

# Friction

Running Time: 26 Minutes

## Nifty questions in this episode:

- What is friction?
- What causes heat?
- Do skates create friction on ice?

## Awesome answers:

- Friction is the force resisting motion when things rub on each other.
- Friction generates energy (e.g., rubbing hands together causes heat).
- Skates do not create friction on ice. Tiny water droplets form between the blades and the ice, which makes the surface slippery.

## Experiments shown on the video:

### HOVER CRAFT

**Objective:** To design an object that will hover over a flat surface on a cushion of air.

- Cut a 15-centimeter circle out of heavy cardboard.
- Glue a plastic bottle cap to the center of the cardboard circle (open end of the cap glued down) and place the circle on a flat surface.
- Punch a hole in the top of the cap and through the cardboard with a large nail.
- Blow up a balloon and twist the end.
- Slip the end of the balloon over the cap and release.
- The cardboard will hover above the flat surface on a layer of air.

## More interesting stuff to do:

### A FRICTIONAL BRICK

**Objective:** To determine the amount of force needed to pull bricks over different surfaces.

- Use approximately one meter of string. Tie the string around a brick lengthwise. Make a loop in the end of the string, leaving about 20 centimeters of string hanging.
- Measure the weight of the brick using a spring scale (in ounces, pounds, or grams.)
- Hook the end of the spring scale through the loop on the string. Hold the other end of the scale and pull the brick on a glass surface.
- Using the reading on the spring scale, record the amount of force needed to start the brick moving and to keep it moving.
- Make a chart to list different surfaces, different amounts of bricks, and different force measurements.
- Repeat the same test on a carpet and a linoleum or cement floor; record the test data.
- Place two bricks on top of the first brick and repeat the first trial procedure.
- Repeat the process, using one brick on top of twelve straws on a wooden or cement surface; record all data.
- Create your own test, using bricks for comparison on different surfaces (grass, cardboard, tile, etc.).
- Do the various surfaces determine the amount of friction generated?

### ROLLON

**Objective:** To observe how friction affects the rolling resistance on different surfaces.

- Use a basketball, playground ball, and volleyball, each of which will hold between 8 and 13 pounds of air pressure.
- Use an inflation needle, ball pump, and an air pressure gauge to maintain the correct air pressure.
- Roll each ball on each of three different surfaces — carpet, linoleum or cement, and grass—for 20 meters.
- Record the time (in seconds) that it takes each ball to travel 20 meters on all three surfaces.
- Release 2 pounds of air pressure after each trial; repeat this step for all surfaces.
- Keep repeating the trials until all the air in each ball is exhausted.
- Record the data from all trial surfaces.
- How is the rolling resistance of each ball affected by the surface on which the ball is rolling, the texture of the ball's surface, and the amount of air pressure in each ball? Explain, using data from the trials to support your conclusions.

 closed-captioned



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