Today we learn about:

Why friction is a drag,
but still our friend.

How weight and mass are inter-related.

How to calculate the coefficient of sliding friction!

First we'll look at mass and weight! Mass is how much stuff is in an object, weight is how hard gravity pulls on that stuff! Mass' unit is kg, while weight is clearly a force (pulls!) and so is in _____.

F = ma becomes W = mg

W is a type of F, and "g" is a type of "a"

So W = mg is a special version of F = ma.

My mass is 82.6 kg… what is my weight in Newtons?

The - means down, but what other way can weight push?, so saying down or - is not mandatory in an answer.

Anything that opposes motion is called: **Friction**!

There are three basic types of friction:

1. _____ friction occurs when two solids rub against each other during motion.
2. _____ friction occurs when one of the solids is round!
3. _____ friction occurs when there is a layer of liquid or gas between the solids.

To accurately solve for both rolling and fluid friction you need calculus!

With sliding friction, on the other hand, you just need to know two things:

1. How rough the surfaces are, called the coefficient of sliding friction (μ), and
2. How hard they are shoved into each other, called the Normal Force (F_N)

On a horizontal surface

$F_N = |W|$

The formula is therefore:

$$F_f = \mu F_N$$

or

$$F_f = \mu mg$$

F_f = the force caused by friction
μ = the coefficient of sliding friction
F_N = the Normal Force

Ben drags Sonia across the floor at a constant speed by her hair. If her mass is 55 kg, and the μ between her and the floor is .2894, how much force is Ben applying to her hair?

We know:

Angelica needs a 93 N force to push a 179 N box across the floor at a constant speed. What is the coefficient of sliding friction between the box and the floor?

We know: