

LESSON PLAN by: Meganmarie Pinkerton

Lesson: What Boat Designs Float the Best?

Length: 50 minutes

Age or Grade Intended: 5th Grade

Academic Standard(s):

- 5.5.7 Explain that predictions can be based on what is known about the past, assuming that conditions are similar.
- 5.2.7 Read and follow step-by-step instructions when learning new procedures.
- 5.2.3 Choose appropriate common materials for making simple mechanical constructions and repairing things.
- 5.5.8 Realize and explain that predictions may be more accurate if they are based on large collections of objects or events.

Performing Objectives:

Using knowledge of buoyancy students will create a small boat out of a 15in X 12in piece of aluminum foil that can hold cargo.

Using knowledge of buoyancy students will make a hypothesis of which types of boats will float the best and predict the amount of cargo their boat can hold.

After the experiment students will write a 4-6 sentence conclusion explaining how well their boat worked and why.

While conducting an experiment students will record observations on a chart and orally explain the data as a class.

Advanced Preparation by the Teacher: Materials: 15 X 12 in piece of aluminum foil for each student, two tubs of water to float boats in, baggie of pennies, lab report sheet. Promethean board flip chart with samples of scientific method, and charts to keep record of students' cargo

Procedure:

Introduction/Motivation: Discuss the science fair that classes can participate in.

Explain that for the next science chapter we will be discussing matter and its properties. Explain that for this experiment we have to discuss buoyancy and density. What is buoyancy and density? How does that connect with matter and its properties? How does that affect our lives. In order to do this experiment and put it up in the science fair we have to keep good records of our data so that we can show others. For this lab we are going to make boats and see which ones can hold the most cargo. I need everyone's absolute attention to do this activity so it is very important that everyone pays attention. (Bloom's knowledge and analysis.)

Step-by-Step Plan:

1. How do scientists do experiments? Discuss scientific method. Hypothesis, observations and conclusion. Figuring out what we learn.
2. Explain procedure. Each person will get 15 X 12in piece of aluminum foil. Then shape it into a boat that they think will float in water and eventually hold pennies. We will record the top three and then analyze the boat design.
3. Take a minute to think of the boat shape that you would like to make. Record some examples of designs on the board and vote as a class for which ones you think are the best. Discuss what design was predicted to be the best.

4. You will have about 5 minutes to design your boat.
5. When they have designed their boat. They write their hypothesis, what there design is and why they think it will float. They need to fill in the chart on their worksheet about the dimensions of the boat and how many pennies they think it can hold.
6. Two students at a time come up to test their boat, then they add one penny at a time until their boat sinks. Then write down the penny number on a chart and then write observation about their own boat and observations of other boats.
7. Once everyone has gone look at the data. What were the top three boats? What were the top designs? Record your conclusions on papers and why you think that was.
8. Once everyone writes their conclusions share as a class and vote on the best conclusion.

Closure: Clean up write number on the bottom top three boats. Collect journals and print off data. Discuss set up of display if there is time. If, not then set up the display on Tuesday.

Adaptations: Students with ADHD will be moving around and working with their hands. They will also have a time limit so that they can keep on task. Also students who have trouble putting thoughts into words can identify their boat shapes with pictures instead of words then draw their boat on their paper.

Enrichment: After students are done with their boats then they may reshape their boats and explain why they changed their shape.

Name_____

Buoyancy Lab Report
What Boat Design Will Carry the Most Cargo?

Draw a picture of your boat.

Hypothesis:_____

Test Results		
Size of boat (cm)	Amount of cargo carried without sinking (pennies)	
Length_____cm	Prediction	Observed
Width_____cm		
Height_____cm		

Observations:_____

Conclusion: Why was your boat successful or not?_____

How could you modify your boat?_____

Other thoughts:_____
