

## Energy Practice Problems for APES

One way to conserve energy is to replace incandescent light bulbs with compact fluorescent bulbs. The fluorescent bulb typically uses 25% of the energy of an incandescent bulb of comparable brightness typically lasts about 12 times longer.

1. How much would you save by replacing a 100-watt incandescent bulb with a compact fluorescent bulb over the 12,000 hour lifetime of the bulb if the electricity cost 0.08\$ per kwh (kilowatt hour)?

2. If that bulb was turned on for 12 hours a day, how many months before it needs to be replaced?

3. If an incandescent bulb cost \$1 and lasts 1,000 hours, and a compact fluorescent bulb costs \$8 and lasts 12,000 hours, which bulb has the cost advantage and by how much?

### AP Free-Response Example:

Answer the questions below regarding the heating of a house in the Eastern United States. Assume the following:

- The house has 3,000 square feet of living space.
  - 80,000 BTUs of heat per square foot are required to heat the house for the winter.
  - Natural gas is available at a cost of \$5.00 per thousand cubic feet.
  - One cubic foot of natural gas supplies 1,000 BTUs of heat energy.
  - The furnace in the house is 80% efficient.
- 1) Calculate the following, showing all the steps of your calculations, including units.
    - a. The number of cubic feet of natural gas required to heat the house for one winter
    - b. The cost of heating the house for one winter
  - 2) Discuss two environmental impacts of natural gas use, one positive and one negative.
  - 3) Identify and describe three actions the residents of the house could take to conserve heat energy and lower the cost of heating the house.
  - 4) The residents decide to supplement the heating of the house by using a wood-burning stove. Discuss two environmental impacts, one positive and one negative, of using a wood-burning stove.