

A Bright Idea: Energy Efficiency



https://www.youtube.com/watch?v=IP_KcsVtng0

1. a) What is the meaning of the “Law of Conservation of Energy”?

It means that energy, in any form, can never be created or destroyed. It is impossible to produce energy or “use it up”. What we actually do is change energy from one form to another. For example, a heater turns electrical energy into thermal energy.

- b) How does this apply to technological lighting, what happens to the energy that goes into and out of a light bulb?

Electrical energy goes into a light bulb in the form of electric current. The light bulb then transforms this energy into visible light and heat.

Electrical energy -> Thermal and Radiant (Heat and Light) Energy

2. Light bulbs are often labeled based on their wattage; this represents how much power the bulb uses in a circuit. If a light bulb is set up in a circuit with a voltage of 110V and a current intensity of 0.73A what is the power rating of the light bulb?

Power = Current x Voltage

$P = VI = V \times I$

$P = 110V \times 0.73A$

$P = 80W$

Select formula for power

Representation with symbols

Input values

Calculate

The power rating of the light bulb is 80 Watts.

3. Compact fluorescent and halogen gas light bulbs are more efficient than traditional incandescent lights. Determine which of the two has the best energy efficiency using the information in the table below.

	Compact Fluorescent	Halogen Gas Bulb
Power Use (W)	30 W	80 W
Light Energy (J/s)	5.0 J/s	3.2 J/s
Energy Efficiency	?	?

Efficiency formula: $Efficiency = \frac{Useful\ Energy\ (or\ Power)}{Total\ Energy\ (or\ Power)} \times 100$

Joules/Second = Watts

Compact Fluorescent

$$Efficiency = \frac{5.0\ W}{30\ W} \times 100 = 17\%$$

Halogen Gas Bulb

$$Efficiency = \frac{3.2\ W}{80\ W} \times 100 = 4\%$$

Answer: The compact fluorescent light bulb is more energy efficient.