



## Curiosity Guide #403

### Kinetic Energy

Accompanies Curious Crew, Season 4, Episode 3 (#403)

#### Wind-Up Toy

Investigation #2

#### Description

How is a wind-up toy like a tape measure?

#### Materials

- Wind-up toy
- Retractable tape measure

#### Procedure

1. Wind up the toy car and place it on the table.
2. Let the car go.
3. Stretch out the tape measure so that the tape is locked open with 3 to 4 feet sticking out.
4. Unlock the tape so that the tape rolls itself up.
5. How are the two objects related?

#### My Results

## Explanation

When the key of a wind-up toy is turned, the key rotates a coiled spring. The spring normally looks like a wide spiral of circles, but when the key is turned, the spiral spins in on itself, getting smaller. The winding action adds potential energy into the coiling spring. When the toy is released, the spring unwinds, turning a gear, which is usually attached to wheels. Some toys have no key but can be wound by pushing the toy backwards. As the wheels turn backward, the wheels compress the coil spring.

The measuring tape works in a similar way. Pulling the tape out tightens a coil spring. When the tape is let go, the coil spring expands again and pulls the tape measure back inside.

**Think about this!** Whenever something is moving, we say the object has kinetic energy. That might include objects that people *make* move, like when we drive a car or throw a baseball. But there are many natural examples of kinetic energy too, like a flowing river, the wind, even rotating planets or moving electrons. Imagine a tree leaning way over. Well, if the tree isn't moving, then it has potential energy from gravity pulling down on it. If the tree were to fall, that potential energy would change into kinetic energy once the tree was moving.

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