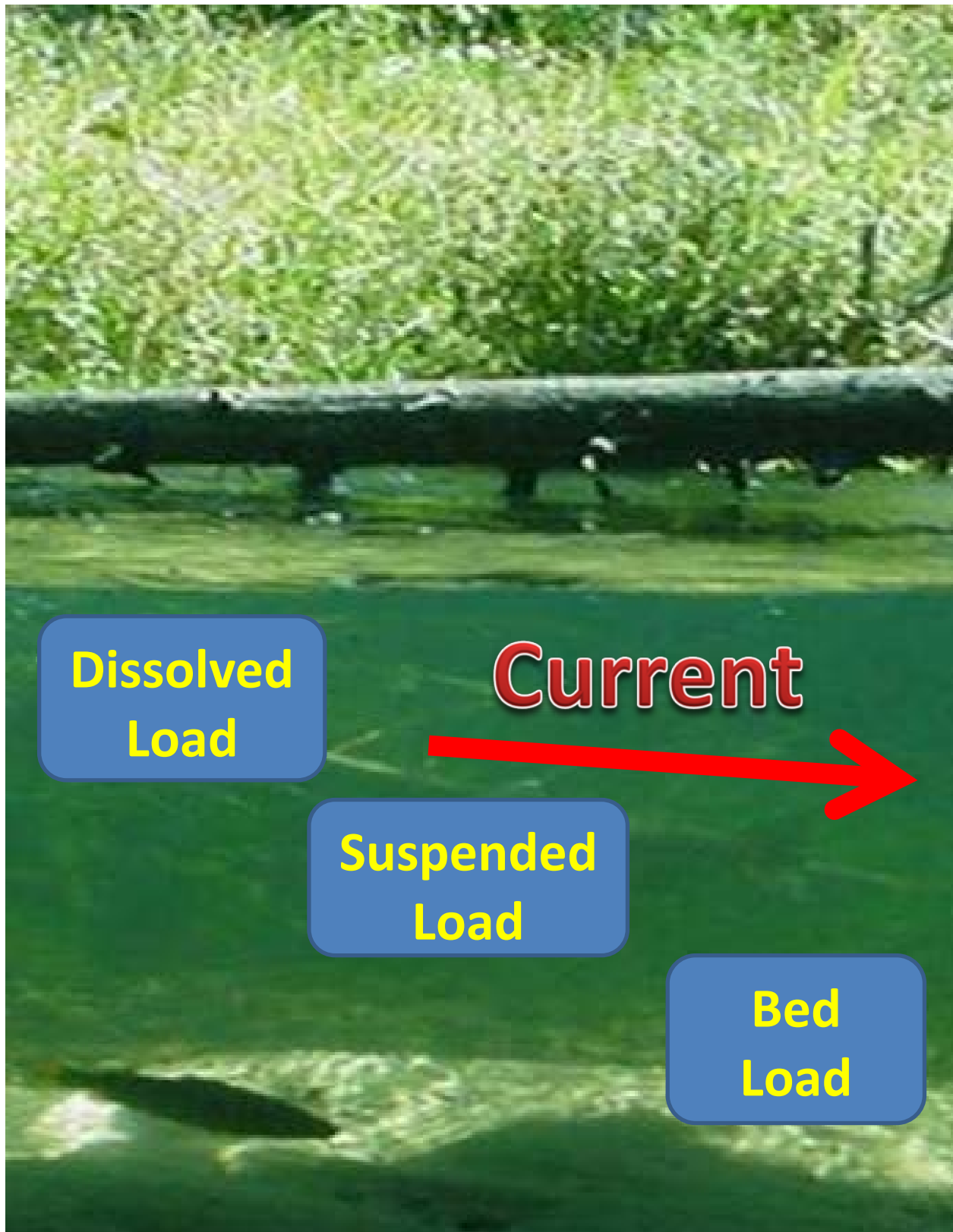
1. According to Newton's First Law of motion, an object at rest stays at rest and an object in motion stays in motion with the same speed and in the same direction unless acted upon by an unbalanced force. What forces (push and pull) were involved in your model?
2. What patterns of sediment movement did you observe during low flow?
3. What patterns of sediment movement did you observe during high flow?

Movement of Sediment

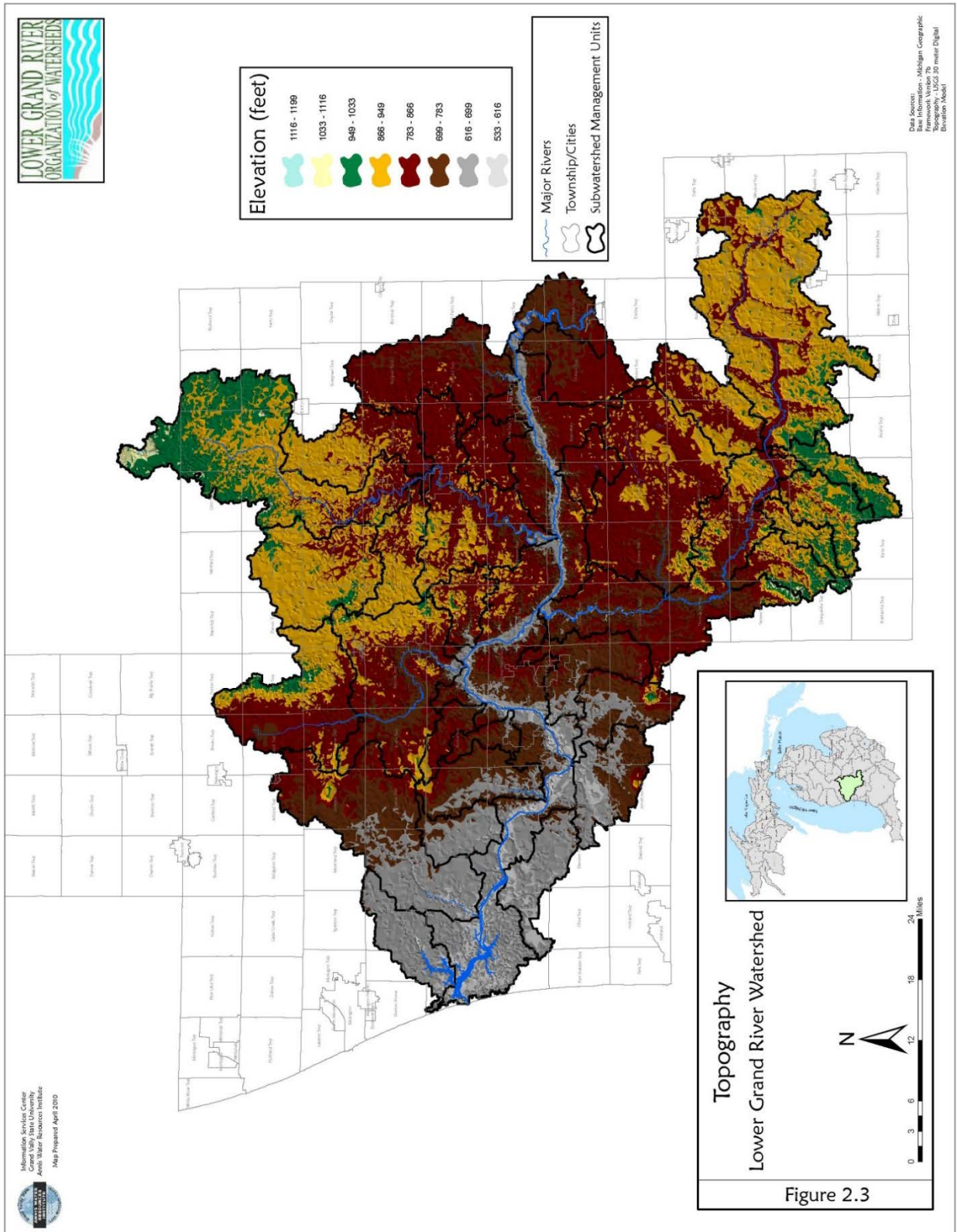


Erosion and Deposition Source: River Features and Function, Flathead Lake Biological Station, https://flbs.umt.edu/newflbs/media/2038/flare_river-features-and-function_presentation_c150_final.pdf

Sediment in a Stream



Lower Grand River Watershed Topography



Lower Grand River Watershed Management Plan. Image from the Figures Volume:
<https://www.gvsu.edu/wri/isc/lower-grand-river-watershed-management-plan-312.htm>