

Weigh to Have Fun

Strand:	Measurement and Geometry
Topic:	Measuring and comparing weight using nonstandard units
Primary SOL:	1.10 The student will use nonstandard units to measure and compare length, weight, and volume.
Related SOL:	1.2b

Materials

- Balance scales
- One apple
- One orange
- Student journals or recording sheets
- Manipulatives for measuring weight (e.g., paper clips, plastic bears, cubes, bean counters)
- Objects to weigh
- Pencils

Vocabulary

balance, balance scale, equivalent, estimate, heavier, less, lighter, more, the same as, unit

Student/Teacher Actions: What should students be doing? What should teachers be doing?

1. Explain to students that today they will explore measuring the weight of an object. Review the terms *more*, *less*, and *equivalent*.
2. Show students a balance scale. Inform students that a balance scale can be used to compare the weight of two objects. Show students how the balance scale works. Show students a paper clip and an eraser. Ask: “Which weighs more?” Explain to students that, “When I put this paper clip on one side, the scale will move down according to which side is heavier. Because nothing is on the other side, we will watch this side move down as I put the paper clip on the scale. Now, I can add the eraser to the other side and the scale will move according to which side is heavier.” Ask: “How will I know which object is heavier?” “Does the scale move up or down?” Inform students, “While this shows me which one is heavier, it does not tell me how much heavier the eraser is than the paper clip”.
3. Ask: “What if I wanted to know how many paper clips it would take to be equivalent to the eraser? What should I do?” Lead students to discover they can use the paper clips on one side of the scale while the eraser is on the other end, and to add as many paper clips needed to balance the scale.
4. Tell students, “Today we will use the balance scale to compare the weight of two objects, using cubes as our unit to measure its weight.”
5. Hold up the apple and the orange in front of the students, ask them to predict which will weigh more, and have them record their predictions in their journals. Provide students

with a sentence frame, “I predict the _____ will weigh more.” Ask how they could determine whether their prediction is right (by weighing each object). Have them predict and record in their journals how many units (e.g., cubes) it would take to balance the apple and how many it would take to balance the orange. Provide students with a sentence frame: “I predict the apple will weigh _____ cubes. I predict the orange will weigh _____ cubes. Have students share and discuss their predictions.

6. Have a student come up and weigh the apple, counting the number of cubes it takes to balance it on the scale. Have students record the weight in their journals and compare their estimate to the actual weight. At this point, allow students to adjust their estimation of the number of cubes it will take to balance the orange, if they wish. Be sure to discuss the reasons they might want to change their estimates, explaining how and why the actual weight of the apple might affect their estimate of the weight of the orange.
7. Repeat the weighing procedure with another student and the orange. Have students compare the weights of the apple and the orange and discuss their findings. Were there any surprises? Have them write in their journals which weighed more and which weighed less, stressing use of the target vocabulary.
8. Tell students they will now work in pairs to compare the weights of two more objects, using the same procedure. Say, *“When measuring weight with nonstandard units, such as cubes, marbles, beans, etc., this is our unit of measure. So, when you record your answer you should tell me the object weighs 15 cubes or 15 marbles based on what you are using.”* After answering any questions, give each pair a balance scale, two different objects to be estimated, weighed, and compared, and some nonstandard units of measure for measuring the weight. As students work, circulate to check for understanding, questions, and proper use of materials. When students have finished measuring and comparing, engage them in a dialogue about their observations, estimations, and results. Students should describe and record their investigations in their journals, using the terms *more*, *less*, or *equivalent*.
9. After the hands-on activity, have a mathematics discussion in which students may share their results with each other, noting any similarities and differences. Some questions to lead the discussion: *“How close did your predictions come to your counted or actual measurement? Why do you think that was?” “Is it easier to measure weight with lighter units or heavier units?” “Would you rather weigh an elephant with large, heavy units or small, light units? Why?” “Some pairs had the same objects with the same exact weight, but got a different number: How could this be?”* (Using a different unit of measure).

Assessment

- **Questions**
 - Which object weighed more? Which weighed less? How do you know? Which objects weighed close to one another? Were the weights of any objects equivalent?
 - How many more (cubes) would the first object have to weigh to be equivalent to the second object? How do you know?

- Would the objects you weighed weigh the same if you used a different manipulative? Why, or why not?
- **Journal/writing prompts**
 - Which object weighed more? Which weighed less? How do you know? Which objects weighed close to one another? Were the weights of any objects equivalent?
 - How many more (cubes) would the first object have to weigh to be equivalent to the second object? How do you know?
 - Would the objects you weighed weigh the same if you used a different manipulative? Why, or why not?
- **Other Assessments**
 - Circulate around the room during the lesson to observe students and engage them in conversation about their explorations. Use questioning strategies that probe their understanding of the concept.

Extensions and Connections (for all students)

- Allow students additional opportunities to practice estimation and measurement skills by setting up your mathematics center with balance scales, recording sheets, and a variety of objects to compare and measure.
- In your mathematics center, provide three or more objects for students to measure. First, before picking up the objects, have them predict what the order of the objects will be when ordered from lightest to heaviest. Then, have them weigh the objects and record the results in their math journals, comparing the results with their predictions.

Strategies for Differentiation

- Allow students who have difficulty writing to dictate their responses to the teacher.
- Provide a sentence frame such as, “The _____ is heavier/lighter than the _____.”

Note: The following pages are intended for classroom use for students as a visual aid to learning.