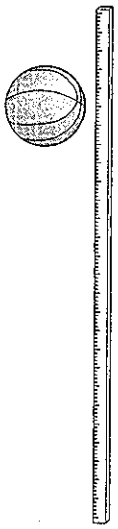
Name_____ Date_____

Ball Bounce



Science Potential energy is changed to kinetic energy when a ball bounces.

Stuff Basketball; yardstick; tennis ball; golf ball; baseball; soccer ball

What to Do

1. Hold a basketball so that the top of the basketball is 36 inches above an asphalt or cement surface. Drop the basketball. Have a partner measure how high the top of the basketball reaches after it bounces one time. Repeat this step two times, and find the average height that the basketball reaches after one bounce.
2. Repeat step 1 using the tennis ball, golf ball, baseball, and soccer ball.
3. Repeat the entire activity on grass.

What's Going On Here

When you hold the basketball above the ground, it has potential energy due to its height. That potential energy is changed to kinetic energy (energy of motion) as the ball speeds up when it falls to the ground. The potential energy is greatest when you are holding the ball above the ground. The kinetic energy is greatest just before it hits the ground. When the ball hits the ground, the ball is compressed at the point of impact. The ball then has *elastic potential energy.* That elastic potential energy is changed to kinetic energy when the ball bounces back up. The kinetic energy of the ball changes to potential energy and is greatest when the ball is at the highest point of its first bounce. The ball doesn't reach its initial height because some energy has been dissipated as sound energy (when you hear the ball's impact on the surface) and heat energy (when the ball comes in contact with the surface, friction causes the surface and the ball to become heated). Different balls will bounce to different heights because of the way they were made. When you bounce the balls in the grass, they do not bounce as high. The balls are not as easily compressed on a soft surface, so they do not acquire as much elastic potential energy.