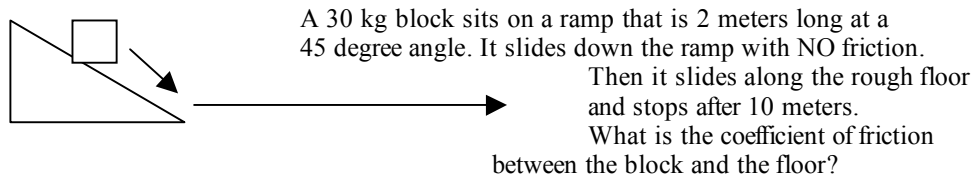


## FORCES REVIEW

Try this problem:



FIRST:

2 parts: ramp and floor

Ramp:

Mass of block=30 kg

Weight of block= $W=mg=30 \times 9.8=294$  N

Parallel force down ramp= $W \sin = 294 \times \sin 45 = 207.89$  N

Acceleration=  $F_{net}=F_{parallel}=207.89=ma$ ,  $207.89=30 \times a$ ,  $a=207.89/30=6.93$  m/s<sup>2</sup>

Distance= 2

Initial velocity=0

Final velocity=  $\sqrt{2 \times a \times D} = \sqrt{2 \times 6.93 \times 2} = 5.26$  m/s

Floor:

Initial velocity= 5.26 m/s

Final velocity= 0

Weight of block= 294 N

Normal force= 294 N

Distance= 10 m

Deceleration=  $V_i^2/2D = 5.26^2/(2 \times 10) = -1.386$  m/s<sup>2</sup>

Force friction= $F_{net}=mA=30 \times 1.389=41.6$  N= $uF_n = u(294)$

Coefficient of friction=  $41.6/294=.14$

For test:

What factors affect the force of air resistance? Surface area, Mass, velocity, air properties

What is terminal velocity and what does it depend on? When air resistance = force of gravity

Describe the path of a brick thrown at an angle of 45 degrees into the air with air resistance that then lands and skids on the ground.

Describe how to draw a force diagram for moving objects.

Describe the relationship between mass, weight, and acceleration due to gravity.

If an object is moving at a constant speed describe the forces acting on it.  $F_{net} = 0$

How are the properties of static and starting friction related?

Explain, using Newton's 2<sup>nd</sup> law, why giving with a baseball pitch hurts your hand less. More time, less acceleration, so less force  $F=ma=m \times v/t$

Describe Newton's 1<sup>st</sup> law.

Describe the forces, motion, and acceleration of two objects pushing each other, and what it depends on.

Describe the four fundamental forces, their range, strength, and how we perceive them in everyday life. Gravity, electromagnetic, strong, weak

Describe how scientists study fundamental forces.

Describe the normal force and how to calculate it.  $F_n$  = force push back, usually weight

Describe how to calculate the coefficient of friction.  $=F_f/F_N$

Describe how to calculate the acceleration of an object moving horizontally with friction, a push, and gravity acting on it.  $F_{net}=ma$  so  $a=F_{net}/m$   $F_{net}=F_p-F_f$ ,  $F_f=u F_N$ ,  $F_N=W=mg$

Describe how to calculate the coefficient of friction of an object moving at a constant speed down a ramp.  $\tan \theta$

Explain why the coefficient of friction does NOT depend on the mass or surface area of an object.