

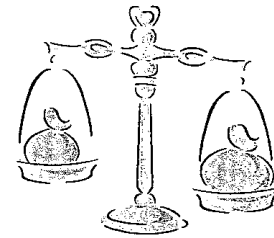
Which is Lighter?

Description: Students build a balance and use it to compare the masses of various objects.

Age Group: Upper elementary.

Estimated Time: 15 minutes

Key Questions: How can a balance be used to determine which object is lighter than a penny? How can a balance be constructed using common materials?



Content Expectations Addressed: Physical Properties- All objects and substances have physical properties that can be measured.

Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.

Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.

Reflecting on knowledge is the application of scientific knowledge to new and different situations. Reflecting on knowledge requires careful analysis of evidence that guides decision-making and the application of science through history and within society.

Teacher Information: Mass and weight are difficult concepts for students to understand. To help students understand these ideas, it is important to give them opportunities to compare different objects and answer the questions: Which is heavier? Which is lighter? Which is the same? A balance is a tool that can help them in making these observations.

In this activity, the students will construct a simple balance. They will place an object in a cup on one end of the balance and a penny in the other cup. They will observe each object to see if it is lighter, heavier or the same as the penny. The students are determining the weight of the objects in this activity by finding how light or how heavy each object is. The penny is the standard unit being used.

Science Process Skills: Collecting data, communicating, making models and measuring.

Materials: 2-8 oz. cold/hot cups, 2-3/4 oz. plastic soufflé cups, 1 rubber band, 1 ruler, 1 large crayon, 1 roll masking tape, 1 small bag containing plastic figure, washer, 1 poker chip, 1 eraser, 1 marble, 1small koosh ball, 1 paper clip, and 1 penny. Copies of chart “Which is Lighter?”

Procedure: A balance is constructed this way: Cut a small notch in the bottom lip of each cold/hot cup. Attach the crayon to the ruler by doubling the rubber band twisting it into a figure eight and folding it over. Place the crayon on the numbered side of the ruler, on the 6-inch mark. Loop one end of the rubber band

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over the crayon. The rubber band then goes under the ruler and over the other side of the crayon. The soufflé' cups are fastened to the end of the ruler with a loop of masking tape. The ruler with the crayon and cups attached is balanced on the lip of the inverted cold/hot cups with the crayon in the notches. The ruler must not touch either of the inverted cups.

Students are told to make sure their balances are balanced so that both ends of the balance are an equal distance above the desk or table. Tell them this is called zeroing their balance. The students may need assistance to zero their balances. If the balance needs adjusting, the placement of the crayon on the ruler can be moved a little bit to one side until balancing is achieved.

Students are given a bag of items to test. They look at the penny and one other item in the bag. They predict if the item will be lighter or heavier than the penny. They place the penny into one of the cups of the balance and the other object in the other cup and then determine which is heavier by observing what the balance does.

Students continue testing the items in the bag and recording their findings in the data table. Young students may simply trace the object after placing it on the correct side of the data table. Older students can write the name of the object in the appropriate space. As an extension, students may make a bar graph by coloring in one section for each object on that part of the data table.

Remind the students to be certain their balances are zeroed after they test each object. If the balance is moved, they may need to re-balance it before using it again.