2nd Grade - Lesson 4.1
Float and Sink

Objective
Students will be able to plan and carry out an investigation to compare whether different objects or substances sink or float in water. Students will develop an understanding that whether a substance sinks or floats in water is a characteristic property of the substance.

Key Concepts
- Whether a substance floats or sinks in water is a property of the substance.
- Whether something floats or sinks in water has to do with how heavy it is compared to how big it is.
- Things that are heavy for their size tend to sink in water.
- Things that are light for their size tend to float in water.

NGSS Alignment
- **NGSS 2-PS1-1**
  Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Summary
- Students will look at several objects made from wax, wood, metal, and rubber and predict and test whether the objects will sink or float in water.
- Students will be introduced to the idea that whether a substance floats or sinks in water is a characteristic property of that substance.

  Note: The quantitative concept of "density" as D=mass/volume is not addressed directly. Instead, students explore sinking and floating and develop the understanding that things that sink are heavy for their size and things that float are light for their size. It is important for students to understand that weight alone does not determine whether an object or substance will sink or float.

Evaluation
Download the Student Activity Sheet and distribute one per student when specified in the activity. The activity sheet will serve as the Evaluate component of the 5-E lesson plan.

Safety
Make sure you and your students wear properly fitting goggles.

Materials for each group
- Pencil
- Popsicle stick
- Birthday candle
- Crayon
- Penny
- Paper clip
- Eraser
- Rubber band

ENGAGE

1. Begin a discussion about sinking and floating by placing a stick and a stone in water.

Show students a clear plastic container of water. Hold up a small stick and a stone and ask students to predict whether each object will sink or float. After students make a prediction, place the stick and the stone in the water.

Ask students:

- **Do you think other things made out of rocks and stone, like cement and bricks also sink? Why?**

  Yes, because they are all made out of a material that is similar to the stone. If the stone sinks, the other objects made out of material like stone should also sink. Stone and material like stone have the characteristic property of sinking.

- **How about the stick? The stick is wood. Do you think other things made of wood, like a popsicle stick or wooden building block, will also float? Why?**

  Yes, because if wood floats then other things made out of wood should also float. Wood has the characteristic property of floating.

Give each student an Activity Sheet.
Students will record their observations and answer questions about the activity on the activity sheet.

EXPLORE

Question to Investigate:

Do certain materials tend to sink or float in water?

2. Have students predict and then test whether different objects sink or float in water.

Materials for each group

- Pencil
- Popsicle stick
- Birthday candle
- Crayon
- Penny
- Paper clip
- Eraser
- Rubber band

Ask students to use the Activity Sheet to predict and write down which objects they think will sink and which will float.

Procedure

1. Predict whether you think each object will sink or float in water and record your prediction on the activity sheet.
2. Place the objects in the water one at a time to see if they sink or float. Write down your results on the Activity Sheet.

Expected results

Objects that sink

Penny
Paper clip
Eraser
Rubber band
Crayon

Objects that float

Candle
Pencil
Popsicle stick

Note: Certain objects like the rubber band and the crayon may seem to float when first placed on the surface of the water. These objects may actually be supported by the water's surface tension and not truly floating as a result of being less dense than water. If students touch the rubber band and crayon and push them a little below the surface, they should sink.

Also, even though a crayon is made mostly from wax, most crayons sink. This is because of the pigments and other substances added to the wax to give them color and to improve other qualities of the crayon.

Ask students

- **What do the penny and paper clip have in common?**
  They are both made out of metal. A characteristic property of metal is that it sinks in water.

- **What do the eraser and rubber band have in common?**
  They are both made out of rubber. A characteristic property of rubber is that it sinks in water.

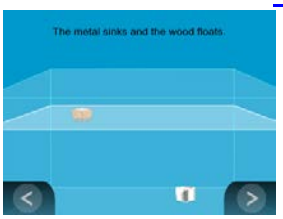
- **What do the candle and crayon have in common?**
  They are both made out of wax, but the candle floats and the crayon sinks. A characteristic property of wax is that it floats in water. The candle is mostly pure wax so it floats, but the crayon has other substances mixed in it which makes the crayon sink.

- **What do the pencil and Popsicle stick have in common?**
  They are both made out of wood. A characteristic property of wood is that it floats in water.

EXPLAIN

3. Show an animation to help explain that floating or sinking is a characteristic of a substance regardless of how much it weighs.

Show the animation Sink and Float.



Explain that if a block of metal and a block of wood are the same size, the metal will be heavier. Metal also sinks in water and wood floats. But what if a piece of wood is bigger and weighs as much as the metal? The bigger piece of wood still floats. What if the wood is even bigger and weighs more than the metal? The wood still floats! Floating is a characteristic property of wood no matter how big it is and how much it weighs (as long as it's a regular shape – cube, sphere, etc.).

If a rubber eraser and a wax candle are the same size and shape, the eraser will weigh more. The eraser will sink and the candle will float. But what if a smaller piece of eraser weighs the same as the wax candle? The piece of eraser will still sink. What if the eraser is even smaller and weighs less than the candle? The eraser still sinks! Sinking is a characteristic property of eraser rubber no matter how small it is and how little it weighs (as long as it's a regular shape – cube, sphere, etc.).

EXTEND

4. Demonstrate to students that liquids can float or sink in water.

Tell students that liquids can also float or sink in water. Some liquids have the property that they sink in water. Other liquids have the property that they float in water.

Materials for the demonstration

- Water
- Corn syrup
- Mineral or vegetable oil
- Food coloring
- 4 clear plastic cups
- Popsicle stick or plastic spoon

Teacher preparation

1. Add 2 tablespoons of water to a clear plastic cup. Add 1 drop of food coloring (not yellow) to the water.
2. Add 2 tablespoons of corn syrup to a separate cup. Add 1 drop of a different color food coloring (not yellow) to the corn syrup. Stir to mix.
3. Add 2 tablespoons of vegetable oil to a separate clear plastic cup.

Procedure

1. Pour the colored water into a clear plastic cup and show it to students.

Ask students:
Do you think the vegetable oil will float, sink, or mix when it is added to the water?

2. While holding up the cup with the water, slowly pour the oil down the inside surface of the cup.

Expected results
The oil floats on the water.

3. Show students that you also have a cup with colored corn syrup.

Ask students:

- **Where do you think the corn syrup will end up if it is added to the water?**

4. While holding up the cup containing the water and oil, slowly pour the corn syrup down the inside surface of the cup.

Expected results
The corn syrup sinks through the oil and water and ends up on the bottom of the cup. Explain to students that a property of oil is that it floats on water, and a property of corn syrup is that it sinks in water.

Recommended Book
Things That Float and Things That Don't by David Adler, illustrated by Anna Raff, can make an excellent read aloud to accompany this lesson about sinking and floating. When you choose to read it in the lesson, is up to your own personal preference.