Chapter

Coin Attributes

The Bottom Line

Coins have various attributes that cause them to be distinctly different from one another.

Students sort and classify coins, count the number of coins in each category, and describe and compare coins based on their measurable attributes.

Standards Met in This Chapter

CCSSM Standards and Practices

K.CC.B.4. Understand the relationship between numbers and quantities; connect counting to cardinality.

K.MD.A.1. Describe measurable attributes of objects such as length or weight. Describe several measurable attributes of a single object.

K.MD.B.3. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

1.MD.C.4. Organize, represent, and interpret data with up to three catagories; and and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another

MP.3: Construct viable arguments and critique the reasoning of others.

MP.6: Attend to precision.

(National Governors Association Center for Best Practices and Council of Chief State School Officers [NGA Center and CCSSO] 2010)

Jump$tart Standards

Spending and Saving: Apply strategies to monitor income and expenses, plan for spending and save for future goals.

Standard 3. Describe how to use different payment methods.

Knowledge Statements:

Overall: Paper money and coins have different values

Standard 3: Sort coins and paper money by appearance and name.

(Jump$tart Coalition for Personal Financial Literacy 2017)

Future Value

The most recognized coin in the American monetary system is the penny. The copper color of a penny makes it distinguishable from other U.S. coins; it is also the least valuable coin, at only one cent. One of the first experiences that children will have with money is noticing these differences in attributes, which make each coin unique.

In this chapter, students will explore the measurable attributes of the penny, nickel, dime, and quarter and will classify them based on these similarities and differences. After the following activities, students should be able to distinguish these specific categories and describe them based on how the coins are sorted.

The following sections describe the mathematical and financial literacy concepts that this lesson will encompass, as well as the knowledge and experiences that elementary students may bring to the lesson and take from it on its completion.

Did you know? Before the 18th century was over, the U.S. Mint began adding ridges to the coins' edges, a process called "reeding," in order to make it impossible to shave them down without the result being obvious. As a side benefit, the reeded edges also made coin design more intricate and counterfeiting more difficult (Maranzani 2012).

Mathematics

Like geometric shapes, coins have characteristics and attributes that make them distinct from one another. These characteristics include color, face picture, value, and the feel of the outer edge of the coin. Other measurable attributes (K.MD.A.1) include diameter, thickness, and weight. Students can describe these attributes with mathematical vocabulary such as larger, smaller, thicker, thinner, heavier, and lighter. Through the activities in this chapter, students will use reasoning to compare various coins and determine their defining characteristics. They will also describe measurable attributes of each coin and compare them to one another (K.CC.B.4). When comparing, students must attend to precision (MP.6), specifically in measurable attributes.

Students' ability to classify objects is fundamental for future data collection skills (K.MD.B.3). By providing students with multiple opportunities to classify and categorize sets, students can discover that sometimes there are multiple ways to classify the same collection of coins. Students will increase their mathematical vocabulary through descriptive words (MP.3), be able to organize data, and answer questions based on their findings (1.MD.C.4).

Once students have determined data sets, counting and cardinality standards (K.CC.B.4) are reinforced through one-to-one correspondence between the numeral representation and the number of coins in the set.

Financial Literacy

A large part of improving financial literacy at a young age is recognizing that different coins have different values. Students must be able to identify each coin and learn to distinguish how much each is worth. Through these repetitive experiences, students begin to identify the penny, nickel, dime, and quarter and label them with their appropriate value using the cent (¢) sign. In

Did you know?
The *cent*, frequently represented by the cent sign (a miniature letter "c" crossed by a vertical or diagonal stroke: ¢; or a simple "c") is a monetary unit that equals 1/100 of a dollar or other decimal currency unit. The word "cent" derives from the Latin word *centum*, meaning hundred (dictionary.com n.d.).

doing so, students start to realize that some coins are worth more than others, and this realization can be a precursor to exchanging less valued coins for their larger counterpart—e.g., five pennies for one nickel.

Student Knowledge and Experience

This lesson builds on students' skills of sorting and counting objects and emerging understanding of data collection and interpretation. Some students will first see the difference in color, thus separating pennies from the silver color of the other coins. Others will notice the size difference. This recognition will lead to an important discussion in that size does not have a direct correlation with value. The relationship of size to value is a common student misconception and must be addressed. This rich conversation could lead to a student-led investigation during a different lesson on why the coins were created with specific attributes.

Once students have sorted and described their sets, they can practice their counting and cardinality skills by matching or writing the number of coins with the correct numeral. Students will continue to develop their one-to-one correspondence as they match each item with its corresponding numeral and identify the cardinality for each set.

Lesson Plan

Learning Targets

- Classify coins by their defining attributes and characteristics.
- Connect counting to cardinality by identifying how many coins are in each set.
- Organize and interpret the coin data to ask and answer questions.

Resources and Tools

- **Resource 1.1a and 1.1b:** Money Jars (one sheet of each for each student or pair of students)
- **Resource 1.2:** Number Cards 1–20
- Coins to sort (pennies, nickels, and dimes; quarters depending on appropriateness)
- Money jar (yogurt containers, baby food jars, and applesauce cups all work well for this activity)

Preparation Prior to Lesson

Part 1: Prepare enough copies of Resource 1.1a and 1.1b as needed for each student or pair of students. Laminate a class set for reuse. Place a collection of coins into each money jar depending on student appropriateness.

Part 2: Make copies of Resource 1.2 for students who are not yet able to write the corresponding numeral.

Children's Literature Option

The Coin Counting Book by Rozanne Williams (2001). For other possible resources, see the Literature for Financial Literacy list on p. 203.

Key Language

attribute: A characteristic of an object.

sort: To group based on an attribute of an object.

Money Talks

Ask children if they, or their parents, have a "money jar." Show them a small jar full of coins. Ask them what a money jar might be used for or how money can "grow" in the jar. Talk with the students about how one might count the money in the jar. Lead them to the realization that it is easier to count money if you **sort** it into the different coins.

Sales Pitch

Explain to the students that coins have different attributes. This means that the coins have different characteristics unique from one another. Give each student, or pair of students, a "jar" with a predetermined amount of coins. For example, quarters would not be used in a kindergarten classroom, and the amount placed in each jar can vary based on ability. Have students carefully dump their money onto their desks. Give them time to explore the various coins, and record their noticings and wonderings on the board. As students are noticing differences in the coins, explain that these individual characteristics are called **attributes.** Ask the following questions:

- How do the coins look different?
- How do the coins feel different?
- What are some attributes you notice that are unique to the penny, nickel, and dime?
- What are some different ways we could sort the coins?

Explain that the penny is the most easily recognized coin because of its color. The nickel and dime are similar in color, but the nickel is larger, thicker, and has a smooth edge, whereas the dime is smaller, thinner, and has a ridged edge. Some students will have the background knowledge regarding the value of each coin and this can be an extension for further practice, but first focus on the visible elements. Make a list of defining attributes on the board for students to refer to later in the activity. Discuss which attributes are measurable (such as size and weight) versus those that are not (such as color and ridges).

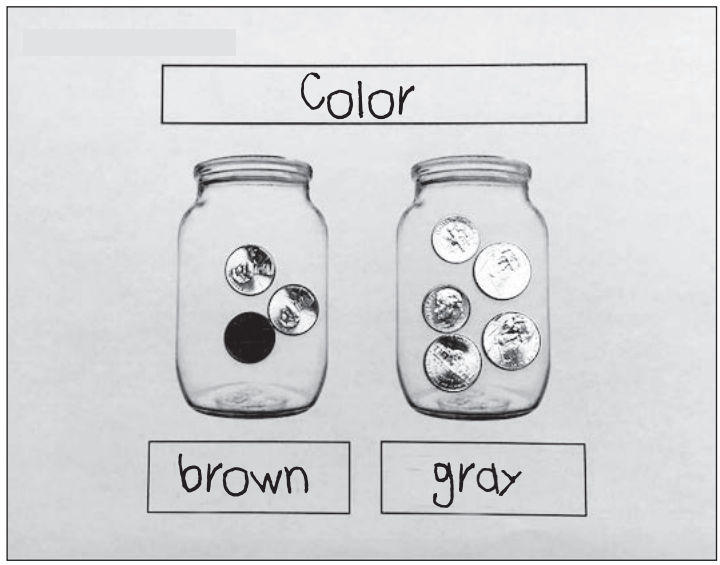
The Fine Print

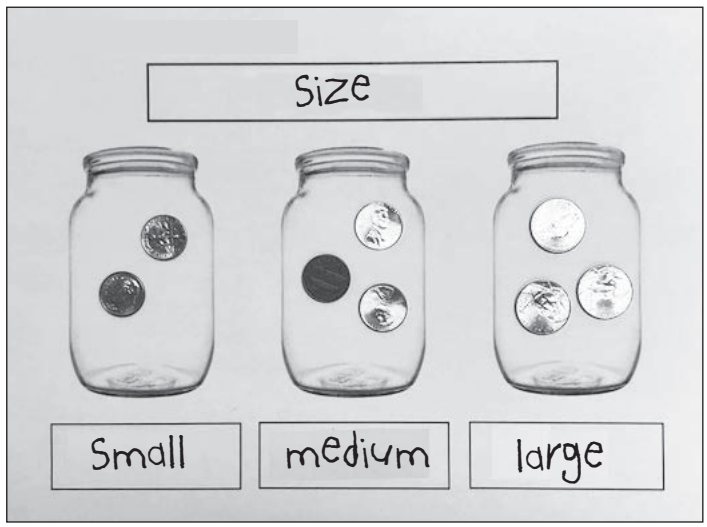
Part 1: Sorting

Pass out **Resources 1.1a and 1.1b** to the students. Explain to them that they are going to sort their coins into money jars. The students may choose whether to sort into two or three categories. (Fig. 1.1a shows two categories, while fig. 1.1b shows three.) The students will choose an attribute by which to sort and place the coins in the corresponding jars. They will then switch places with a partner to examine how the other person sorted and determined the defining attribute. After carefully inspecting the coins in the jars, have the students make notes about how the coins might be sorted.

Standards for Mathematical Practice: Students develop MP.3 when they determine how the coins are sorted and can justify their reasoning.

They could write or draw a picture to express their thinking. For instance, a student might write that the coins in a certain jar are brown, or thick. Once students have taken notes on the characteristics of the coins in each jar, have them choose one attribute that could be used to define the sorted set. Encourage students to refer back to the attribute list made earlier in the lesson.





Figs. 1.1a and 1.1b. Coins sorted by two and three attributes

Part 2: Counting

After the students have had multiple opportunities to sort and classify the coins by their attributes, explain to them that they are going to practice counting and writing numerals. As students work toward counting to 100, they must recognize the 0–9 digit sequence and develop the transition signals for generating a new series of ten. They must also be able to use one-to-one correspondence skills while keeping track of which elements have been counted. Have the students begin by sliding their money jar resource sheet to the top of their workspace. Next, have them bring all the coins down from the first jar and place them in front of them. Have students arrange the coins into a line. As students are counting, have them place a finger on each individual coin and slide it up to make a

new line. One of the difficulties that children contend with when counting is keeping track of which coins have been counted and which have not. By physically separating the coins, students will have an effective strategy for distinguishing between the two (fig. 1.2).

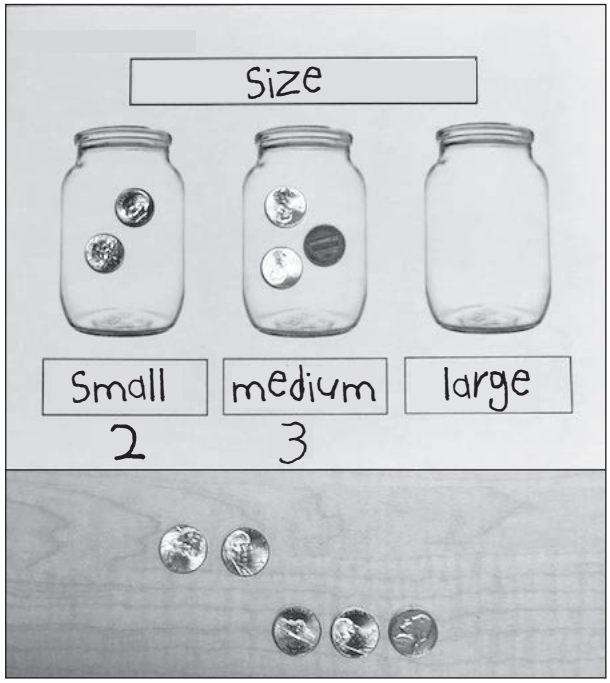


Fig. 1.2. Coins sorted into two lines

Standards for Mathematical Practice: As students count the sets of coins, they are attending to precision when recounting for accuracy (MP.6).

Students can then record the number of coins in each jar by either writing the number or matching using a number card **(Resource 1.2: Number Cards 1–20).** Encourage students to count each set more than one time to validate their answers.

Closing the Deal

Share with students that this activity is the start to knowing how much total value of money is in the money jar. Ask the following questions:

- What did you notice about the jars as you were counting the coins?
- Did some attributes tend to have more coins than others?
- Why do you think they did or did not?

Place two or three new jars in front of the students, with coins sorted by an attribute that has not been discussed yet (for example, as in fig. 1.3, where the coins are sorted by heads and tails). Ask the following questions:

- What do you notice about the contents of each jar?
- How do you think I sorted my coins?

As a class, count the number of coins in each jar. Ask the following questions:

- Which jar has the most coins?
- Which jar has the least?
- If I were trying to save my money, would I add more coins to the jar or take some away?

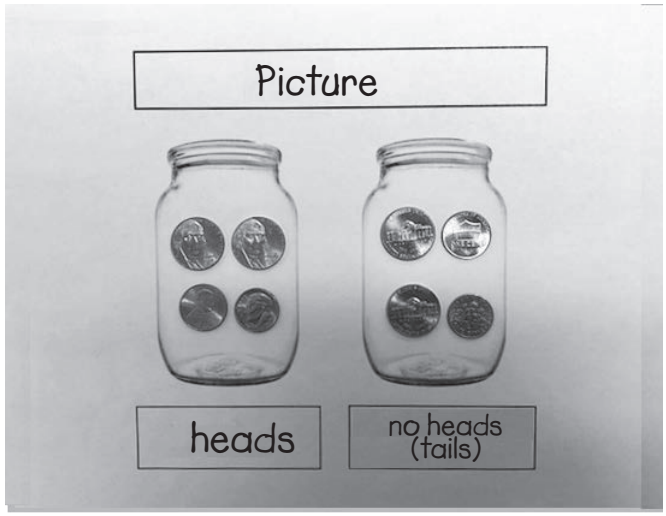


Fig. 1.3. Coins sorted by heads or tails

Close the lesson by having students share something they think is worth saving for. One possible extension is to start a class money jar, adding coins as positive reinforcement in saving and working toward a common goal.

Getting Your Money's Worth

This activity can be modified for various grades through the amount of money in each jar and adding the attribute of value. Continue to revisit this activity through a class money jar, using mathematical strategies such as repeating counting and determining how much more money is needed until a goal is reached.

References and Resources

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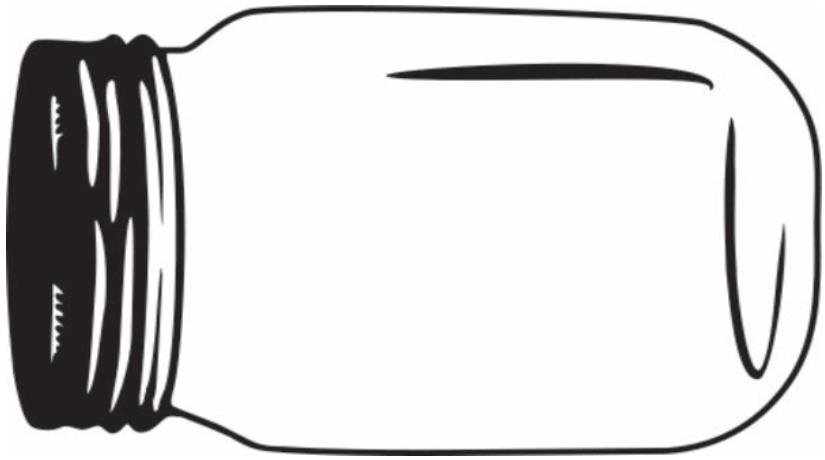
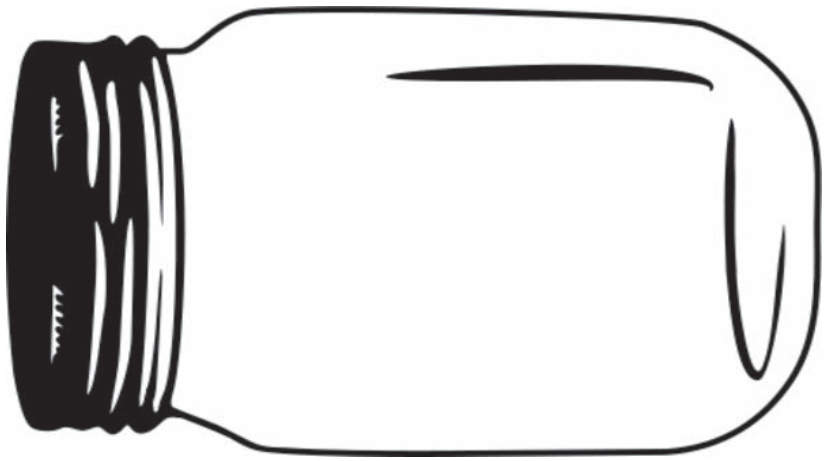
Resource 1.1a

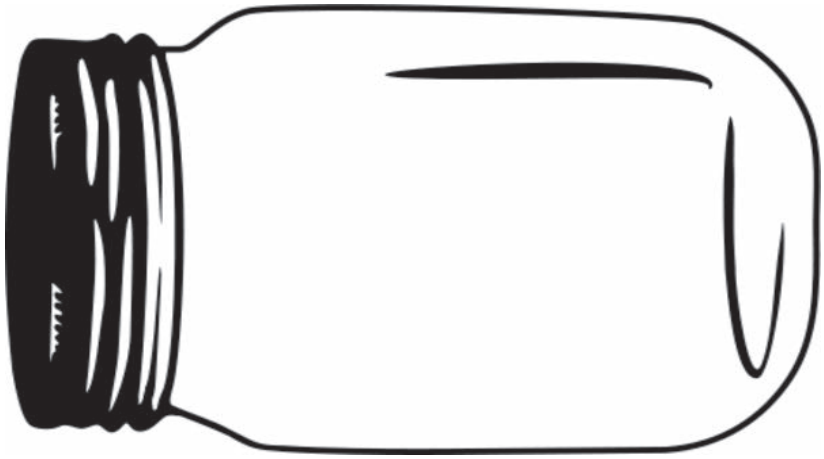
Two Money Jars

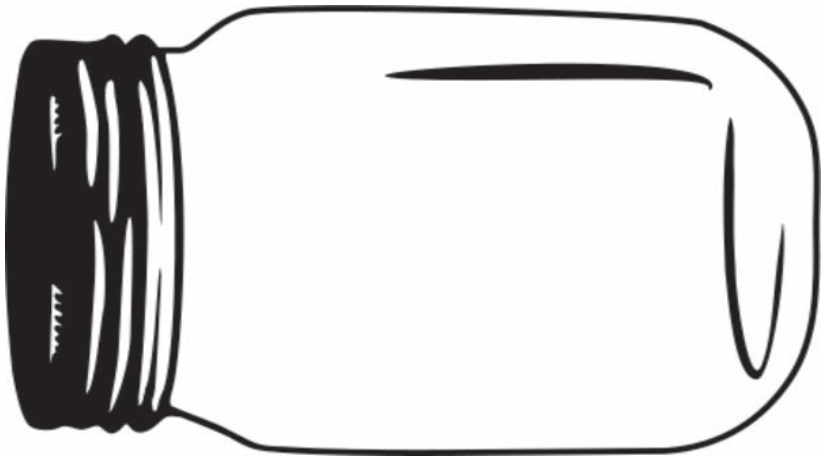


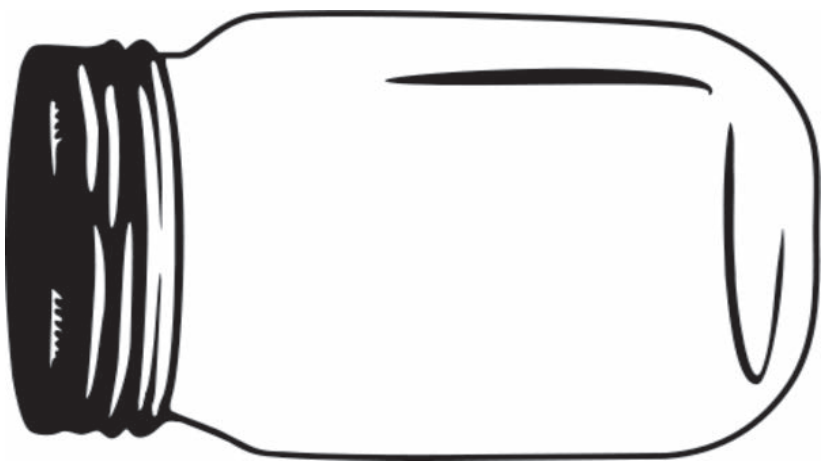


Resource 1.1b

Three Money Jars







Resource 1.2

Number Cards 1–20

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20