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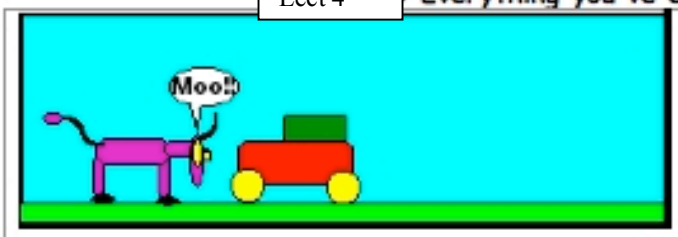
Lect 4

Everything you've ever wanted to know about Friction

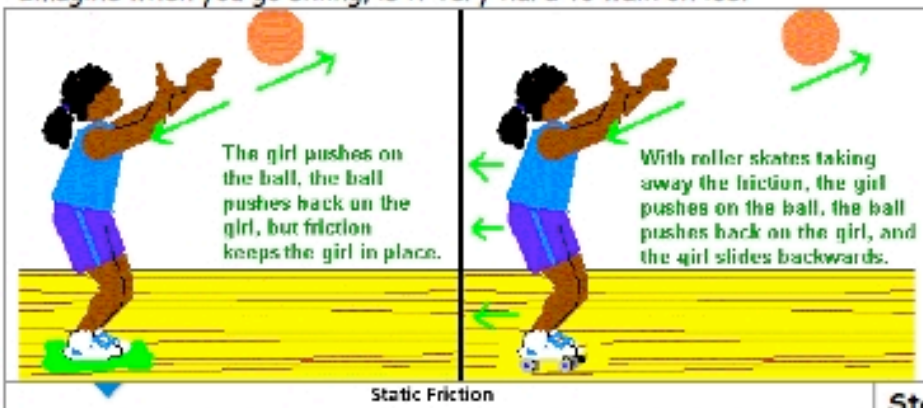


The Lucky Cow : In this animation, the driver of the car applies the brakes to avoid hitting the cow. But how does this cause the car to slow down and stop? The brakes cause the wheels to stop turning and to slide on the road surface. This action produces a force that resists the forward movement of the car. This force is called _____

Friction is a force _____.

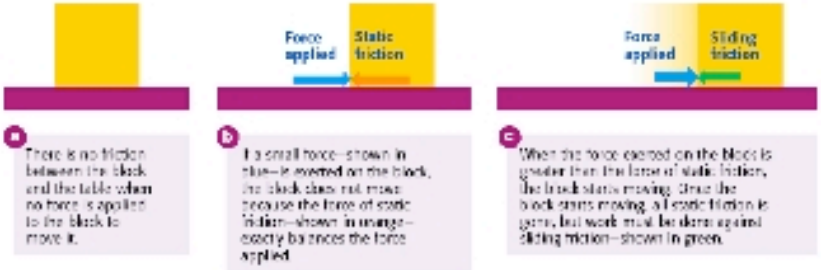
You may be used to seeing moving objects slow down and stop once the force pushing or pulling the objects is removed. For example a wagon will stop moving once you stop pulling it. A ball will stop moving once it is caught. What you may not realize is that there are many forces acting upon objects that affect movement. Friction is one of these. Friction occurs when two objects are rubbed together. The bumps of one surface catch and hook into the bumps of the other surface. When the surfaces stick together, the motion between the objects slows down and stops. Frictional forces make it possible for us to walk, hold balls, open jars, and ride bikes. Lots of friction helps _____ (cleats on soccer shoes help the shoes grip the ground), while little friction _____ _____ (moving over a smooth surface like a slide). Most motion on earth involves friction. A ball rolling on a level floor will eventually stop because the floor pushes against the ball and creates friction. When you play baseball and slide into a base, you stop because of friction between you and the earth. If there were no friction you would slide right on over the base.

It is the force of friction that _____Many people think that it is a nuisance because it has causes us to apply a greater force to move an object. But in fact, it is of great help to us. **If there is no friction, then cars cannot move on the road and we can hardly even walk.** Imagine when you go skiing, is it very hard to walk on ice?



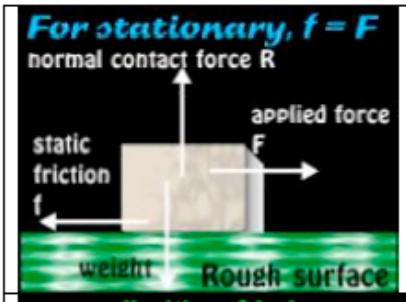
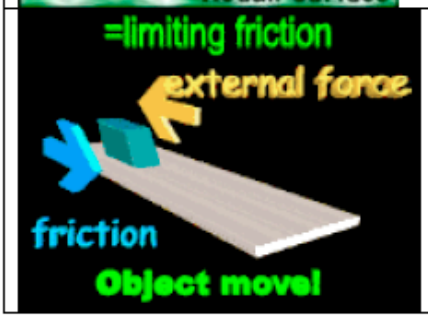
Frictional forces act along the common surfaces between two bodies in contact so as to resist the relative motion of the two bodies. The frictions involved form an _____ _____

Static Friction



Static friction

In the figure below, a horizontal force is applied to a body with an intention to move it to the right-side, as long as the body is at rest, the frictional force is equal to the applied force and directs to the left-side (opposite direction of motion) resisting the motion. The friction is _____

	If applied force is increased, the frictional force will also increase until it reaches the _____. As the applied force increases further, the body will begin to move. The limiting frictional force is independent of the applied force but depends on the nature of the surfaces and the normal contact force.
	This figure shows that object begin to move if the applied force is larger than the limiting friction. Before that, the frictional force increased with the applied force. _____: Once the body starts to move, the frictional force would fall to a smaller value compare with the static frictional force. This frictional force remains constant even the applied force is increased further.

A plane and it's friction experience **Sliding friction = HEAT**
_____The friction between the wheels and the ground is an example of rolling friction. The force of rolling friction is usually less than the force of sliding friction
_____opposes the motion of objects traveling through a fluid
Remember that fluids _____, water, milk and air are ALL fluids

Bill Nye Video: Friction

1. What is friction?

2. Explain why the Triangular Weight doesn't slide down the tilted Friction Ramp of Science even though gravity is pulling it down.

3. What causes heat?

4. Why do athletes often have spikes on their shoes?

5. Do skates & skis create friction? Explain.

6. Why is a round bowling ball better than a square bowling ball?

7. Does air have friction? Does water?

8. How does mucus help a slug move?

9. Give 5 examples of friction