Curiosity Guide #405
Basketball Science

Accompanies Curious Crew, Season 4, Episode 5 (#405)

Layup Angles

Investigation #4

Description

Use science to perfect your layup shot!

Materials

- Basketball
- Basketball hoop with a backboard

Procedure

1. Stand about 3 feet away from the basketball hoop. Try to bounce the ball off the backboard and into the hoop.
2. How can you use the square marked on the backboard to help you?
3. Try aiming for different parts of the square and testing your results.
4. Which part of the square leads to the most baskets?
5. Now try adding different spins to the ball. How does that change the result?

My Results

Explanation

When a basketball collides with the backboard, there is an elastic collision, which causes the ball to bounce off the backboard. This relates to Newton's third law of motion, that says every action produces an equal and opposite reaction. The ball pushes on the backboard, and the backboard pushes back on the ball. At the same time, the ball is moving in a sideways angle. Whatever angle the ball hits the backboard will be the same angle the ball bounces off. This is called the law of reflection. The white square printed on the backboard is designed to help a player focus on the rim from a distance, but also provides a target for a bank shot, a shot where the ball bounces off the backboard. A good layup gently bounces off the backboard, often hitting the lower corner of the square, before rebounding back into the hoop. A slight spin on the ball can help direct the ball when the ball strikes further out on the backboard. A well-done spin can also slow the ball down.

Think about this: There is a lot of science in a good bounce pass! Making sure that the ball hits the floor at the right angle and with the right spin is important. You also have to throw the basketball hard enough to have good energy coming out of the bounce. This is because some of the kinetic energy, the energy of motion, changes into heat energy when the ball collides with the floor. When passing through the air, be sure to step into the pass and throw the basketball with a slight upward force to be sure the ball has enough energy to get to your teammate. Great pass!

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