



## THE APPLE OF MY EYE

### **BENCHMARKS and TASKS**

**SC.A.1.2.1** The student determines that the properties of materials (e.g., density and volume) can be compared and measured (e.g., using rulers, balances, and thermometers).

**SC.A.1.2.3** The student knows that the weight of an object always equals the sum of its parts.

- The student measures matter using various tools such as rulers, thermometers, balances and graduated cylinders.
- The student compares and contrasts the physical properties of matter by making both quantitative and qualitative observations.
- The student compares the weight or mass of an object to the sum of its parts using a spring scale or balance.

### **KEY QUESTIONS**

What observations can you make about an apple?

What attributes are measurable for an apple?

### **BACKGROUND INFORMATION**

**Mass** is defined as the measure of the amount of **matter** in a **solid, liquid, or gas**. All solids, liquids, and gases have mass because they are all made of matter. Mass is recorded in units such as kilograms or grams. A balance is used to measure the mass of an object.

The amount of space that an object or substance takes up is defined as **volume**. Volume is measured in units such as liters. A liter box is one tool used to measure the volume of liquids. The buoyant apple in this activity displaces an amount of water equal to its mass.

### **MATERIALS**

#### **Per group**

1 balance  
1 gram set  
1 measuring tape  
1 ruler  
1 liter box  
1 apple  
1 plastic knife  
water

#### **Teacher**

*Mr. Archimedes' Bath*, Pamela Allen  
*Measuring Tools*, Daronco and Presti, Benchmark Education Co.

#### **Per student**

*The Apple of My Eye* data sheet

## **TEACHING TIPS**

1. Allow time for students to explore balances, gram sets, and other measurement tools before the activity.
2. Request that each student bring in an apple prior to the lesson, but have some extras on hand, just in case. Use a variety of kinds and sizes of apples.

## **ENGAGE**

1. Before distributing the apples, ask students what they know about apples. Record their responses on a Circle Map.
2. Tell students that they will be using their senses and scientific tools to make observations about apples. Share the book, *Measuring Tools*, and ask students to think about which of the tools mentioned might be useful when observing apples.

## **EXPLORE (Part 1)**

1. Have students form several groups.
2. Ask: *Using your senses and scientific tools (e.g., balance, measuring tape, ruler), what observations can you make about apples?*
3. Demonstrate how to use the balance and gram set to measure the mass of an apple.
4. Demonstrate how to use the measuring tape to measure the circumference of an apple.
5. Distribute all materials, including the *Apple of My Eye Data Sheet* to each student.
6. Tell students they will have time to observe their apples using their senses, as well as other appropriate tools.
7. Monitor students as they observe, measure, and record.
8. When observations are complete, tell students to discuss their findings within their groups.

## **EXPLAIN (Part 1)**

*What unit of measurement did you use for the mass of your apple?*

*Why did the apples not all have the same measurements?*

*How tall (high) is your apple?*

*Why would it not be appropriate to try to find the width of the apple? (The apple's shape makes it difficult.)*

*How were you able to measure the distance around your apple – the circumference?*

## **EXPLORE (Part 2)**

1. Ask: *How can we determine the amount of space taken up by an apple?* Explain that this is the volume of the apple.
2. Have students fill a liter box with enough water to cover the apple.
3. Students should observe and record the level of the water in the box.
4. Students should place the apple in the water and again, observe and record the level of the water.
5. Ask students to compare the two measurements.

## **EXPLAIN (Part 2)**

Discuss:

*How did the level of the water change after the apple was placed in the liter box? (The level of the water got higher.)*

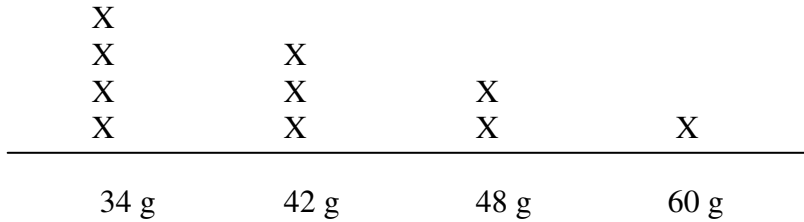
What do you think caused the level of the water to change? (The apple takes up space and has volume.)

**EXTEND/APPLY**

1. Ask:  
*What happens to the level of the water when you get in the bathtub?*  
*What happens to the level of the water when you get out of the bathtub?*
2. Read *Mr. Archimedes' Bath*.
3. Ask: *Will the mass of your apple change when it's cut into quarters?*  
Help students cut their apples into quarters and use the balance and the gram sets to find out if the mass of the four pieces approximately equals the mass of the whole apple.  
Discuss observations and conclusions.

**EXTENSIONS**

1. Compare the mass of all the apples by collecting data from each group. Create a line plot to determine the **range**, **median**, and **mode**.



Range: 34 g – 60 g, a difference of 26 g

Median: 42 g

Mode: 34 g

2. Use oranges to complete a similar investigation. Compare the mass of the whole orange to the mass of the peeling plus the fruit.

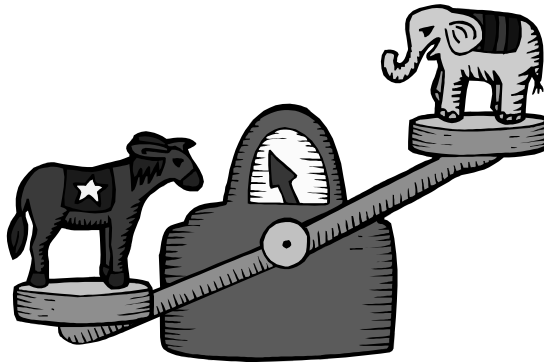
**ASSESSMENT**

Use the picture below to answer these questions:

*Why is the balance tilted to one side?*

*Which animal has the most mass? How do you know?*

*Explain how you could make the two sides balance.*



NAME \_\_\_\_\_

DATE \_\_\_\_\_



# THE APPLE OF MY EYE DATA SHEET



## Part 1

Directions: Using scientific tools and your five senses, observe your apple and record your findings.

<b>COLOR</b>	
<b>SHAPE</b>	
<b>OTHER CHARACTERISTICS</b>	
<b>MASS</b>	
<b>HEIGHT</b>	
<b>CIRCUMFERENCE</b>	

## Part 2

What is the measurement of the level of the water in the liter box without the apple?

What is the measurement of the level of the water after the apple is placed in the water?

How did the level of the water change?