Notes: Friction

Friction

- Friction is a Force that always pushes _____ an object when it touches another object.
- When _____ things are in contact with each other, there will be friction acting between them.
- High friction (_____ friction) – will slow something down
- Low friction (_____ friction) – will keep things moving

High friction or Low friction?

Ski's on the snow	Car tire	Brakes on a bike
Water on a slide	Pencil and eraser	

How can we reduce the friction between two objects?

- Reduce the _____ by using rollers/ball-bearings/wheels
- Change the _____ that are touching by using lubrication eg. Oil
- Create a _____
    - Eg. Like a _____ or _____

Types of friction

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-
-
-

Static

- Friction that acts on something that is _____
- Piano is held in place by static friction
- Static friction keeps you in your seat
- No _____ or _____ is generated

Kinetic

- Force resulting when _____ or _____ an object over a surface.
- Moving day—pushing a box across the floor
- _____ and _____ can result

Rolling

- Contact is _____ because of rollers or wheels or ball bearings.
- Skate boards have ball bearings in the wheels.
- A cart has wheels.
- _____and _____ will result.

Fluid friction

- _____ from a "liquid" or _____.
- Stirring a thick batter
- Walking through water
- Olympic bike riders

"Fluid" Friction

- This type of friction is what happens with liquids and gases *(In Physics, liquids and gases are both called "fluids". They behave in similar ways.)*
- Fluid friction is also known as _____. On aircraft it's also called _____.

  It depends on:
  - how _____ the fluid is (its "viscosity")
  - the _____ of the object
  - the _____ of the object

Mu

- is the _____ of friction.
- Kinetic friction formula:
  - $f_k=\mu_k F_N$
- Static friction formula:
  - $f_s=\mu_s F_N$

Typical values of Mu	
Wood on wood	.25-.5
Glass on glass	.9-1.0
Steel on steel	.6
Steel on steel with oil	.09
Rubber on dry pavement	1.0
Ski on snow	.04
Teflon on teflon	.04

Practice Problem 1
What is the force due to friction for an object that has a Normal force of 25 N and is pushed along a surface with a friction coefficient of .42?

Practice Problem 2
What is the force due to friction for an object that has a mass of 15 kg and is pushed along a surface with a friction coefficient of .27?