Tin Foil Flatboat

STEM

Grade Level
1-7

Length of Lesson
60 minutes

Objective
By the end of this lesson, students will have a better understanding of using riverways to transport goods.

Materials Needed
- Tin foil
- Water basin
- Water
- Pennies
- Towel
- Device with internet access

Standards
Common Core
CCSS.ELA-Literacy.RI.1.5; RI.2.5; RI.3.5

CCSS.Math.Content.k.CC.A.1; K.CC.B.4; K.CC.B.5

NGSS
K-5-ETS1; MS-ETS1

Lesson Summary
This lesson is a fun, hands-on activity designed to help students understand the important role that rivers play in the transportation of agricultural goods from place to place. This is also a perfect lesson to connect to Illinois history and Abraham Lincoln.

Suggested Sequence of Events:
1. Set Up: Fill a tub or bin with water for students to test their boats in. A clear tub or bin is suggested so that all your students can see. Put a towel to the side for groups to set their boats on after testing.
2. Read through the IAITC Illinois History Ag Mag to learn more about transportation and Illinois history. Interactive online versions can be found on our website.
3. As a class, watch this video (1:00 minute long) to learn about how boats and waterways play an important role in transporting IL commodities. Video available at: https://vimeo.com/203606737
4. Complete the activity following the procedures:
    - Put students into groups of two or three.
    - Explain that they will be designing a boat using tin foil. They will be using pennies to see whose boat will hold the most weight.
    - Have each group talk about the shape of the boat and the construction process.
    - Give each group a piece of tin foil.
    - Once the boats are built, have each group come to the water basin, one at a time, and set their boat in the water.
        - If the boat sinks, have the group go back to their desk and revise their design.
        - If the boat floats, have them start slowly placing pennies on it, one at a time, until the boat sinks.
    - Make sure each group collects their pennies from the bottom of the water basin after it sinks.
    - Then, have students use a scale to weigh the pennies and calculate the weight their boat could hold before sinking. (The penny that causes the boat to sink should **not** be counted as a part of the weight)
5. Whole class discussion and reflection of activity. Suggested post-activity discussion questions can be found on the teacher resources page.

TEACHER RESOURCES

Background Information:
One of Abraham Lincoln's first jobs was to steer flatboats down the Mississippi River to New Orleans. This was also his first time seeing enslaved people being bought and sold. This experience helped shaped his social views, which ultimately led to the ending of slavery in the United States.

Today, the Illinois and Mississippi Rivers continue to play an important role in exporting Illinois commodities. Many agricultural products are loaded onto large boats, called barges, and shipped up and down the rivers for low costs.

This activity suggests students work in small groups but can easily be adapted for students to work individually or even with larger groups. Materials and time allotment for this activity can also be adapted in a variety of ways to meet the needs of your classroom.

Post-Activity Discussion Questions:
- What type of shape of the boat worked best?
- What are some things your group discussed before building your boat?
- How is the use of rivers for transporting goods similar or different than the use of roads and rails? What are the pros and cons of each type of transportation?

Extension Ideas:
- For higher grades, or to dig deeper into STEM, provide a variety of materials for students to pick from to create their boats.
- For lower grades, have students use the pennies to practice counting.
- Use the pennies as manipulatives to do math equations on the table.
- Read *The Superlative A. Lincoln* by Eileen R. Meyer, *Lincoln Clears a Path* by Peggy Thomas, and *Where Lincoln Walked* by Raymond Bial to learn more about Abraham Lincoln.
- Read through the following Ag Mags to learn more about transporting agricultural goods: IL History, Water, Soybean, Dairy, Corn, and Urban.
- Have students read and research more about the different types of transportation.
- For older students, have them research the supply chain. How do agricultural products end up in our grocery stores?
- Go to agintheclassroom.org to contact your County Literacy Coordinator for free classroom sets of our Ag Mags!