Warm-up

Is friction occurring when you are playing indoor soccer? Explain your answer.

Yes, between the ball and ground, ball and foot, feet and ground, ball and net... and the list goes on!

Friction always causes 3 things to occur: (USE THE HINTS AT THE BOTTOM TO HELP!)

- Produces heat
- Slows objects down
- Wears down surfaces

Rub your hands together... what do you feel?

Check the soles of your shoes, what do you see?

What do brakes do for a bike and car?
Friction
What do all of these activities have in common?

Rolling Friction
Rolling Friction

- **Rolling friction** is friction that occurs between surfaces in motion in which one of the surfaces is a wheel, roller, or ball.

Examples:
- Riding a bike – tires and ground
- Bowling – ball and lane
What do you notice about all of these items?
Static Friction

- **Static friction** is friction that occurs when the surfaces in contact are at rest (not in motion).

- **Examples:**
  - A book resting on a desk.
  - A potted plant sitting on a sidewalk.
What do all of these activities have in common?

- Ice Hockey
- Curling
- Shuffleboard

Sliding Friction
Sliding Friction

- **Sliding friction** is friction that occurs when solid surfaces slide over one another.

- **Examples:**
  - Writing – pencil point and paper
  - Combing your hair – surface of comb and strands of hair

ROLLING friction is usually LESS than sliding friction.
What do all of these activities have in common?

- Air Hockey
- Water Skiing
- Hang Gliding
- Wind Sailing

Fluid Friction
Fluid friction is friction that occurs when objects move across or through a fluid.

Examples:

- Swimming – swimmer’s body and surface of water
- Greasing a squeaky door hinge – now the 2 hinge parts are sliding across a fluid (the grease)
Check for Understanding

Which type of friction is it?

- Pulling a wagon.
- Swimming in the ocean.
- Pushing a box across the floor.
- A vase sitting on a table.
- Riding a bike.
- A seagull soaring through the air.
Fluid Friction

- **Air resistance** is an example of fluid friction caused by the particles that make up air.
- It causes a falling object to slow down.

**Examples:**
- Throwing a frisbee – frisbee is slowed down by air resistance
- Skydiving – parachute is slowed down by air resistance
Fluid Friction cont.

- FLUID friction is usually LESS than sliding friction.
- Lubricants change sliding friction to fluid friction.
- **Lubricants** are slippery substances.

- **Grease** for motor parts in a car
- **Cooking oil** so food won’t stick to bottom of pan
- **Wax** on bottom of surf board to make it move faster through water
Which type of friction is this picture an example of?

Rolling Friction
Which type of friction is this picture an example of?

Fluid Friction
Which type of friction is this picture an example of?

Sliding Friction
Which type of friction is this picture an example of?

Static Friction
Which type of friction is this picture an example of?

Sliding Friction
Which type of friction is this picture an example of?

Fluid Friction
Which type of friction is this picture an example of?

Rolling Friction
Which type of friction is this picture an example of?

Static Friction
Which type of friction is this picture an example of?

Sliding Friction
Which type of friction is this picture an example of?

Rolling Friction
Wrap-up

What kind of friction is occurring between a pencil and desktop when you flick the pencil? ______rolling____

Which has more friction? Sliding or Fluid friction? ____________

Which affect of friction can you feel on a tire after you rode it for 20 minutes? __________

Friction from the rubber soles of your shoes and the floor allows you to do what when playing basketball or indoor soccer? (an affect of friction) ______Slow down and stop____

Because of which affect of friction makes you have to sharpen your pencil after writing with it for a while? ______Wearing away____