

What Counts In Bounce

from Celebrating Chemistry



Do all balls bounce? Most do, but how high a ball bounces depends on the material from which it is made and the temperature of the ball. In the following activity, you will compare the bounciness of warm and cold racquetballs to see if temperature makes a difference.



SAFETY!

Be sure to follow Milli's Safety Tips and do this activity with an adult!

Do not eat or drink any of the materials used in this activity.



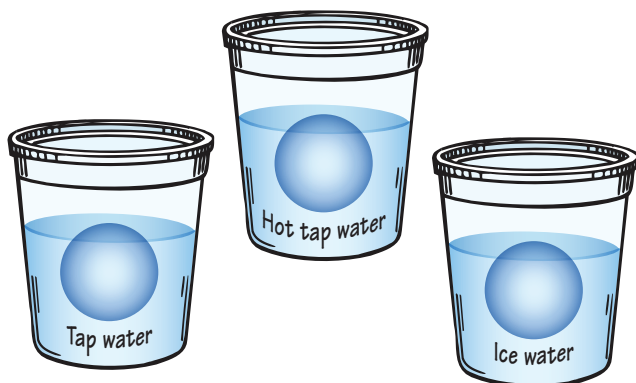
ADAPTATION

Students who are visually challenged may press the balls in their hands and feel the difference of how they feel at different temperatures.

Materials

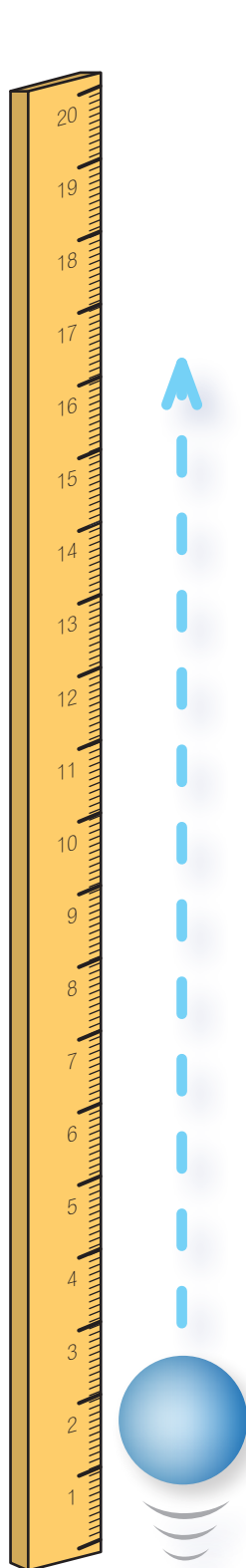
Masking Tape
Permanent marking pen
3 plastic containers (24 oz.)
Ice

Water
Hot tap water
3 racquetballs
Timer
Tongs
Measuring tape or yard stick



Procedure

1. Using the marking pen and a strip of masking tape, label one of the containers, "Ice water", label the 2nd, "Tap water" and the 3rd, "Hot tap water".
2. To the container labeled "Ice water", fill it halfway with tap water. Next add ice so that the container is $\frac{3}{4}$ full of ice and water.
3. To the container labeled, "Tap water", fill the container with tap water until it is about $\frac{3}{4}$ full.
4. To the container labeled, "Hot tap water", have an adult partner fill the container with hot tap water until it is about $\frac{3}{4}$ full.
5. Place one racquetball in each container and let it sit for at least 2 minutes. Use a timer to keep track of the time.
6. Meanwhile have your adult partner hold a measuring stick or tape with the zero end resting on the floor.
7. Using tongs, remove the ball from the "Tap water" container.
8. Hold the ball at a height of 90 cm above a hard surface and drop the ball next to the measuring stick or tape. Make sure to pay attention to how high the ball bounced.
9. In the table provided, record your result in the "What Did You Observe?" section. Place the ball back into its container.
10. Repeat steps 7-9 for the balls placed in the "Tap" and "Hot tap" water containers, respectively.
11. Thoroughly clean the work area and wash your hands.



What Did You Observe?

Ball temperature	Height (cm)
Ice water	
Tap water	
Hot tap water	

Try this...

Test how temperature affects golf balls.

Where's the Chemistry?

Balls bounce because most of them are made from some type of polymer, like rubber. The type of polymer used in a ball will determine how high, or low, a ball will bounce. The rubber polymers found in racquetballs are long, stringy, and closely coiled to each other. It is that coiled shape that gives a ball its ability to spring into the air. When the temperature of a ball is cooled, the polymer loses its coiled shape and becomes straighter and less springy. Warm up a ball and its polymers become even more coiled than at room temperature.

The American Chemical Society develops materials for elementary school age children to spark their interest in science and teach developmentally appropriate chemistry concepts. The Activities for Children collection includes hands-on activities, articles, puzzles, and games on topics related to children's everyday experiences.

The collection can be used to supplement the science curriculum, celebrate National Chemistry Week, develop Chemists Celebrate Earth Day events, invite children to give science a try at a large event, or to explore just for fun at home.

Find more activities, articles, puzzles and games at **www.acs.org/kids**.

Safety Tips

This activity is intended for elementary school children under the direct supervision of an adult. The American Chemical Society cannot be responsible for any accidents or injuries that may result from conducting the activities without proper supervision, from not specifically following directions, or from ignoring the cautions contained in the text.

Always:

- Work with an adult.
- Read and follow all directions for the activity.
- Read all warning labels on all materials being used.
- Wear eye protection.
- Follow safety warnings or precautions, such as wearing gloves or tying back long hair.
- Use all materials carefully, following the directions given.
- Be sure to clean up and dispose of materials properly when you are finished with an activity.
- Wash your hands well after every activity.

Never:

- **Never** eat or drink while conducting an experiment, and be careful to keep all of the materials used away from your mouth, nose, and eyes!
- **Never** experiment on your own!

For more detailed information on safety go to www.acs.org/education and click on "Safety Guidelines"