Bill Nye: Friction

Friction Introduction:

Friction happens when things rub together

Friction is everywhere slows comb down holds knots together

Friction is the force we feel when things rub together

If there is less friction things slide more easily

Friction slows down moving things and turns moving energy into heat energy

Friction is created whenever things rub together

Friction is everywhere even in space because there are a few gas molecules and gravity

Experiment #1 - Rub a wooden box back and forth on a wooden board. It takes a lot of energy, but much of the motion energy is turned into heat. The board has gotten warm, so has the bottom of the box.

Fingerprints are rough edges and they let you hold on to things coins have rough edges so you can

Experiment #2 - Hovercraft -boat that floats on a layer of air above the water moves easily because there is very little friction Make your own hovercraft thread spool circle of cardboard balloon and glue. Cut out a round piece of cardboard and put a hole in the cardboard. Glue the spool over the hole. Fill the balloon and put it over the spool. The escaping air makes a cushion of air for the circle to hover on.

Shoes (or not) and Friction

Football cleats create friction with the ground so you can turn easily

Basketball shoes are made of rubber and rubber creates a lot of friction on hardwood

Ice skates create a thin layer of water and the blade glides across

Leather dance shoes allow you to control your movement on the dance floor they are smooth but stick a little to give you the control

Barefoot skiing- A person tries to minimize friction to go fast, but friction between your feet and the water makes your feet hurt after a while. Don't hit face first. It hurts.

Experiment #3 - Fire stick-Make a bow with string to spin a dowel against a piece of wood. The fast rubbing creates enough heat to start tinder on fire. Skiing a very thin layer of water forms and reduces friction

A World Without Friction *- A world without friction would be dangerous Brakes wouldn't work-No dancing*

Experiment #4 -Ball bearings reduce friction example book on marbles vs. just sliding across concrete- roller blades, bike wheels

Bikes are all about friction- Reduce friction(wheels spin, steering moves, grease on chain. Increase friction (Braking you want to increase friction, rubber tires on ground, water bottle in holder, hands on handle bars
Bowling- the ball is smooth and the floor is smooth it does stick a bit, but the spherical shape of the ball lets it roll which reduces friction
Trains- you need friction to get it started you need to reduce friction so it rolls easily
Space craft- you wouldn't think air has much friction, 30,000 kilometers per hour but the Apollo XVII heated up to red hot when it reentered the atmosphere, some parts were burned away friction slowed it down.
Fish are smooth and slippery so they can move smoothly through water with very little friction
Joints have liquid to reduce friction
Crickets make their music by rubbing their wings together
Slugs- the mucus they create all over their bodies is very sticky and creates friction to hold the slug up on things, but it is also slipper so it reduces friction. They are sticky and slippery at the same time.
Wind tunnel- scientists use it to help reduce air or water friction, try to make planes have air flow smoothly to use less fuel - fish a very smooth to reduce friction in water. Should trucks be that shape to reduce air friction? It would make less drag. They would save energy
Experiment #5 - box with balloon inside Blow up the balloon inside the box. Put the box on bunch of straws. As the balloon lets out air, the box slides easily across the straws and falls off the table.
Concluding thoughts:

- Friction works in solid liquid or gas - everywhere
- Friction makes heat
- Friction changes energy of motion into heat!
- When things touch and meet friction happens