Reflect

Imagine a bowling ball rolling very slowly down a bowling alley. Now imagine the same bowling ball rolling very quickly down a bowling alley. Will the slow- moving bowling ball or the fast-moving bowling ball knock over more pins? Why do you think so?

It may not be pleasant to think about, but chances are we have all been hit by a ball, a water balloon, or something else while playing with our friends. Picture yourself being accidentally hit by a basketball while playing. Would you rather be hit by a slow-moving basketball or a fast-moving basketball? Why?

Chances are you would rather be hit by a slow-moving basketball. A slow-moving basketball will likely hurt much less than a fast-moving basketball. Do you know why?

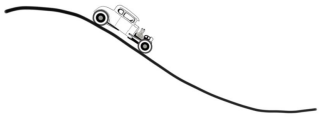
Speed and energy are related.

The slow-moving basketball will likely hurt less because it has less energy. There is a relationship between speed and energy.

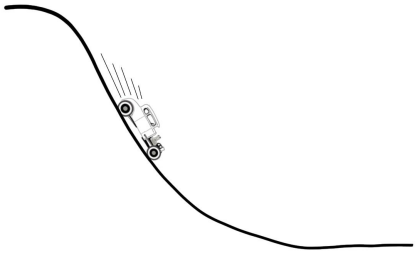
If two objects have the same mass, then the object moving quickly has more energy than the object moving slowly.

What Do You Think?

Look at the two pictures below. In which picture do you think the car has the most energy? Why do you think so? Go to the next page for the answer.



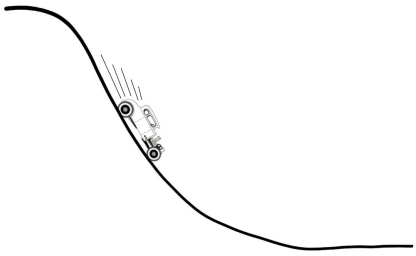
A



B

What Do You Think?

The car in image B will have the most energy. As we know, the faster an object moves, the more energy it has. Since car B is moving faster than can A, it will have the most energy.



Now think back to our original bowling ball example. Do you think the fast-moving or the slow-moving bowling ball will do the most damage to the pins?

If you said the fast-moving bowling ball would do the most damage to the pins, you are correct. If everything else stays the same, such as the mass of the bowling ball and the mass of the pins, then the fast-moving bowling ball will have more energy than the slow-moving bowling ball and will likely knock down more pins.

Try Now

Read each pair of statements and circle the one you think describes the object with the most energy.

1. A racecar on a race track moving 20 miles per hour,
   OR
   An identical racecar moving 40 miles per hour.

2. A skydiver that is falling at 80 kilometers per hour,
   OR
   The same skydiver falling at 95 kilometers per hour.

3. A baseball thrown by a professional baseball pitcher,
   OR
   A baseball thrown by a child.

Connecting With Your Child

Marbles and Ramps

To help your child recognize the relationship between speed an energy, you can conduct a simple investigation.

Materials

- Books or something to stack in order to build a small ramp
- Marble
- Ruler or something to roll the marble down
- An object for the rolling marble to hit and push, such as a paper cup

Begin by building a simple ramp using the books and ruler. Place the paper cup in the path the marble will travel after it rolls down the ramp. Place the marble near the bottom of the ramp and let it go so that it runs into the paper cup and pushes it. Ask your child to make a prediction about what will happen if the marble is released from the middle of the ramp. Will it push the paper cup a shorter distance, the same distance, or a farther distance? Try it and see. Then repeat the process while holding the marble near the top of the ramp and releasing it.

Assuming that everything else stays the same, when the marble is released from higher up on the ruler, it should push the paper cup farther than when it is released from lower on the ramp.

Here are some questions to discuss with your child:

- In which situation does the marble have more speed, when released from the top of the ramp or when released from a lower point on the ramp?
- In which situation does the marble have more energy, when released from the top of the ramp or when released from a lower point on the ramp?
- How is energy of the marble related to speed of the marble in each situation?