

# OBSERVING AND SORTING

## **BIG IDEA 8: PROPERTIES OF MATTER**

### **BENCHMARKS AND TASK ANALYSES**

**SC.1.P.8.1** Sort objects by observable properties, such as size, shape, color, temperature (hot or cold), weight (heavy or light), texture, and whether objects sink or float.

The student:

- sorts objects by what can be physically observed: size, shape, color, temperature (hot or cold), weight (heavy or light), texture, and whether objects sink or float.

**SC.1.N.1.2** Using the five senses as tools, make careful observations, describe objects in terms of number, shape, texture, size, weight, color, and motion, and compare their observations with others.

The student:

- uses the five senses as tools to:
  - make careful observations.
  - describe objects in terms of number, shape, texture, size, weight, color, and motion.
  - compare own observations with observations of others.

**SC.1.N.1.3** Keep records as appropriate - such as pictorial and written records - of investigations conducted.

The student:

- keeps records, such as student-drawn illustrations, science notebooks, or digital media, of investigations conducted.

**SC.1.N.1.4** Ask "how do you know?" in appropriate situations.

### **KEY QUESTION**

How do observations help us to sort an object?

### **TEACHER BACKGROUND INFORMATION**

Things in our environment can be sorted by different attributes such as color, shape, size, temperature, weight, and texture. It is important to realize that objects can often be sorted by more than one attribute (color and size). Scientists classify objects using different properties. Experience with sorting provides students with the opportunity to classify objects by properties.

### **MATERIALS**

#### **Teacher/Class**

chart paper and markers,  
set of similar objects that can  
be easily viewed by the class

#### **Per student**

science notebook and pencil

#### **Per group**

trays or boxes of similar objects related to a topic of study (rocks, toys, seeds, etc.)

### **SAFETY**

Always follow OCPS science safety guidelines.

## **TEACHING TIPS**

- Prepare “clear” observations and “poor” observations of an object and write these on a chart tablet. The “clear” observations should allow students to easily determine which object you are describing, while the “poor” observations could indicate more than one of the objects in the set.
- Include in your observations size, shape, color, weight, and texture.
- Create a library of observation boxes (perhaps housed in plastic pencil boxes) which can be used throughout the year.

## **EXPLORE**

1. Bring students together in a circle and ask them: *“What might a scientist do if he/she were observing something?”* (use his/her five senses, use a microscope, shine a light on the object).
2. Place your set of similar objects in the center of the circle.
3. Post the t-chart you created (see Teaching Tips).
4. Tell students you are going to read several observations of an object and ask them to guess which object you are describing.
5. Begin by saying, “I observe an object that...” and read a “clear” observation. End by asking: *“Do you observe what I do?”* Call on volunteers to guess. Re-read the observation if incorrect answers are given and follow up correct answers by asking questions such as:
  - *Does everyone agree with that answer?*
  - *How did you know it was that object?*
  - *Why couldn't it have been that one instead?*
  - *What other words could be used to [point to another object] describe that object?*
6. Repeat step 3, only this time read a “poor” observation. When you ask, “Does everyone agree with that answer?” and, “Could it be a different object instead?” help students recognize that the description could in fact be applied to more than one object in the pile.
7. Ask students to explain the difference between the two observations you read.
8. Ask: *Was one observation better than the other?*
9. Ask: *What types of words did I use to describe the objects? (size, shape, color, texture, and weight words)*
10. Tell students that they are now going to make observations in order to put objects into groups. Tell students that scientists often have to sort, or classify, objects by their characteristics like size, shape, color, texture, and weight).

## **EXPLAIN**

1. Divide the class into small groups and give each group a tray or shoebox of similar items.
2. Have students make observations and write descriptions, in their science notebook, of one of the objects in the tray or shoebox at their table.
3. Have students read their descriptions to each other, and take turns identifying the object being described.
4. Have students then sort the entire set of objects into categories based upon their observations.
5. Circulate from table to table, checking students’ written observations for accuracy and assisting group members in judging the clarity of each other’s descriptions.
6. Regroup as a class to have groups report out their findings.
7. Ask: *How did you sort your objects?*
8. Ask: *Did every group sort the objects in a similar way? Why or why not?*

## **EXTEND AND APPLY**

Basic observation and classification skills can be extended to all areas of the curriculum. Scavenger hunts in which students look for similar objects and describe similarities can be applied.

## **ASSESSMENT**

Assess students' ability to make clear observations that enable others to distinguish between the object being described and other objects:

*What do you observe about the object?*

*How is it like the other objects?*

*How is it different?*

Throughout the activity, students should also be able to identify objects based on the descriptions they share:

*What object is being described?*

*How do you know?*

*Could it be another object? Why or why not?*

# PROPERTIES OF SOLIDS

## **BIG IDEA 8: PROPERTIES OF MATTER**

### **BENCHMARKS AND TASK ANALYSES**

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The student:

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**SC.1.N.1.2** Using the five senses as tools, make careful observations, describe objects in terms of number, shape, texture, size, weight, color, and motion, and compare their observations with others.

The student:

- uses the five senses as tools to:
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  - describe objects in terms of number, shape, texture, size, weight, color, and motion.
  - compare own observations with observations of others.

**SC.1.N.1.4** Ask "how do you know?" in appropriate situations.

### **KEY QUESTION**

How can you sort materials?

### **TEACHER BACKGROUND INFORMATION**

Things in our environment can be sorted by different attributes such as color, shape, size, temperature, weight, and texture. It is important to realize that objects can often be sorted by more than one attribute (color and size). Scientists classify objects using different properties. Experience with sorting provides students with the opportunity to classify objects by properties.

### **MATERIALS**

#### **Teacher/Class**

vocabulary chart  
Venn Diagram chart

#### **Per student**

science notebooks

#### **Per group**

four of the same solid objects (the sample uses cotton and Unifix cubes in the first part)

### **SAFETY**

Always follow OCPS science safety guidelines.

### **TEACHING TIPS**

- This lesson will only use two objects from the baggies of solids. All students will use the same two objects. You will pass just the two solids that you choose to all pairs of students without introducing the whole baggie of solids.
- You may want to begin a Class Vocabulary Chart to use throughout the lessons or you may make individual vocabulary charts to display. When students are giving definitions, be sure to accept what they say. Later, after working with the solid materials during the following lessons, you can ask questions that may lead them to come back and correct or add more to their definition.

## ENGAGE

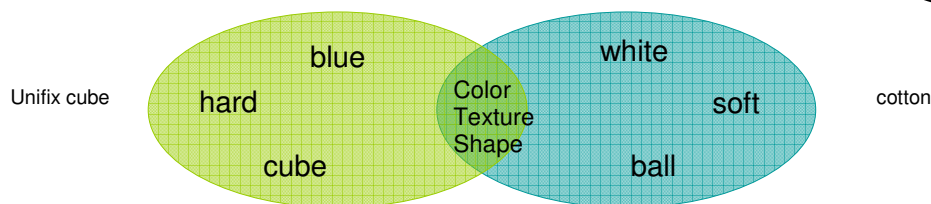
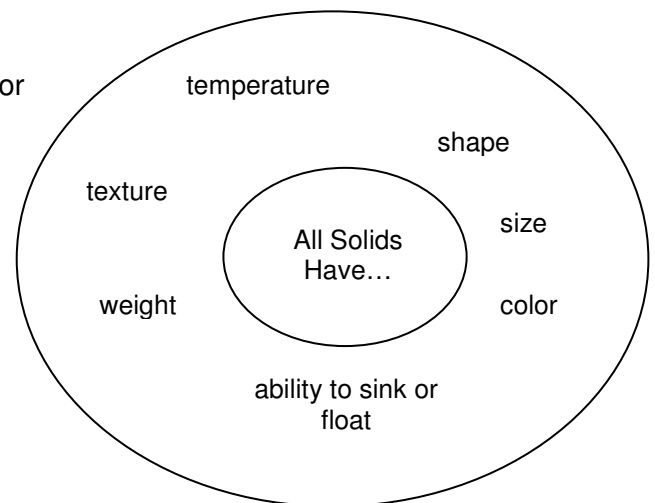
1. Ask: *What's the matter? Does anyone know what matter is?* (anything that takes up space or has mass)
2. Use a class vocabulary chart to develop a child friendly definition.
3. Ask: *What types of things in this room are examples of matter?* (Have students create a list.)
4. Ask students pairs to brainstorm ideas to sort these examples into categories based upon their observations of the objects.
5. Ask: *What are some observations that you used to sort these items into different categories?* (Guide students to talk about characteristics of texture, size, color, shape, weight, temperature).

## EXPLORE

1. Tell students, "Today we will work with solid matter."
2. Choose the same two solids from each baggie and have students observe to find likenesses and differences.
3. After they have had a chance to explore the two objects, make a list or a Venn diagram of the comparisons.
4. Have students create a Properties of Solids Thinking Map and have them add to the map while you discuss the properties with the class.
5. Have students report out their observations.

*Example:* Students say the Unifix cube is blue and the cotton is white. Write this on a Venn diagram and then add the word color to the Properties of Solids map. Take comparisons until you get the following properties for solids: color, shape, texture, size, weight, temperature, and ability to sink or float. Accept any properties that are characteristic of solids such as ability to be used, ability to be magnetic or non-magnetic, ability to move. Students may add to this chart at later times as they think of others.

Properties of Solids



Comparing Solids

## **EXPLAIN**

1. Ask: *What is the definition of the word, solid?*
2. Ask: *Does a solid keep its shape?* (Students may recognize that a solid such as paper can change its shape when you fold or cut it. You may want to clarify your definition by saying that a solid keeps its shape when it is sitting on a table.)
3. Ask: *What are some observable characteristics of a solid?* (texture, shape, color, ability to sink or float)
4. Add any appropriate words to the class vocabulary chart.

## **EXTEND AND APPLY**

1. Have students compare the other two solids that were given to them. They should work in pairs and assist each other in completing a circle map.
2. Encourage students to ask, "How do you know?" when their partner gives an explanation.

## **ASSESSMENT**

Class discussions, Science notebook entries

The following three-point rubric may be adapted to your county's grading scale to evaluate students' work during these lessons.

- **3 points:** Students are highly engaged in class discussions; were able to demonstrate a clear understanding of the vocabulary; give correct examples appropriate to the lesson.
- **2 points:** Students participate in class discussions; were able to demonstrate a basic understanding of the vocabulary; give mostly correct examples; drew pictures that were somewhat appropriate to the lesson.
- **1 point:** Students participate minimally in class discussions; unable to demonstrate a basic understanding of the vocabulary; could not give examples of the lesson. Pictures were incomplete and/or did not clearly identify lesson objectives.

# WHAT HAPPENS WHEN AN OBJECT IS PLACED IN WATER?

## **BIG IDEA 8: PROPERTIES OF MATTER**

### **BENCHMARKS AND TASK ANALYSES**

**SC.1.P.8.1** Sort objects by observable properties, such as size, shape, color, temperature (hot or cold), weight (heavy or light), texture, and whether objects sink or float.

The student:

- sorts objects by what can be physically observed: size, shape, color, temperature (hot or cold), weight (heavy or light), texture, and whether objects sink or float.

**SC.1.E.6.2** Describe the need for water and how to be safe around water.

The student:

- Recognizes how to be safe around water.

**SC.1.N.1.1** Raise questions about the natural world, investigate them in teams through free exploration, and generate appropriate explanations based on those explorations.

The student:

- raises questions about the natural world.
- explores questions about the natural world with a team of students through free exploration and generates appropriate explanations for what was observed.

**SC.1.N.1.2** Using the five senses as tools, make careful observations, describe objects in terms of number, shape, texture, size, weight, color, and motion, and compare their observations with others.

The student:

- uses the five senses as tools to:
  - make careful observations.
  - describe objects in terms of number, shape, texture, size, weight, color, and motion.
  - compare own observations with observations of others.

**SC.1.N.1.3** Keep records as appropriate - such as pictorial and written records - of investigations conducted.

The student:

- keeps records, such as student-drawn illustrations, science notebooks, or digital media, of investigations conducted.

### **KEY QUESTION**

What happens when objects are placed in water?

### **TEACHER BACKGROUND INFORMATION**

Water is one of our most vital natural resources. All living things require water to survive. Although it is the second most abundant substance on earth, the amount of fresh water available for use is very limited. Most of the water on the earth is salt water, which is found in the oceans and the seas.

Water is a liquid and flows easily. All liquids are able to flow, but some liquids flow faster than others. Water also has other observable properties:

- Water is transparent.
- Water is “sticky,” causing water drops to combine when they meet.
- Water exerts pressure.
- Water can be poured.
- Water has mass.
- Water can dissolve some materials.

- Water can be absorbed.
- Water can evaporate.
- Water can act as a filter.

Why objects float:

- Some objects have a density that is less than the density of water. The objects are buoyed up by the denser water and float.
- Some objects float by utilizing the surface tension of water.
- Other objects float because their shape allows them to displace an amount of water equal to their weight.

## **MATERIALS**

### **Teacher**

teddy bear counter  
penny  
container of water  
*Sheep on a Ship* by Nancy Shaw

### **Per group**

any plastic container for holding water  
newspaper  
*Float or Sink* chart  
red crayon  
blue crayon  
variety of objects for exploring sinking and floating (see  
BLM *Float or Sink?* chart)

## **SAFETY**

Be sure to keep water off floor and immediately clean up spills.

## **TEACHING TIPS**

1. Ask: *Who can remember some characteristics that we used to sort the solids in our last lesson?* (size, texture, shape, ability to float or sink)
2. Tell students that they are going to explore one property of solids- ability to float or sink.
3. Ask: *What do you know about floating and sinking?* (listen to misconceptions and students preliminary knowledge)
4. Ask: *What are some items that float?*
5. Ask: *When you go to the beach and you need to be safe in the water, what should you wear?* (life jacket, Water Wings, Floaties)
6. Ask: *How does a life jacket or Water Wings help you be safe in the water?* (they help you float so you will not drown)
7. Have students cover their desks/tables with newspaper.
8. Tape materials for testing in the object column on the *Float or Sink* chart for each group or use the one with pictures. (This will allow groups to work independently.)
9. Provide additional materials for student experimentation.
10. You may choose to direct the Explore section one object at a time and have the students mark their predictions and discoveries at the same time rather than the groups working on their own.

## **ENGAGE**

1. Read the book *Sheep on a Ship* by Nancy Shaw.
2. Ask: *What sank and what floated in the story?*

3. Post the following chart on the board:

### Float or Sink?

Object	Float	Sink
Teddy Bear Counter		
Penny		

4. Ask students to predict what they think will happen when a teddy bear counter is placed on the surface of the water. After students have made predictions, place the teddy bear counter in the water. Have students describe what happens. Mark the appropriate column on the chart.
5. Use a penny to repeat the investigation, having students predict and describe what happens to the penny. Mark the appropriate column on the chart.
6. Define the terms “sink” and “float.” Demonstrate each definition.  
Sink – to go beneath the surface or to the bottom  
Float – to rest on the surface of a liquid

### **EXPLORE**

1. Be sure student desks are covered with newspaper or do the activity outside.
2. Distribute a *Float or Sink* chart, a container of water, and ten small objects to each group. (Make sure there is a variety of objects of different sizes and shapes for both floating and sinking.)
3. Tell students to sort the objects into two groups – objects that they think will float on water and objects they think will sink in water. Students should record their predictions on the chart by making an X with a *red* crayon.
4. Students should test their predictions by placing each object, one at a time, in the container of water.
5. After determining whether an object sinks or floats, students can record their discoveries on the chart by making an X with a *blue* crayon.

### **EXPLAIN**

Ask the following questions to assess understanding. Guide students if necessary.

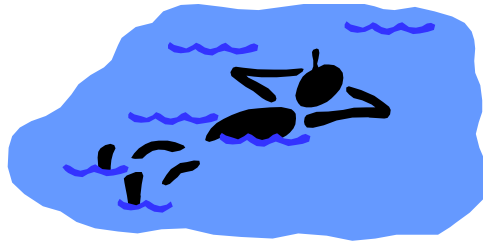
- *Were you surprised by any of the results of testing your objects?*
- *Which objects floated?*
- *Which objects did not float?*
- *What was similar about objects that floated?*
- *What was similar about objects that sank?*
- *Does size affect floating?*
- *Does shape affect floating?*

### **EXTEND AND APPLY**


1. Ask: *Can you make an object that floated, sink?*
2. Provide time for students to try to make floaters sink.
3. Ask: *What did you have to do to make it sink?*
4. Ask: *What can you do to make something that sank, float?*
5. Brainstorm a list of items that are useful because they float (e.g., life jackets, pool rings, rafts, etc.).

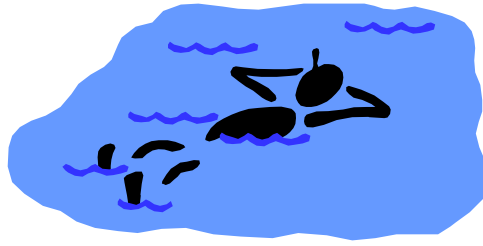
### **ASSESSMENT**

- Provide the student with a limited variety of objects – some sinkers, some floaters.
- Ask the student to choose an item that he/she thinks will float.
- Have the student test the item in a bowl of water.
- Repeat the procedure for an item that sinks.



## Float or Sink?

Object	Float	Sink
<b>rubber band</b> 		
<b>paper clip</b> 		
<b>toy animal</b> 		
<b>toy car</b> 		
<b>interlocking cube</b> 		
<b>golf ball</b> 		
<b>pencil</b> 		
<b>rock</b> 		
<b>whiffle ball</b>		
<b>toothpick</b>		
<b>penny</b> 		



**Float or Sink?**

<b>Object</b>	<b>Float</b>	<b>Sink</b>