Objectives for Physics 1

Chapter 6

1. Be able to describe what work is in terms of energy and systems.

2. Be able to calculate the amount of work done by one specified system on another by using $W = F\Delta x \cos\theta$. Also be able to define carefully what is meant by $F, \Delta x$, and $\cos\theta$.

3. Be able to use a plot of F_x vs x to calculate the change in energy of a system.

4. Be able to explain why $W = F\Delta x \cos\theta$ cannot be applied in practice in the case of friction forces. Also be able to explain what it *can* be used for.

5. Be able to determine an object's kinetic energy.

6. Be able to state the work-kinetic energy theorem and to explain why it is valid only for objects that can be modeled as particles but not for objects having internal structure involved with energy transfers.

7. Be able to determine the gravitational potential energy associated with an object and to attribute that energy to the gravitational field.

8. Be able to determine the force constant of a spring given a plot of F_{spring} vs x where x is the stretch or compression of the spring.

9. Be able to determine the force constant of an ideal spring when F_{spring} and x are available.

10. Be able to determine the energy stored in a spring by using a plot of F_{spring} vs x or in terms of $E_{spring} = \frac{1}{2}kx^2$.

11. Be able to describe what is meant by "mechanical energy."

12. Be able to describe what is meant by the "conservation of energy" and to use it in accounting for energy changes in systems.

13. Be able to determine the power involved in moving an object subject to a net force $\mathbf{F}$ with velocity $\mathbf{v}$.

14. Be able to state the units for energy in the SI.