**Unit 5 – Worksheet 7**

**Forces and Energy**

1. A 30. kg sled is pulled *at constant speed* over a frozen lake by a dog sled team with a force of 240 N applied parallel to the horizontal.
   1. Construct a force diagram for the sled.
   2. Construct a qualitative energy bar graph analysis of the situation as described in part a. Consider the system: Sled, Ice, Earth. Note (keep the dogs on the outside of the system).



1. Assuming everything about the above situation were the same, including the same low resistance to motion from the ice surface, determine the acceleration of the sled, if it were being pulled with a force of 300 N by the dogs.     (Draw a new force diagram.)

1. What would be different in the qualitative energy bar graph analysis of the situation in part b, using the same system definition?



1. A horizontal 100 N force is applied to a 50 kg classmate resting on a level tile floor. The coefficient of kinetic friction (μk) is 0.25.
2. Draw a force diagram to represent this situation.

1. What is the acceleration of your classmate?

1. Construct a qualitative energy bar analysis of the situation above. Define the system as: Classmate, tile floor and Earth.



1. What conclusion can we draw about how energy changes when an unbalanced force acts on a system?