



What Causes Boats to Sink or Float?

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5 E Lesson Plan
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Title of Lesson:
What Causes Boats to sink or float?

Subject: Science – Sinking and floating (Boats)

Student Population:

- 4th grade
- All first English speaking students
- Female and Male

Learning Community:

- Rural
- Elementary
- Team teaching
- Classroom arrangement: Desks are in a horseshoe shape with 3 horizontal rows of 3 desks in the center of the horseshoe.

Objectives:

- Students will be able to work in small groups to determine what makes boats float and what makes boats sink by using aluminum foil.

Essential Question:

- Why do objects sink or float?

Standard:

S4.A.2.1.2: Design and describe an investigation (a fair test) to test one variable.

S4.A.1.3.2: Describe relative size, distance, or motion.

S4.A.2.1.4: State a conclusion that is consistent with the information/data.

3.2.4.B7:

- Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information.
- Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge.

Materials / Sources:

- Container with water
- Aluminum foil
- Ticket Out The Door Worksheet
- Pennies
- Container
- Laptop with projector (video)
- Whiteboard or smart board
- Internet access

Safety:

- ✓ When we test to see if our boats that we make sink or float does not put anything besides the boat into the water.

Sequence of the Lesson:

Participatory Set/ Engage:

- ✓ Use smartboard to display the video: “Why Things Float, A Moment of Science, PBS” using YouTube.
 - Link: https://youtu.be/EAEmseXr_JM
- ✓ Then introduce vocabulary to the students using the whiteboard or smartboard.
 - Ask students what they think the words mean before giving them the definition.
 - Float : Rest or move on or near a surface of a liquid
 - Sink: Going below the surface of a liquid
 - Buoyancy: The ability of an object to float on a liquid or in air
 - Displacement: The amount of weight or fluid that would fill the volume displaced by a floating boat

Explore:

- ✓ Tell students that not all boats need an engine to float or sink.
- ✓ Show the students a few different shapes that they could make with the aluminum foil.

Elaborate / Extend:

- ✓ Divide students up into groups of 3 or 4 (Assign groups)
- ✓ Give each group a 1 foot by 1 foot piece of aluminum foil.
- ✓ Have each group design their boat (give them approximately 5 to 7 minutes).
 - Walk around the classroom while the groups are working to listen to their discussions.
- ✓ Then have each group come one by one to test if their boats float or sink. (“Alright boys and girls you have 2 minutes to finish up your boats. We will then test our boats out using this container of water and these pennies, everyone be excited this fun activity! If your boat sinks it is okay!”)

- ✓ If the groups' boats float have them put pennies onto the boat to see how many pennies it takes to make their boats sink.

Conclusion / Summarizing Activity / Explain: (Explain why the boats are sinking and floating – link to vocab)

- Once each group has demonstrated their boats, regroup the students' attentions. ("Good job boys and girls! Every group did an awesome job with this lesson! Now we are going to talk about why some of our boats sank and why some of our boats floated!")
- Review the vocabulary terms that are listed in the engage section (sink, float, displacement, buoyancy). (Erase from white board).

Assessment / Evaluate: (ticket out the door / observations)

- ❖ Hand each student a ticket out the door worksheet.
- ❖ The students must complete this small worksheet before leaving class.
- ❖ Students may not use any notes or resources to answer these questions.
- ❖ This worksheet and the observations the teacher made throughout the lesson will informally assess the students' knowledge of the lesson.

Special Considerations:

Early Finishers: Students will be able to design different boats independently, and test them out to see if they sink or float.

Remediation: The teacher will walk around and help the students that are struggling. The teacher will also explain in depth and provide examples of concepts to help the students better understand.

Enrichment: These students will write a small 3 to 4 sentence paragraph describing what he or she learned during this lesson.

Special Accommodations: The vocabulary words will be written on the board, but the teacher will read them word for word and repeat if needed for the students that need the assistance. Students that are struggling will be paired with advanced students.

References:

Hershey Antique Auto Museum

Standards - View Standards by Subject Area and Grade Level or Course. (n.d.). Retrieved October 21, 2015.

Why Things Float | A Moment of Science | PBS. (n.d.). Retrieved October 21, 2015.

Ticket Out The Door

Name:

Date:

1. What does the word float mean?
2. What does the word sink mean?
3. Why did your boat sink if it sank or why did your boat float if it floated?
4. What is buoyancy?

Ticket Out The Door (Key)

- 1. Float : Rest or move on or near the surface of a liquid**
- 2. Sink: Going below the surface of a liquid**
- 3. This is caused by displacement. Displacement is the weight of an object or fluid that submerges the boat.**
- 4. The ability or tendency to float in a liquid or air**