On-level Physics
Mechanical Energy

This unit will allow each student to:

a. gain a better understanding of mechanical energy in the interactions of objects around us
b. continue making proper scientific measurements and calculations
c. define and properly use all vocabulary
d. properly apply all terms and concepts in describing/explaining real world examples
e. continue making and interpreting scientific graphs
f. teach someone else the concepts discussed
g. practice proper laboratory safety

This will be accomplished by each student that is able to:

1. recognize and relate SI and USCS units of force, work, energy, and power
2. recognize a work, energy, and power by the units only
3. recognize energy as the root cause of change in the universe
4. list various forms of energy
5. distinguish between work, potential energy , gravitational potential energy, and kinetic energy
6. state the law of conservation of energy
7. apply the law of conservation of energy to a real object interacting with its environment
8. state the work-energy theorem
9. apply the work energy theorem to real situations in conjunction with energy conservation
10. relate actual units of power and energy to those used on your home's electric bill
11. perform calculations using proper problem solving techniques to determine: (a)gravitational potential energy, (b) kinetic energy, (c) work, and (d) power

Textbook Reference – Physics: Principles and Problems

Chapter 10 - Energy, Work, and Simple Machines (Section 1); Chapter 11 - Energy and its Conservation (Sections 1 and 2)

Key Terms – *write the definitions of the boldface terms on your own paper, definitions are available at thetеterszone.net*

energy, kinetic energy, potential energy, gravitational potential energy, work, mechanical energy, law of conservation of energy, power

Daily Grade: Daily questions/homework/review sheet
/30

Mechanical Energy Review – Answer on a separate sheet of paper due prior to the 20Q on Day 5

A. Define work. What are the US and SI units for work?

B. How many joules of work are done on an object when a force of 10 N pushes it a distance of 10 m?

C. Define power? What are the US and SI units for power?

D. In which situation is more power required: **Slowly** lifting a book bag full of books up the stairs or **quickly** lifting the same book bag full of books up the same stairs?

E. How much power is required to do 10,000 J of work on an object in a time of 1.5 seconds? How much power is required if the same work is done in 3 seconds?

F. What are the two main forms of mechanical energy?

G. Calculate the potential, kinetic, and total energy of a 5,000 kg plane flying at a speed of 95 m/s and 220 m above the ground.

H. State the law of conservation of energy.

I. If you do 3,456 J of work to elevate a bucket of water, what is the gravitational potential energy relative to its starting position? How high is the bucket if its mass is 16 kg?

J. Sketch a diagram showing a 10,000 kg boulder as it falls from a 100 m high cliff. Show the boulder's KE, PE, and TE at the following heights above the ground:
100 m, 80 m, 50 m, 25 m and 0.000 000 001 m

K. Suppose a box has 25 J of kinetic energy. When it moves at twice its original speed, what will be its kinetic energy? What's its kinetic energy at four times the original speed?