

LESSON 6

Objective

Use metric units to estimate and measure weight (grams).

Common Core State Standards

- **3.MD.2** Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.

Measurement and Data

Measure Weight

Estimation is an important mathematical skill for students to develop. Establishing benchmarks by which students can compare the weights of items is a strategy that will help them make more reasonable estimates. Students also need opportunities to work with a variety of measurement tools and to recognize that slightly different measurements may be found for the same items. It is important for students to experience both customary and metric units of measurement.

Try It! Perform the Try It! activity on the next page.

Talk About It

Discuss the Try It! activity.

- **Ask:** *Why do you think it's important to put the Centimeter Cubes into the balance one at a time?*
- **Ask:** *How many grams did the Papa Bear™ Counter weigh? Mama Bear™ Counter? Baby Bear™ Counter? Did anyone find a different weight for any of these?*
- **Say:** *Grams are a good unit of measurement for small items like the Three Bear Family® Counters. Ask: Do you think grams would be practical for measuring the weights of larger items, such as your desk? Why or why not?*

Solve It

With students, reread the problem. Have students explain in writing how Jessica should measure each Bear Counter to find its weight.

More Ideas

For other ways to teach about estimating and measuring weight—

- Provide a balance and Centimeter Cubes at the math center. Instruct students to find items they believe to weigh approximately 1, 50, 100, and 500 grams. Have students use the balance and cubes to check the weights of the items and select new items as needed. Instruct students to list the items discovered for each of the target weights.
- Challenge students to use the weights of the Three Bear Family Counters and the Centimeter Cubes to create problem-solving opportunities (1 Baby Bear = 4 grams, 1 Mama Bear = 8 grams, and 1 Papa Bear = 12 grams). Example: What combination of Bear Counters weighs 24 grams (cubes)? What other combinations of Bear Counters weigh 24 grams (cubes) total?

Formative Assessment

Have students try the following problem.

Which item weighs about 5 grams?

- A. a pencil B. an apple C. a box of crayons D. a dictionary

Try It! 20 minutes | Groups of 4

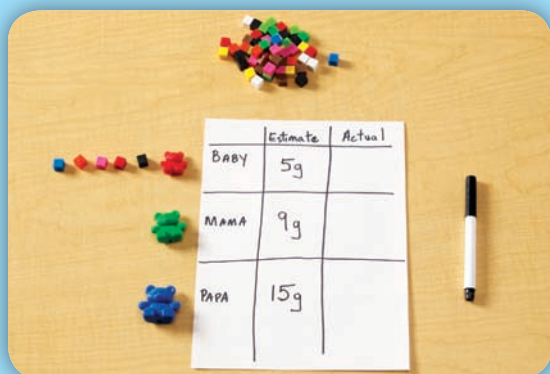
Here is a problem about using metric units to estimate and measure weight.

Jessica's teacher says that a Papa Bear™ Counter, a Mama Bear™ Counter, and a Baby Bear™ Counter all have different weights. How can Jessica measure them to find out how much each one weighs?

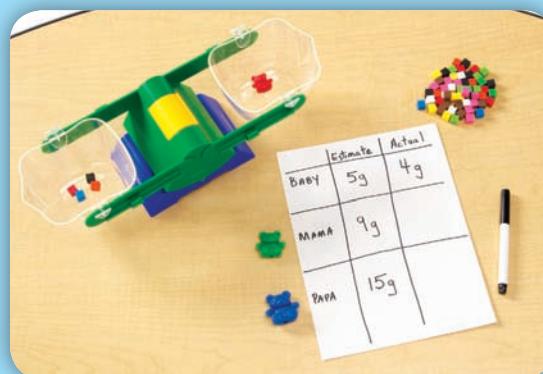
Introduce the problem. Then have students do the activity to solve the problem. Distribute Three Bear Family Counters and Centimeter Cubes to groups. Groups may have to share balances. Explain that a gram is a metric unit used to measure the weight of an object. Hold up one cube and explain that each cube weighs one gram.

Materials

- Three Bear Family® Counters (20 per group)
- Centimeter Cubes (100 per group)
- bucket balance (1 per group or station; not included in kit)
- paper and pencils (1 each per group)



1. Have students select three Bear Counters, one of each size. **Say:** *A paper clip weighs about 1 gram. A textbook weighs about 435 grams.* **Ask:** *How much do you think each of the Bear Counters weighs?* Have students make a chart with one column for the bear name, one for their estimate, and one for the actual weight. Then have them fill in their estimates.



2. Have students measure the Baby Bear first. Tell them to put the Baby Bear in one bucket and then place cubes in the other bucket, one at a time. **Say:** *When the buckets are balanced, count the cubes and record the weight in your chart.*

Look Out!

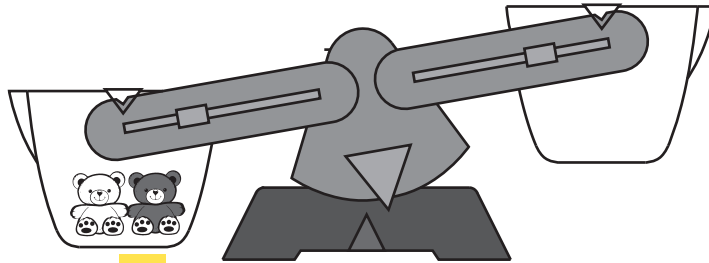
Students may use arbitrary numbers when estimating the weights of classroom objects. Remind students of the weights of the textbook and the paper clip discussed in Step 1. Give students one cube to hold and use as they start to estimate. Then have them hold 10, and then 20, and compare how the different weights feel. Also, watch that students' buckets are balanced before they begin weighing. Have students check that the buckets are level, and discuss how having unlevel buckets can affect their measurements.



3. Have students continue by measuring the other two bears and then comparing their estimated weights with their actual weights.

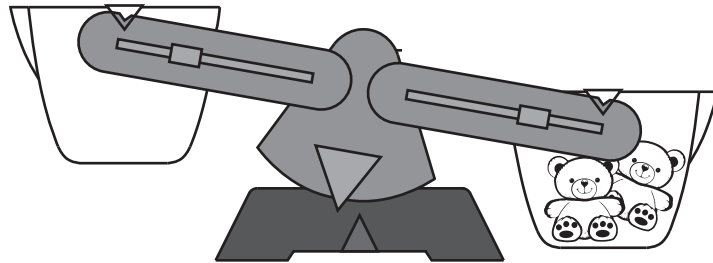
Use Three Bear Family Counters, Centimeter Cubes, and a balance to model weight. Find the weight, in grams, of each group of counters.
(Each cm cube = 1 gram.) (Check students' work.)

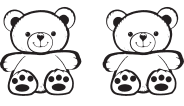
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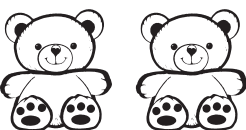


 = 8 cubes = 8 grams

2. 



 = 16 cubes = 16 grams

3.  = 24 cubes = 24 grams

Locate each item named. Use a balance to find each weight in grams.

4. pencil Sample:

15 cubes = 15 grams

5. empty envelope Sample:

5 cubes = 5 grams

6. paper clip Sample:

1 cube(s) = 1 gram(s)

7. penny Sample:

3 cubes = 3 grams

8. quarter Sample:

7 cubes = 7 grams

9. dollar bill Sample:

1 cube(s) = 1 gram(s)



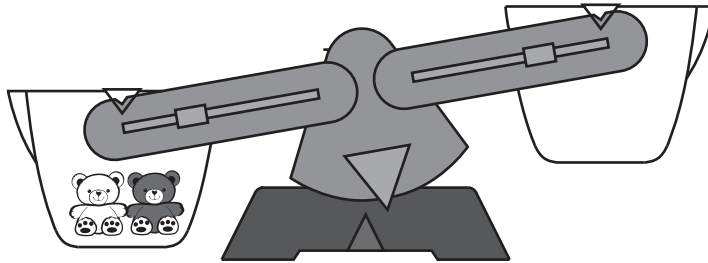
Answer Key

Challenge! Use your answers to Problems 7 and 8 to find the weight of a stack of each coin that would be worth \$1.00. Show your work.

Challenge: (Sample) One hundred pennies equals \$1.00, so \$1 in pennies weighs 300 g. Four quarters equal \$1.00, so \$1 in quarters weighs 28 grams.

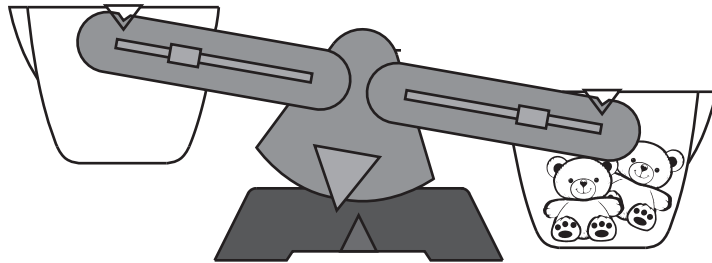
Use Three Bear Family Counters, Centimeter Cubes, and a balance to model weight. Find the weight, in grams, of each group of counters. (Each cm cube = 1 gram.)

1. 

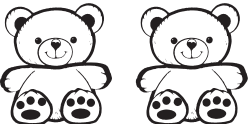


 = _____ cubes = _____ grams

2. 



 = _____ cubes = _____ grams

3.  = _____ cubes = _____ grams

Locate each item named. Use a balance to find each weight in grams.

4. pencil

_____ cubes = _____ grams

5. empty envelope

_____ cubes = _____ grams

6. paper clip

_____ cube(s) = _____ gram(s)

7. penny

_____ cubes = _____ grams

8. quarter

_____ cubes = _____ grams

9. dollar bill

_____ cube(s) = _____ gram(s)

Name _____

Challenge! Use your answers to Problems 7 and 8 to find the weight of a stack of each coin that would be worth \$1.00. Show your work.

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