ENERGY

What is it? What is your definition of it? How can we really understand how much energy is used by an appliance in our home, school or office?

The following lab will help you answer these questions and provide you with a new understanding and feeling for the forms and quantities of energy we use everyday.

How much energy can a human produce? Let's calculate.

We will need 3 volunteers who won't mind being weighed or winded for the rest of the class. At a staircase, measure the vertical distance from one floor level to the next or calculate this distance by measuring the vertical rise of a single step and multiply by the number of steps from floor to floor. Allow two or three trials for each student. Record the time of each trial. Return to the classroom to calculate.

DATA

Total vertical rise in inches _____ in.

Student 1 _____ Trial # 1_____sec
(name)
Wt._____ lbs. Trial # 2_____sec Avg. time _____sec

Trial # 3_____sec

Student 2 _____ Trial # 1_____sec
(name)
Wt._____ lbs. Trial # 2_____sec Avg. time _____sec

Trial # 3_____sec

Student 3 _____ Trial # 1_____sec
(name)
Wt. _____ lbs. Trial # 2_____sec Avg. time _____sec

Trial # 3_____sec

CALCULATIONS (pick any student)

Student name _____

Weight of student_____ lbs. Convert of Kilograms _____Kg
(1 lb = .454 Kg)

1. Convert _____ Kg to _____ newtons
(1 Kg = 9.8 newtons)

2. Convert total vertical rise from _____ inches to meters_____m
(1 in. = .0254m)

3. Convert to Watts: $\frac{\text{1 newton meter}}{\text{second}} = 1 \text{ Watt}$

$$\frac{\text{\_\_\_\_\_ newtons x \_\_\_\_\_ meters}}{\text{seconds}} = \text{\_\_\_\_\_ watts}$$

For horsepower use the following conversion: 746 watts = 1 horsepower

QUESTIONS

1. Could your classmate produce this amount of energy indefinitely?

2. Was all the energy used for climbing the stairs? Explain

3. What appliance might operate on the energy used by the climber?

4. What kind of energy was used by the climber? What kind of energy was it converted to?

5. Explain what is meant by the statement "It takes energy to produce energy." How might this be applied to the current fossil fuel situation?