



## The Density of Coins

**Subject:** Math

**Grade Level:** 6<sup>th</sup>-8<sup>th</sup> grades

**Summary:** Students will conduct a science experiment where they will learn that the different denominations have characteristic densities that can be used to help identify the type of coin being used.

### BIG QUESTION

How do I make a graph to see patterns and test predictions?

### TIMING

46 to 90 minutes

### LEARNING OBJECTIVES

- Students will learn that the different denominations have characteristic densities that can be used to help identify the type of coin being used.

### MATERIALS

- Pennies
- Nickels
- Dimes
- Water
- Graduated cylinders
- Balances
- Calculators
- Pencils
- Paper

## **U.S. Mint Coin Classroom Lesson Plan: The Density of Coins**

### PROCEDURE

1. Divide the students into pairs. Distribute five of each coin (pennies, nickels, and dimes) to each pair.
2. Have each pair of students create a data table where they will include columns for coin type, mass, volume and density.
3. Have each group use a balance to measure and record the mass of each set of five coins in their data table.
4. Have the students fill a graduated cylinder to the 20 mL point
5. Have the students drop one coin group (pennies, nickels, or dimes) into the water and record the height that the water rises to, then subtract the initial 20 mL from the new height to find the volume for the coin group and record that volume in their data table.
6. Have the students perform the same measurement for the remaining coin groups separately and record the results.
7. Using a calculator, have the students divide the mass of each set by the volume of that coin group. This calculation will be representative of the density of that coin group. Have them write these densities in the data table. Have the students share their answers. Note that the mass, volume and therefore density of circulating coins may vary slightly due to wear, but these discrepancies should be minor.

### ASSESSMENT

Use the lab notebooks to determine whether the students have met the lesson objectives.

### DIFFERENTIATE

- Have students use a spreadsheet to record their results.
- Create a class spreadsheet in advance and allow students to enter their data and the results can be calculated immediately.
- Allow students to use the graphing features of the spreadsheet program to create a graph.

### RELATED

- U.S. Mint Coin Classroom circulating coin information: <https://kids.usmint.gov/learn/kids/about-the-mint>
- U.S. Mint Coin Specifications: <https://www.usmint.gov/learn/coins-and-medals/circulating-coins/coin-specifications>

## ***U.S. Mint Coin Classroom Lesson Plan: The Density of Coins***

### **STANDARDS**

#### [CCSS.Math.Content.6.SP.B.4](#)

Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

#### [CCSS.Math.Content.6.SP.B.5](#)

Summarize numerical data sets in relation to their context, such as by:

#### [CCSS.Math.Content.6.SP.B.5.a](#)

Reporting the number of observations.

#### [CCSS.Math.Content.6.SP.B.5.b](#)

Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

#### [CCSS.Math.Content.6.SP.B.5.c](#)

Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

#### [CCSS.Math.Content.6.SP.B.5.d](#)

Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.