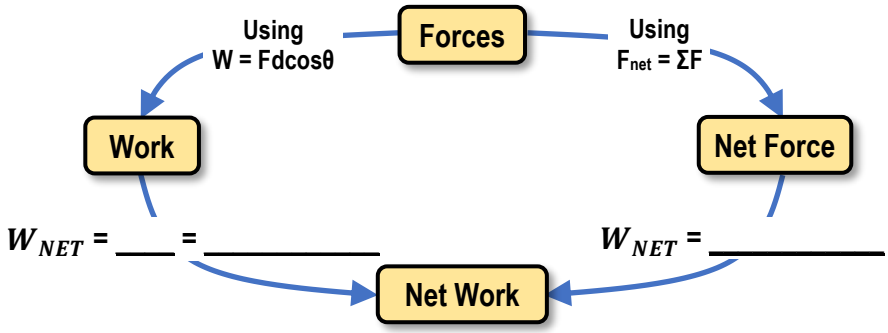
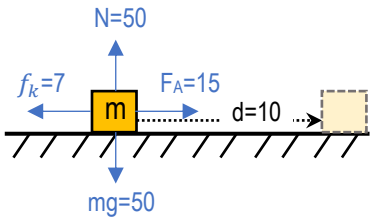
CONCEPT: CALCULATING NET WORK

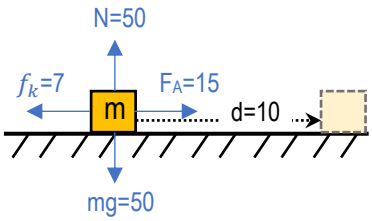
- The NET or TOTAL work done on an object is the _____ of ALL Works done by ALL Forces. Multiple ways to find $\mathbf{W_{NET}}$:



EXAMPLE: You pull a 50N box for 10m on a rough surface with 15N. There's a kinetic friction f_k = 7N. Calculate **(a)** the works done by all forces; **(b)** the Net Work done



EXAMPLE: You pull a 50N box for 10m on a rough surface with 15N. There's a kinetic friction f_k = 7N. Calculate **(a)** the Net Force; **(b)** the Net Work done on the box



PROBLEM: You pull a 3kg box on a flat surface. The coefficient of kinetic friction is 0.6. When you pull the box horizontally through a distance of 10m, it accelerates at 2m/s^2. Find the net work on the box.

A) 17.6 J
B) 35.3 J
C) 176.4 J
D) 60 J

WORK & ENERGY
$KE = \frac{1}{2}mv^2$
$W = Fd\cos\theta$
$W_g = -mg\Delta y$
$W_{NET} = \Sigma W = F_{NET}d\cos\theta$

PROBLEM: To pull a 51 kg crate across a rough floor, a worker applies a force of 100 N, directed 37°above the horizontal. The coefficient of friction is 0.16. If the crate moves 3.0 m, what is the total work done on the crate?

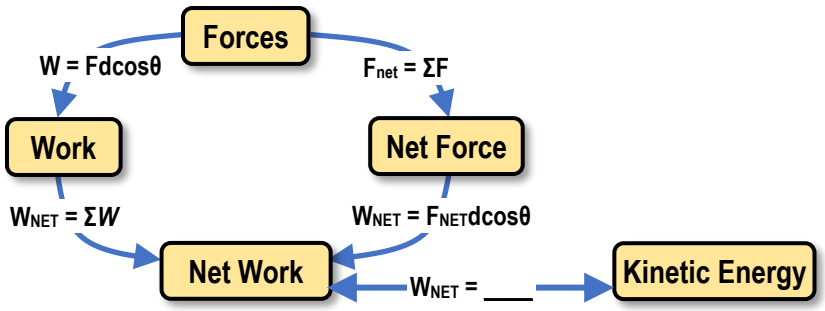
A) 29 J
B) 0 J
C) 240 J
D) 169.6 J

WORK & ENERGY
$KE = \frac{1}{2}mv^2$
$W = Fd\cos\theta$
$W_g = -mg\Delta y$
$W_{NET} = \Sigma W = F_{NET}d\cos\theta$

CONCEPT: THE WORK-ENERGY THEOREM

● Remember: Work is the **transfer** of ENERGY between objects. The Work-Energy Theorem describes this relationship:

W_{NET} = _____ = _____



EXAMPLE: A 4-kg box has an initial speed of 6m/s at Point A. At Point B, it has a speed of 10m/s. How much work was done to the box from from Point A to Point B?

WORK & ENERGY
$KE = \frac{1}{2}mv^2$
$W = Fdcos\theta$
$W_g = \pm mg\Delta y$

● Whenever forces aren't given, but work is asked for, it's implied that it's the **NET** work.

PROBLEM: A box slides across the floor with an initial speed of 3.5m/s. If the coefficient of kinetic friction is 0.15, how far will the box slide before stopping completely?

A) 1.19 m
B) 4.17 m
C) 9 m
D) Not enough information

WORK & ENERGY
$KE = \frac{1}{2}mv^2$
$W = Fd\cos\theta$
$W_g = -mg\Delta y$
$W_{NET} = \Sigma W = F_{NET}d\cos\theta = \Delta K$

PROBLEM: A 5kg is on a rough surface, with a coefficient of friction of 0.6. You push on the box with a constant force, such that the box moves with a constant 8m/s. Find the net work on the box.

WORK & ENERGY
$KE = \frac{1}{2}mv^2$
$W = Fd\cos\theta$
$W_g = -mg\Delta y$
$W_{NET} = \Sigma W = F_{NET}d\cos\theta = \Delta K$

- The Work-Energy Theorem is very useful conceptually. If an object has **constant speed**, **ΔK = ___ → W_{NET} = ___.**