A. Why is it more difficult to do a pull-up with 1 arm than 2 arms?

B. If you weigh 700N, How much force is in 1 arm vs. 2 arms?

# Tension

When a flexible cord pulls on an object

If the cord is massless, the **tension will be same** along its entire length

If pulleys are involved, assume they are **massless** and **frictionless**

Ropes and cords can only **pull**

Force always acts along (**parallel to**) the rope or cord

Bowser is using pulleys to lift a block to the top of his castle. He is using a rope looped over 2 pulleys. How much of the block's 2000kg mass does he have to pull on the rope?
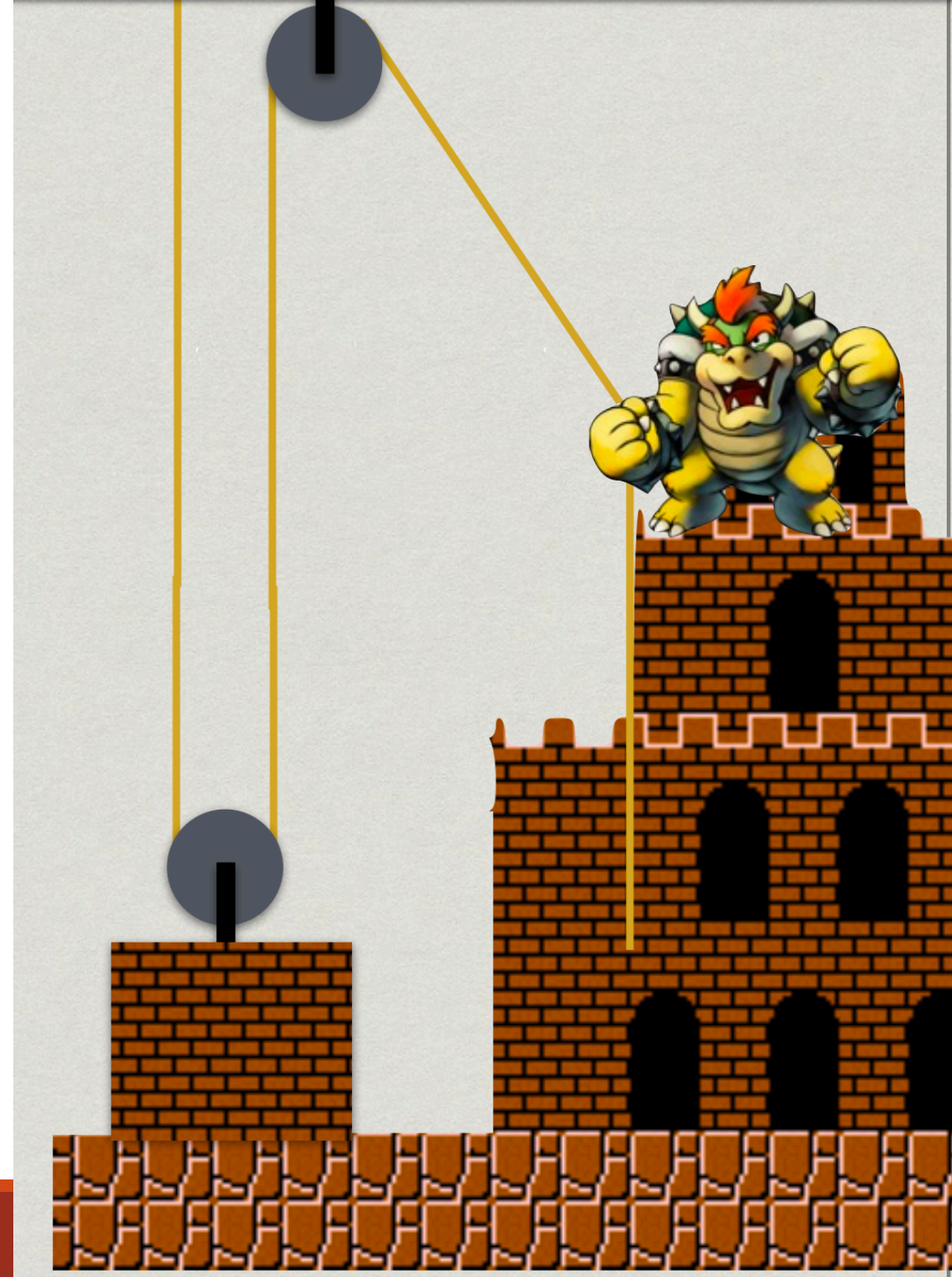
# "Normal" Forces and Frictional Forces

**Friction Force = Normal Force × (coefficient of friction)**

$$F_{friction} = \mu \cdot F_{normal}$$

**Force From Ramp**

**Decompose Vector**

**Weight of block**
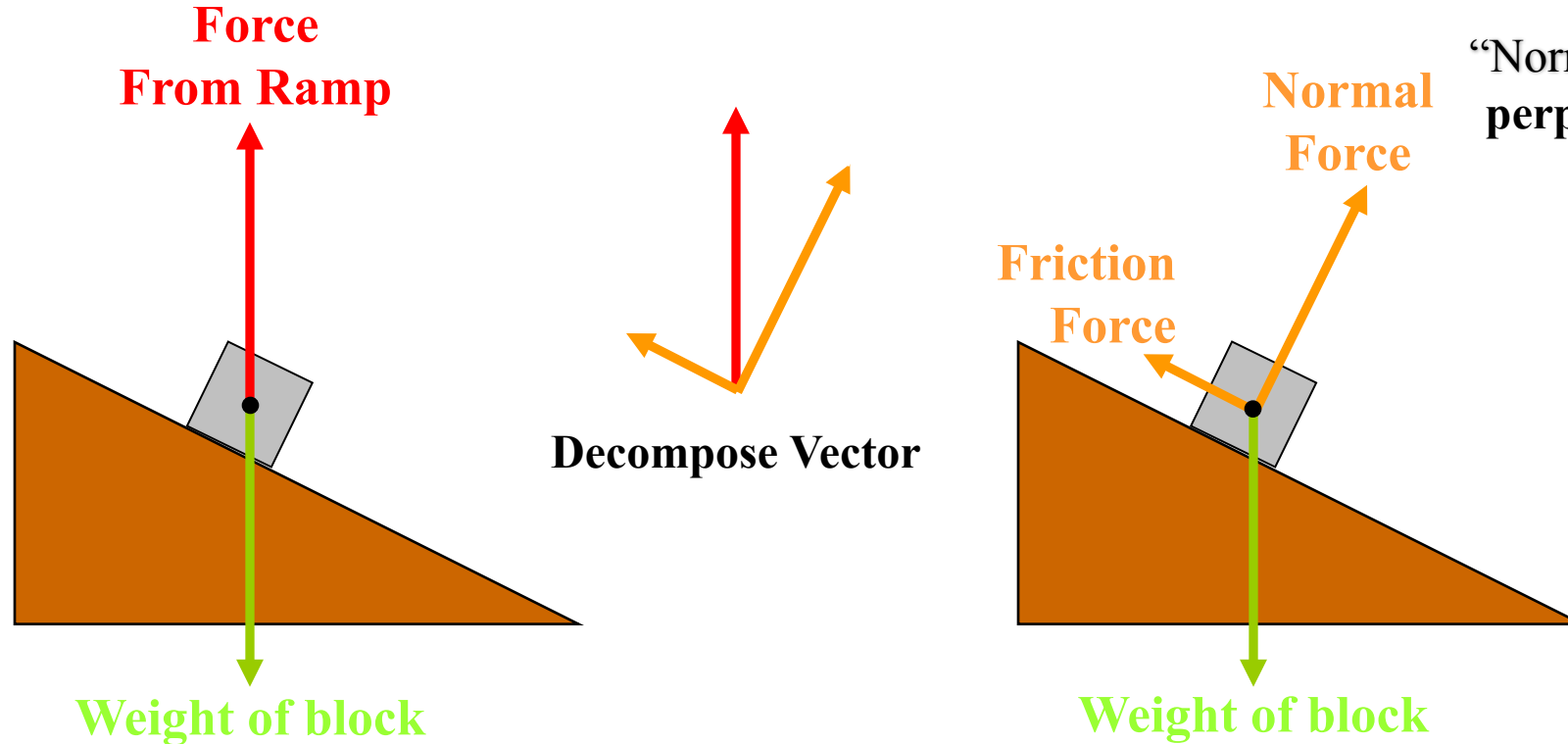
**"Normal" means perpendicular**

**Normal Force**

**Friction Force**

**Weight of block**

# Problem Solving for Forces

1. Draw a FBD for each object involved

2. Identify the forces in both directions and make a net force equation

3. Is either direction in equilibrium? (a = 0, $F_{net}$ = 0)

Are there ways we can simplify the equation?

4. Plug and chug!

Determine the coefficient of kinetic friction of a penguin slipping on flat seaweed if its mass is 21.8 kg and force due to friction is 18.9 N

◦0.08

Maria is sliding down a bannister. If she has a mass of 45 kg and the coefficient of kinetic friction between Maria's PJs and the bannister is 0.20, what is the force due to friction impeding her motion down the bannister?

◦76 N