River Predictions and Inferences
Show Us Your Mussels Challenge

Grades: 6-8

Type of Lesson
Adapted for delivery in distance learning settings.

Activity Overview
Students will be making predictions and inferences, based on prior knowledge as well as information shared from the teacher. They will read a fictional diary using task cards about what changes will occur on the Mississippi River, based on several factors including environmental, human impact, and animal impact. As students read the story, they will use inferencing as well as picture evidence to solidify their predictions. After answering each task card, they will be able to see the answer along with images and a detailed paragraph to give further background information for learning.

Objectives
- Students will predict how environmental, human, and animal factors will affect the structural integrity, ecosystem, and usability of a major river.
- Students will infer what types of changes occur on a river over time based on evidence explicitly provided as well as drawn implicitly from the text.

Technological Considerations
No technology needed for this lesson. If technology is available, students may work collaboratively or chat about answers as they go.

Materials Students/Families Need
- Mississippi River Journal Task Cards (one set per student)
- Loose Leaf Paper (optional)
- Pen/Pencil (optional)

Standards Connections

Minnesota State Standards

6th Grade Language Arts

6.4.1.1 Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

7th Grade Language Arts

7.5.3.3 Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events).
8th Grade Language Arts
8.7.9.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

7th Grade Science

7.4.2.1.1 Identify a variety of populations and communities in an ecosystem and describe the relationships among the populations and communities in a stable ecosystem.
8th Grade Science
8.3.1.2.2 Explain the role of weathering, erosion, and glacial activity in shaping Minnesota's current landscape.

NGSS

MS-LS2 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
ESS2-2 Describe and graph the amounts and percentages of water and freshwater in various reservoirs to provide evidence about the distribution of water on Earth.

Time

One 60-minute lesson or two 30-minute lessons.

Procedure

Prior to Lesson: Print a set of task cards for each student or send them to students via your digital platform. If working together, suggested group size is four. Students will be reading the cards and answering one multiple choice question per card. Cards have pictures and graphics that will assist students in their inquiry. There are also separate resources that can be printed or sent to each student that might be helpful visuals for students. (i.e. River Maps) .

1. Begin a discussion about change. If students are working off-line, have them journal their answers. Suggested questions to prompt discussion: What does it mean to change? (either something or someone) Does change happen quickly or slowly? (Ex. erosion usually happens slowly over time, yet if there is flooding from a storm, it can happen more rapidly) What determines how fast something changes? How have you changed since you were born? What made you change? Is change a good or bad thing, and what determines if it is good or bad?
2. Ask students to PREDICT what they think the following terms mean and give examples if they can: Environmental factors, human impact, and animal impact.
3. Provide students with the definitions of the terms above to check their understanding.
4. Explain to students that they will be given six different task cards covering six days of travel by two canoe travelers named Benjamin and Noor who are going down the Mississippi River. Along the way, they have several questions or thoughts they need students' help to figure out. They will work either independently or in small groups to try to predict/infer what they think is happening on the river.
5. Share this description about Benjamin and Noor, the characters they will read about in their task cards, to give students background information on the characters.
    a. Benjamin and Noor have been best friends since 6th grade. They met in science class, and found a common interest in the outdoors, particularly trips they had taken with their families to the Boundary Waters each summer. Now that they are about to be seniors in high school, their parents finally gave them the okay to take a canoe trip on their own! They have always wanted to travel down the Mississippi River by canoe, stopping along the way to take hikes, track animals, and take in all the sights of their home state of Minnesota before they go their separate ways to college next year. They will begin their trip at the headwaters of the Mississippi in Itasca.
6. Pass out student task cards.
    a. They will first be using the PREDICTION task cards. These will say, "We predict…" on the bottom of each. If you have made enough copies for each group, they can write directly in the space provided on the prediction cards. Otherwise, they can use a separate sheet of paper.

   b. Students first make a prediction and then answer the multiple-choice question for each card.
7. When students have completed all six-task cards, the teacher can send them the teacher key for them to check their answers and correct their answers. These answers will be used to complete the assessment portion of the lesson.

Assessment

Students will be completing a final response individually based on what they have learned throughout completing the task cards/through discussion.

Prompt for written assessment: After reading the journal of Benjamin and Noor, what are two ways that the river or ecosystem changed because of ENVIRONMENTAL impact, and what are two ways that the river or ecosystem changed because of HUMAN impact?

Extensions

To extend learning, have students continue the story from where it ends, creating their own predicting questions and vocabulary as they go. Students can also tell their own story from a non-human perspective with a similar narrative. Example: write from the perspective of a freshwater mussel traveling in the river, or a rock from the riverbank.

Lesson Resources

Mississippi River Facts: https://www.nps.gov/miss/riverfacts.htm
Mussels of the Mississippi: https://www.nps.gov/miss/learn/nature/mussels.htm
Minnesota Zoo Restoring Freshwater Mussels:
http://mnzoo.org/conservation/minnesota/freshwater-mussels/