**Work – Energy Problems**

These problems represent a review of the types of problems you will see on the CSCOPE assessment.

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|  | The amount of work (W) done on an object by a given force can be calculated using the formula**W = F d cos **where **F** is the force and **d** is the distance over which the force acts and **** is the angle between **F** and **d**. It is important to recognize that the angle included in the equation is not *just any old angle*; it has a distinct definition that must be remembered when solving such work problems. |

**Work Problems**

1. Ben Pumpiniron applies an upward force to lift a 129-kg barbell to a height of 1.98 m at a constant speed. How much work was done on the barball?
2. How much work is done on a vacuum cleaner pulled 3.0 m by a force of 50.0N at an angle of 30.00 above the horizontal?
3. A worker pushes a 1.5x103 N crate with a force of 345 N up a ramp for an unknown distance (in meters) to load the crate in the back of his truck. The tailgate of the truck is 1 m above the ground.
	1. How much work was done on the crate?
	2. How long was the ramp?

**Energy Problems**

Remember that $KE=\frac{1}{2}mv^{2}$

1. A 7.0 kg bowling ball moves at 3.0 m/s. How much kinetic energy does the bowling ball have?
2. What is the velocity of a .145 kg baseball if it has a kinetic energy of 109 J?
3. A ship has a mass of 40,000 kg. It’s engine gives it an acceleration of .2 m/s2 while it travels a distance of 100 meters from rest.
	1. What force does the engine exert on the ship?
	2. How much work does the engine do?
	3. What is the maximum kinetic energy after it moves 100 meters?

**Conservation of Mechanical Energy**

* 1. At a water park, a 50 kg child goes down a water slide. At a point 3.00 meters above the splashdown pool, the child passes a radar-type speedometer that determines the child’s speed is 12.0 m/s. Calculate the child’s kinetic and potential energy with respect to the splashdown pool, when passing the speedometer. (use g=9.8 m/s2)