ACTIVITY 6

Weight

OBJECTIVES

Students compare the relative weights of different objects using an equal-arm balance.

The students

- predict the relative weights of different objects
- use an equal-arm balance to determine the relative weights of the objects
- arrange the objects in order of increasing relative weight

SCHEDULE

About 40 minutes

VOCABULARY

equal-arm balance
weight

For the class

1	chart, Property Words (from Activity 5)*
1	crayon*
1	marker, felt-tip*
1 pair	scissors*

*provided by the teacher

PREPARATION

1. Make a copy of Activity Sheet 6 for each student.
2. Put the following items together on a sorting tray for each team of four: a square block, a birthday candle, a cork, a feather, a shell, and a plastic spoon.
3. Each team of four will need an equal-arm balance (consisting of an arm and a pivot) and their sorting tray of items.
4. You will need a crayon and a pair of scissors for an opening discussion.

All materials are ready for the small groups in the lab!

BACKGROUND INFORMATION

Mass is a measure of the amount of material in any object. The more mass an object has, the more it resists changes in its motion. Thus it is harder to start a boulder moving or to stop a moving boulder than it is a pebble.

Weight is a measure of the gravitational force acting on an object. The greater an object's mass, the greater the gravitational force acting on it, and the greater its weight will be. Thus more-massive objects weigh more than less-massive objects.

An ***equal-arm balance*** is an instrument for weighing that consists of a beam supported in the center with two trays or pans of equal weight at either end. In this activity, students use an equal-arm balance to compare the relative weights of different objects. First, they hold various objects to gain an intuitive understanding of the expressions ***heavier than, lighter than,*** and ***weighs the same.*** Students then place objects on opposite sides of the balance and observe that the side with the heavier object goes down while the side with the lighter object goes up. Students use the balance to arrange the objects by increasing relative weight.

Arranging objects in seriate order is another way of sorting and organizing the objects in our environment. Students practice arranging objects in seriate order when they stack together a set of nesting boxes or arrange family members in order of increasing height.

▼ **Activity Sheet 6**

Weight

1. Draw a picture of the heaviest object on your tray.

a shell

2. Draw a picture of the lightest object on your tray.

a feather

3. Draw a picture on the line below of each of the objects you weighed. Draw them along the line from lightest to heaviest.

feather/plastic spoon/birthday candle/cork/square block/shell

Lightest Heaviest

Guiding the Activity

Additional Information

1 Write the word *weight* on the board and tell students that **weight** is a measure of how heavy an object is. Point to *Weight Words* on the Property Words chart at the front of the classroom. Read, or have a student read, the words listed in the column. Ask, **What are some other words that tell us about weight?**

Students might mention some of the following words: pounds, tons, very heavy, heavy, light, *and* very light.

Hold up a pair of scissors and a crayon. Say, **Raise your hand if you think the scissors are heavier than the crayon.** Then, **Raise your hand if you think the crayon weighs more than the scissors.**

Record students' guesses on the board.

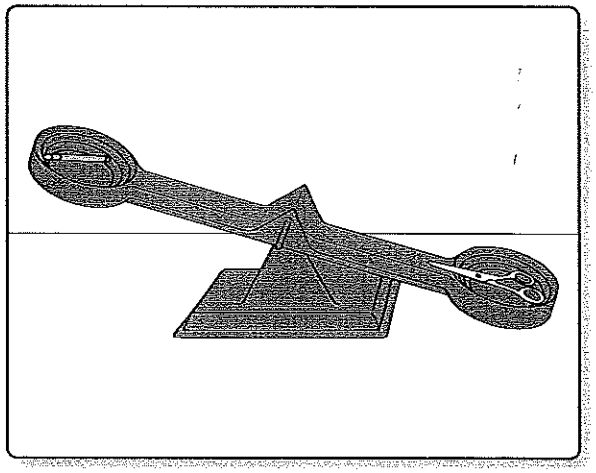
Ask, **How can you tell which of these two objects weighs more than the other?**

Students might say that they would need to hold one in each hand to compare their weights. Some students might suggest weighing the two objects.

Invite two student volunteers to each take a turn picking up the two objects and comparing their weights. Ask, **Which feels heavier, the scissors or the crayon?**

Accept each student volunteer's response and record it on the board. The two answers might or might not be the same.

2 Tell students that they are going to find out which of the two objects weighs more using a special measuring device. Write *equal-arm balance* on the board. Point to an equal-arm balance and explain that an **equal-arm balance** can be used to determine which of two objects is heavier (see Figure 6-1).



▲ *Figure 6-1. An equal-arm balance can be used to determine which of two objects is heavier.*

Demonstrate the use of the balance: Place the scissors in one pan and the crayon in the other pan. Ask, **What happened to the pans? What do you think that means?**

Students should say that the pan with the scissors went down while the pan with the crayon went up. Students might realize that the pan with the scissors went down because the scissors are heavier than the crayon.

Guiding the Activity

	Additional Information
Compare the weights of other objects in the classroom until students understand that the object that weighs more, or is heavier, always makes the pan go down.	
3 Distribute an equal-arm balance and a sorting tray of objects to each team of four and a copy of **Activity Sheet 6** to each student. Have students compare the relative weights of the different objects using the equal-arm balance and determine which object is heaviest and which is lightest. Students should record their results on their activity sheets.	*Students might need guidance with this exercise. Point out that they must compare the weight of only two objects at a time until they have determined which object is the heaviest and which is the lightest of the group. For example, to determine which object is heaviest, they should first place two objects on the balance—one in each pan. The lighter of these objects (the object whose pan goes up) should then be removed and replaced by the next object in the group. Students should continue this way until they have determined which object made the pan go down in all trials.*
After all the groups have finished weighing their objects, stimulate class discussion. Ask, **Which of the objects is the heaviest? Which is the lightest?**	*Students should say that the shell is the heaviest object while the feather is the lightest object.*
4 Next, encourage students to arrange their group of objects from lightest to heaviest.	*Students should have figured out which object is the heaviest and which is the lightest, but might need assistance figuring out the order of the objects in between. If necessary, point out to them that each object must be weighed against each other object in order to determine the relative weight of each object. Encourage them to reweigh pairs of objects as needed to determine the correct ordering of objects from lightest to heaviest.*
Students should draw a picture of each object along the line in question 3 of their activity sheets, ordering the objects from lightest to heaviest. Go over student responses once they have finished.	*Help students read the instructions on their activity sheets.*