

1. Essential Element

Activity/Lesson Title: Properties of Materials

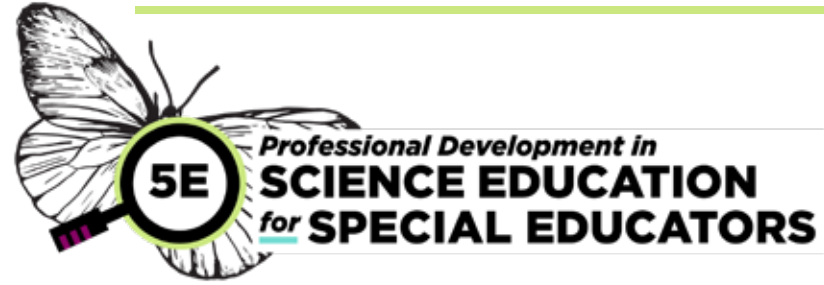
EE.5.PS1-3: Make observations and measurements to identify materials based on their properties.

Teacher: Alice

Grade Level: 5

Student: Luke

Level: Precursor



2. Science and Engineering Practice

SEP 3: Planning and Carrying Out an Investigation

SEP description: Supports students to make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.

3. Disciplinary Core Idea

Structure and Properties of Matter

Core Idea description: Make observations and measurements to identify materials based on their properties.

4. Crosscutting Concept

Scale, Proportion, and Quantity

Concept Description: Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.

5. Linkage Level Descriptors

Initial: Match materials with similar physical properties.

Precursor: Classify materials by physical properties (e.g., weight, shape, texture, buoyancy, color, and magnetism).

Target: Make observations and measurements to identify materials based on their properties. (e.g., weight, shape, texture, buoyancy, color, and magnetism).

6. Student's Typical Accessibility Supports

- Sensory Table
- Checklist of lesson activities
- Enlarged photographs
- Models and objects
- Graphic organizers
- Oral directions
- Interactive whiteboards

7. Student Prior Experiences, Prior Knowledge

- The student loves playing with water.
- The student is interested in boats and being outdoors.
- The student has prior knowledge of sorting objects based on the number of sides or shapes.
- The student enjoys listening to music.

8. Phenomenon to Explore

Question: Why do objects float or sink?

9. Possible Alternative Conceptions

Some students may think (incorrectly) that

- Objects either sink or float, and only those two categories exist.
- Wood always floats.
- Plastic always floats.
- Hollow objects always float.

10. UDL Options and Solutions to Potential Barriers

- Use media and technology (e.g., interactive whiteboards) to display steps in data collection.
- Use an appropriate number of observations (i.e., experiments) the student will conduct.
- Use engaging videos to show students multiple occurrences of placing objects in water to determine if they float.
- Use graphic organizer to collect data on sinking and floating materials.

11. Engage

Think

- How can I make sure to access student prior learning?
- How can I use the CCC to connect everyday language with scientific language of the phenomenon?
- How can I support student participation by scaffolding the SEP?

Teacher Will

- Show students a video about buoyancy.
- Ask students to think about, “What is the difference between objects that sink and those that float?”

Students Will

- Think about the difference between objects that sink and those that float as they view a video.
- Communicate about things they saw sink or float after watching the video.

12. Explore

Think

- What is difficult or inaccessible about the phenomenon and how can I make it more accessible in the Explore phase?
- How can students collect data in a way that helps answer a scientific question?
- How can I stress students’ careful observation and asking good questions vs. looking for only the “right answer”?

Teacher Will

- Read a grade-appropriate text with students about the properties of solid objects (**Solids** in Tarheel Reader).
- Assist students in testing different objects for sinking or floating (nickel, marble, balloon, crayon, pumpkin, sponge, toys, etc.).
- Provide a graphic organizer for students to document what sinks and floats; include a category for objects that sink AND float.
- Ask students to think about how the properties of those objects (e.g., weight, size, surface area) relate to whether they sink or float.

Students Will

- Test different objects, use the graphic organizer to chart results about what sinks and floats, and label the properties they have.

13. Explain

Think

- How can I help students connect science topics, phenomena, data, and everyday experiences? How can I help my students differentiate everyday language from scientific language? What reasoning helps students see or explain the invisible?

Teacher Will

- Ask students to think about what the sink/float data says about the properties of objects.
- Support students with needed vocabulary (e.g., materials, heavy, light, flat surface).
- Assist students in using data to describe what objects floated: lighter objects and objects with a bigger flat surface (e.g., surface area).

Students Will

- Complete a CER statement

Claim: Objects sink or float depending on what materials they are made of.

Evidence:

- » I tested objects in a tub of water and kept track using a data chart.
- » I read books that describe what types of objects sink or float.

Reasoning: The materials that objects are made of help to determine if they sink or float.

14. Elaborate

Think

- How can I enrich or extend student ideas? Are there related science concepts or processes that would support student learning?

Teacher Will

- Elaborate on buoyancy by discussing that some items float, some sink into the water but stay above water, and some sink immediately. And some, like different types of wood, both sink and float.
- Communicate thinking about what other objects may sink or float and the properties they have.
- Extend the lesson to apply knowledge of classifying objects using a different property (e.g., color, texture, weight, temperature, magnetism, shape).

Students Will:

- Sort objects based on similar or different properties.
- Make observations about objects and the materials they are made of.

15. Evaluate

Think

- What do I need to see or hear from my students that assures that they have learned the science content? What information must I gather to inform my teaching as I move through the lesson?

Teacher Will

- Monitor students’ responses to questions during the lesson; adapt the lesson as needed to address student ideas; administer a summative assessment.

Students Will

- Provide responses in a graphic organizer to classify materials as buoyant or not, use descriptors (e.g., heavier, more, less, lighter) in discussing properties, complete a CER statement, discuss properties of materials that make them sink or float.