



Sinking and Floating!

Introduction

Observing and testing the way objects behave in water is serious play for young learners! This curriculum supports children's development of science and engineering skills through sensory play, materials exploration and building challenges.

The science behind these activities includes experimenting with forces, like buoyancy, and investigating properties of materials, like density. Children can connect with concepts like these through their experiences in the classroom, at home and out in the world!

Through this curriculum, students will be able to:

1. Observe and compare materials by using their senses
2. Investigate how an object's properties affects whether it sinks or floats
3. Experiment with different variables to inform iterative design
4. Practice early math skills like measuring, estimating and counting

Table of Contents

- 3 Activity 1: Sensory Sorting! Exploring Materials**
Use your senses to make observations about objects and learn about why they might sink or float.

Visit [STEMSpark](#) online to complete this the Curriculum with:

- 7 Activity 2: Sink or Float? Investigating Object Density**
Test objects in water! Observe how an object's density affects whether it sinks or floats.
- 11 Activity 3: Cargo Carry! Boat Engineering**
Build two boat designs and compare how much weight they can hold before sinking.

ACTIVITY 1

Sensory Sorting

In this activity, children can observe and classify household items to predict which will sink or float!



Learning Objectives

- STEM Process Skills: observe, classify, hypothesize, compare, measure
- Developmental Skills: working memory, mental flexibility
- Science Content: build basic knowledge about object properties



Research Connection

Children as young as 3 months old are biologically predisposed to learn. Scientists have discovered that infants and children have stronger inclinations to notice and learn about physics, biology, causality, numbers, and language. These categories are called “privileged domains” (Brown, Bransford, & Cocking, 2000). This is why, universally, babies and toddlers drop items from tall heights, stare at faces, and learn to speak new languages without formal instruction.

Advocates of early childhood science suggest that children’s natural curiosity and biological aptitude for learning about the world around them makes them ideal little scientists. This activity capitalizes on children’s abilities to explore, observe and learn through sensory science skills.



Preparation

Materials

- Balance Scale
- Rubber Duck (or similar bath toy)
- Hardboiled Egg
- Apple
- Crayon
- Sponge
- Pencil
- Bottle Cap
- Empty Plastic Water Bottle
- Full Plastic Water Bottle

Set-Up

- Collect objects from materials list
- Print and cut out Object Icons Worksheet
- Print Sink or Float Experiment Worksheet

STEMSpark Worksheets

- Object Icons Worksheet
- Materials Exploration Worksheet (3)
 1. Biggest and Smallest
 2. Heaviest and Lightest
 3. Porous and Solid



Many household items are fun to explore through this activity!



Activity Instructions

STEP 1

Investigate and Sort Materials

How dense an object is will determine whether it will sink or float. Explore the objects, make observations and compare them to one another.

Compare the objects and order them from smallest to largest.

Ordering objects is one way that scientists classify.

How BIG is the object? Larger objects tend to displace more water, an important factor for an object's buoyancy.

Weigh the objects by holding them in your hands or using a balance scale. Then order them from lightest to heaviest.

How HEAVY is the object? The heavier the object is, the more likely it is to sink!

Is the object POROUS? Objects that contain pockets of air, such as sponges or wood, tend to float because air is so light!

Can you find an object that has air inside? Can you find an object that has holes? Were they heavier objects or lighter objects?

STEP 2

Predict!

Use your observations to make a prediction about whether an object will sink or float and then sort them into two groups.

Record your predictions using the Object Icons and Sink or Float

Experiment Worksheet

Which objects do you think will float? Which ones do you think will sink? Why do you think that might be?

Research Closeups



Experts agree that **Science Process Skills** are fundamental skills that underlie all science fields. These skills include observing, measuring, classifying, comparing, inferring, predicting, experimenting and communicating. This simple materials exploration activity allows children to practice many of these skills through the use of their senses.



Incorporate more inquiry-based learning into this activity by allowing children to select an object that they want to learn more about. Supporting children's autonomy in classroom science increases interest, engagement and long-term learning.



Science Background

Density is a physical property of an object that is determined by its amount of *mass* (how much matter makes up the object) per unit of *volume* (the amount of space the object takes up). There are three main things that we can observe and measure in order to evaluate an object's density: its size, weight, or structure (e.g. is it solid or does it have holes?).

For example, a brick has a high density because it is heavy and has a compact structure. A sponge has a low density because it is lightweight and has a porous structure. How dense an object will determine whether it will sink or float. Continue on to Activity 2 to extend this lesson!



Do you think a Pumice Stone would sink or float?