

Friction

By Sharon Fabian

What is the difference between socks and sneakers? OK -- there are a lot of differences, but one difference is that sneakers have a lot more friction than socks. In your socks, you can get a running start and slide a long way down the hall. In your sneakers, you can get a running start and . . . stick to the floor!

Friction is the force that happens when two things rub together. The effect of friction is usually to slow you down. With less friction, you can move more easily. With more friction, you have to work harder to move the same distance, because the friction slows you down.

Friction can be useful. Sometimes you want sneakers that grip the floor. The friction caused by the soles of your sneakers is good for running track and for playing basketball. Friction is very useful on items such as snow tires.

Friction can also get in the way. Often it is the force that people are trying to overcome. If you think about the different ways that people have traveled, you will see that anything that reduces friction makes travel easier and faster. Wheels reduce a vehicle's contact with the ground and so reduce friction. A smooth surface produces less friction than a rough one, on smooth racecar tires for example. Oil is used to reduce friction in a vehicle's engine. Ball bearings reduce friction too.

Another way that people try to travel with less friction is by not traveling on the ground at all. Boats avoid the friction of traveling on the ground, but they have their own friction to deal with because contact with water causes another type of friction called fluid friction. The fastest boats ride high in the water; the less contact with the water the less friction. Airplanes and helicopters avoid the friction of land travel too, but they have a different force to fight, gravity.

One of the newest kinds of transportation built to avoid friction is the maglev train. Maglev is short for magnetic levitation. A maglev train is an amazing vehicle. It doesn't touch the ground at all! It is suspended, or levitated, in the air above the track by magnetic force. Magnets in the track and magnets in the train repel each other, keeping the train levitated in the air just a little bit above the track. People started experimenting with magnetic levitation in the 1960s. Now several countries are working on projects to develop maglev trains to use for public transportation. Germany is leading the way with its Transrapid system. Japan is also developing maglev technology and so is the United States. California and Maryland are two states that are working on maglev projects. Maglev trains will be able to travel up to 300 miles per hour. They use complicated technology that involves such things as coils, amplifiers, and negative feedback as well as magnetism.

With a little research, you should be able to find directions for a project to build a simple model of a maglev track. It is not a really easy project; it will take some work, and a lot of magnets! But it might be a lot of fun to try out a new way to fight the force of friction.



Name _____



Date _____

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Questions

- _____ 1. The force that happens when two things rub together is called
- A. electricity
 - B. gravity
 - C. magnetism
 - D. friction
- _____ 2. Friction is
- A. useful
 - B. a problem
 - C. a force
 - D. all of the above
- _____ 3. One way to reduce friction is to reduce the amount of contact with the ground.
- A. False
 - B. True
- _____ 4. One way to reduce friction is to use rough surfaces.
- A. True
 - B. False
- _____ 5. One way to reduce friction is to use a lubricant such as oil.
- A. False
 - B. True
- _____ 6. Boats have no friction because they do not travel on the ground.
- A. True
 - B. False
- _____ 7. A maglev train
- A. has wheels that run on rails
 - B. has only one big wheel
 - C. is levitated above the tracks by magnetism
 - D. runs in water
8. Reducing friction is important in the moving parts of machinery. Can you give an example?
