

America's Amazon

Part One: The Mobile Tensaw Watershed

AL COS Standards Addressed

- Biology COS #13: Trace the flow of energy as it decreases through the trophic levels from producers to the quaternary level in food chains, food webs, and energy pyramids.
 - Describing the interdependence of biotic and abiotic factors in an ecosystem
- Environmental Science COS #7: Identify reasons coastal waters serve as an important resource.
- Aqua Science COS #4: Determine important properties and content of water as related to aquaculture.
- RST 9-10.1: Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

Notes:

- 1. The above are high school standards. Most of the activities would also fulfill middle school standards. Also, be aware the current science COS is in a new DRAFT stage. <http://www.alsde.edu/dept/coss>
- 2. The film is also addresses Social Studies Standards. Link to the Alabama COS for Social Studies is http://alex.state.al.us/staticfiles/2010_AL_Social_Studies_Course_of_Study.pdf

Learning Outcome: Students will develop a working understanding about the connections between land and water. Students will build models of watersheds and interpret the models based on Alabama Rivers Students will construct and write an argument from evidence on the importance of the Mobile Tensaw watershed.

Materials

For each group of four students: 1 plain piece of paper, aluminum foil or waxed paper if using the water. A shower curtain if time and space permits.

For each student: science notebook, Map of the Major Rivers of Alabama, highlighter

For the teacher: water in a spray bottle, Map of the Mobile Bay Watershed (can be projected), movie "America's Amazon," projector. Other potential "pollutants" like cocoa powder.

Engage

1. Ask students to discuss with their group where the water goes when it rains on their town.
2. Also ask students to discuss how the water in one part of the state can affect water in another part of the state.

Evaluate: Listen to their discussions. Make note of key ideas, or misunderstandings, to address throughout the lesson.

Explore

1. Instruct students to make a model of land by crumpling a piece of paper, and then gently opening it, leaving creases and folds to represent ridges and valleys. **NOTE: The type of paper depends on the depth explored by the model. If water is used, the paper needs to be water resistant or backed by Aluminum Foil.**
2. The students should find a larger “river” that leads to the edge of the paper. Students follow and mark that “river” until it meets the edge or the “ocean”. Students then connect all the tributaries possible and follow them to the main "river." Now outline the entire land surrounding each tributary to the chosen main river. They have now outlined a watershed.
3. Age to the students and time will dictate how extensively to discuss landscapes. Connect the students to the “watershed” by allowing them to notate features like farms, ski resorts, houses, roads, construction, etc.
4. Ask students to relate their paper to land, and to discuss what would happen if it rained on that land.

****The activity can end HERE if you do not want to use real water.****

5. Instruct students to spray water onto their paper. (Alternatively, the teacher can walk around the room and spray the models.) Students observe and record how the water flows.
6. Show students the map of the Mobile Bay Watershed, located at <http://water.epa.gov/type/oceb/nep/images/mobile2.gif>, and also included in this lesson plan. It is important to discuss that the watershed extends past the Alabama state lines. Connect the watershed model to a specific watershed in Alabama. If time and level of the students allow, outline an Alabama watershed and its tributaries. Emphasize that we are ALWAYS in a watershed. Every tributary leads to another until it meets a portion of the ocean.
7. Ask them to relate the map to their model. Tell them that they have made a model of a watershed. Ask them to generate a definition of “watershed.” Students should record all answers in their science notebooks. (One definition of watershed is an area of land where all the water on it or under it drains into the same place.)

Evaluate: Ask students to share their comments and their definitions of “watershed.” Clarify confusing points. If possible ground truth the match between their watershed and an Alabama River.

Explain

1. Distribute a map of the Major Rivers to each student. Ask students to locate the Mobile Bay. Ask students to highlight the following rivers using a different color for each river: Coosa, Tombigbee, Tallapoosa, and Alabama.
2. Use that color to follow the river all the way to the Mobile Bay. When rivers join another river, do not change colors. You will add each color to the stream flowing to the bay.

3. Ask students what they notice about where all the rivers terminate. Ask: How does the map of the highlighted rivers relate to the map of the watershed?
4. Tell students they will now watch a 22-minute clip of a movie called *America's Amazon*, which is specifically about an area of Alabama called the Mobile-Tensaw Delta, or MTD.

***Note: When it is natural in your plan, discuss the volume of water that exits the Bay into the Gulf of Mexico. The MTD is in the top 4 watersheds by volume in the US. It covers a much smaller land area than some of the other 3. ***

5. Before watching, have students divide a page in their Science Notebooks into four quadrants for note taking. Label each quadrant as follows, and give a slight description of the ideas in parenthesis.
 - a. Extreme Characteristics (anything that is the most, or one of the most, for example)
 - b. History of the Formation of the MTD
 - c. Examples of Plants and Animals of the MTD (including ones shown on screen but not discussed)
 - d. Habitats mentioned in the segment (Look for connections to the term Biodiversity.)
 - e. Other Interesting Facts and People
6. **Choose vocabulary/concept words appropriate to the COS you are following. Ask the students to predict connections between the words. Present the list to the students so they can gather supporting evidence towards understanding while watching the video segment.**
7. Play the movie by accessing it on the Education tab of the website americasamazon.net, or from the DVD. Pause the movie frequently. Instruct the students to watch the movie, and only write notes during pauses. (You will show the clip from the beginning to 22:24, at which point there is a black screen.)
8. After the movie clip, allow students to share their notes with their group. They may add to or amend their notes as needed.
9. Instruct students to look over their notes, and to use them to come up with a sentence describing the importance of the Tensaw-Mobile Delta based on their notes.
10. Make sure they use examples from each of the chart areas they were to record. It is important that they include connections between the watershed characteristics and the observed exceptionalities of the watershed.
11. Ask students to write a paragraph stating the importance of the TM, and include at least three pieces of evidence to support their answer.
12. Students share their paragraphs with their group members. Each group will select the most compelling evidence, and write a collective paragraph to present to the class.

***Evaluate:** Observe notes as students are writing. Listen to their discussions. Clarify misunderstandings. Listen as they share their paragraphs. Redirect their thinking if their evidence does not support their claim. Evaluate the group paragraphs based on the legitimacy of their evidence.*

Return to the map of the watershed with the rivers highlighted the next time the class meets. Look at a relief map of Alabama or a satellite image. Discuss the physical features of Alabama, the shape of the rivers, and the location of the rivers. Insert the geological features that separate the watersheds, e.g. mountains, large cities, and the surrounding states on the map. Complete the pencil activity with the rest of the rivers until all the colors are flowing out of the mouth of the Mobile Bay.

Discuss, connect, and unify all these topics.

Extend

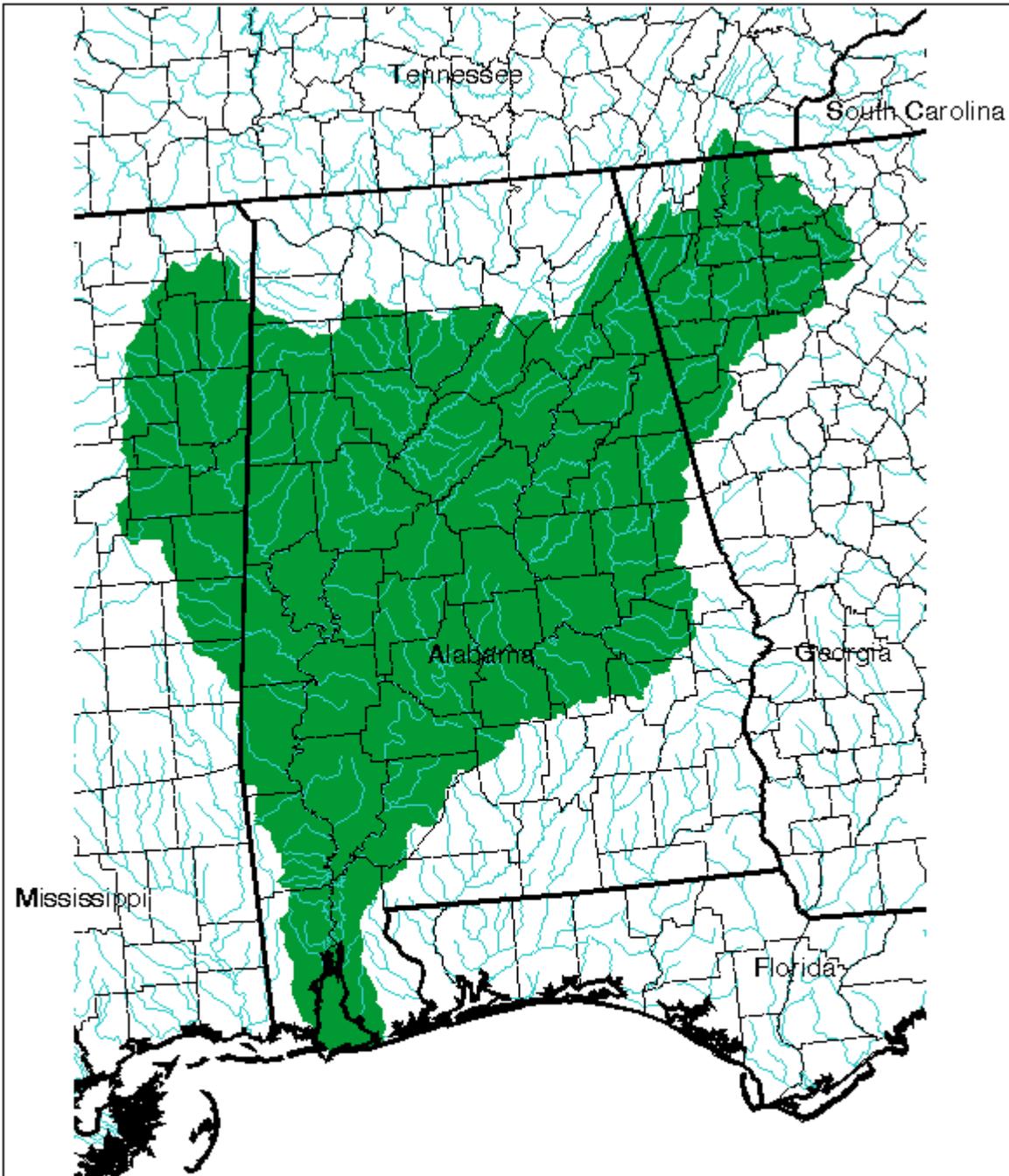
1. **STREAM Extension:** Ask students to work with a partner to stage a quick skit (no more than two minutes) in which one person interviews the other on the topic of the Importance of the Tensaw-Mobile Delta. Encourage them to be creative, as if they were on television.
2. Have students share their skits throughout the next few days, as you study the TM. They can perform them between activities, before or after class, or during transition times.
3. **STEM Career Tech Extension:** Investigate people and organizations that work to protect the water and watershed. Consider what training or commitment they have that makes them a good fit for their job.
4. Another extension could be the use colored particles sprinkled over the watershed model to represent contaminants. When water is sprayed, students see the pollutants/contaminants runoff the land into the receiving water. This mimics land runoff. Kool-Aid colors provide an intense visual that reflects real watershed processes. The color is usually ugly brown and a good model for contaminants.

***Evaluate:** Assess their learning about the importance of the MTD, as well as their understanding of supporting claims with evidence based on their questions and answers. Use teachable moments to discuss effective communication skills.*

CREDITS: *America's Amazon* was funded by **Alabama Nature Partners**, with additional funding from the **Weeks Bay Foundation** for classroom education.

America's Amazon was produced by **Mary Riser, Lynn Rabren** and **Ben Raines** and can be purchased through the Alabama Nature Partners website at <http://americasamazon.net>.

The Teachers Guide was a collaborative effort among the film's producers, **Dr. Tina Miller-Way** of the **Dauphin Island Sea Lab's Discovery Hall** educational program, and Environmental Sciences teacher **Janet Ort** of Hoover High School.



-  Watershed
-  Major Rivers
-  State Boundary
-  County Boundary

Mobile Bay

Scale: approximately 1: 3,473,000
 Sources: NOAA, ARCUSA
 July 26, 1995
 Map MR00022-8



Office of Wetlands, Oceans
 & Watersheds



Eastern Gulf Of Mexico



Major Rivers