

Activity Levers

Lab Preview

Directions: Answer these questions before you begin the Activity.

1. Why is it important to repeat steps 5 through 7 with different coins?

2. How is the length of the resistance arm of a lever measured?

Did you ever play on a seesaw? Wasn't it much easier to balance your friend on the other end if you both weighed the same? If your friend was lighter, you had to move toward the fulcrum to balance the seesaw. In this activity, you will use a lever to determine the mass of a coin.

What You'll Investigate

How can a lever measure mass?

Materials

8 1/2" × 11" sheet of paper
 coins (one quarter, one dime, one nickel)
 balance
 metric ruler

Goals

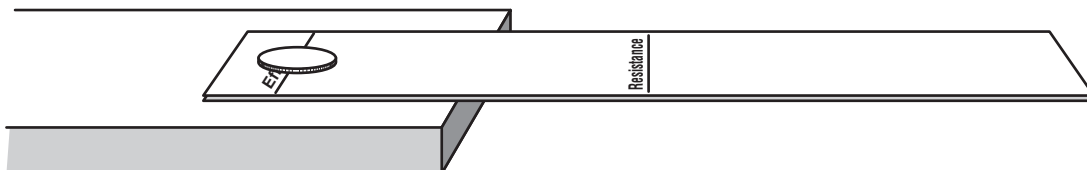
- Measure effort arm and resistance arm.
- Observe how mass can affect the fulcrum.

Safety Precautions

Procedure

1. Make a lever by folding the paper into a strip 3 cm wide by 28 cm long.
2. Mark a line 2 cm from one end of the paper strip. Label this line Resistance.

3. Slide the other end of the paper strip over the edge of a table until the strip begins to tip. Mark a line across the paper at the table edge and label this line Effort.
4. Measure the mass of the paper to the nearest 0.1 g. Write this mass on the Effort line.
5. Center a dime on the Resistance line. Locate the fulcrum by sliding the paper strip until it begins to tip. Mark the balance line. Label it Fulcrum #1.
6. **Measure** the lengths of the resistance and effort arms to the nearest 0.1 cm.
7. Calculate the IMA of the lever. Multiply the IMA by the mass of the lever to find the approximate mass of the coin.
8. Repeat steps 5 through 7 with the nickel and the quarter. Mark the fulcrum line #2 for the nickel and #3 for the quarter.



Activity (continued)**Data and Observations**

Coin	Effort (L_e)	Resistance (L_r)	IMA	Mass of Coin
Dime				
Nickel				
Quarter				

Conclude and Apply

1. What provides the effort force?

2. What does it mean if the IMA is less than 1.0?

3. The calculations are done as if the entire weight of the paper is located at what point?

4. **Infer** why mass units can be used in place of force units in this kind of problem.

Communicating Your Data

Compare your results with those of other students in your class. **For more help, refer to the Science Skill Handbook.**
