

Light Bulb Cost Comparison

WHICH BULB IS THE BETTER BUY?

Help students calculate the true cost of incandescent and compact fluorescent light bulbs.

Note: This activity is a good follow-up to the experiment comparing the heat output of these two types of bulbs.

This activity will help students become smarter consumers by encouraging them to think about hidden costs, and then use their math skills to do a true comparison between two alternatives.

Purchase two light bulbs, one incandescent (INC) and one compact fluorescent (CFL), that deliver an equivalent amount of light. Use a 23 watt CFL and a 75 watt incandescent.

Introduce the question.

Show the class the two light bulbs. Explain that they each produce the same amount of light. Tell them you paid \$6.00 for the CFL and \$1.00 for the incandescent. Ask which is the better buy. If there is disagreement, say you want to see who's correct. If they all get it right, tell them you want to see them prove it.

Decide what factors affect total cost.

Tell the students that you are going to figure it out together. Ask them what you need to consider.

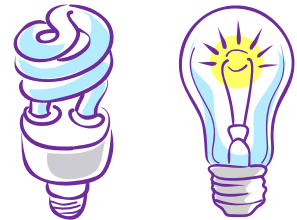
Write these on the board:

- Price of the light bulbs
- Amount of energy the bulbs use, or kilowatt hours (kWh)
- Cost of the energy per kWh
- How long each bulb lasts

Use these formulas and this information to define each factor.

Cost per Bulb

CFL: \$6.00
INC: \$1.00



Amount of energy used

(Watts / 1000) x hour per year = kWh per year

CFL: (23 Watts / 1000) x 1000 hours / year = 23 kWh

INC: (75 watts / 1000) x 1000 hours / year = 75 kWh

Cost of energy per kWh: \$.07 per kWh

Cost of energy used

kWh per year x Cost per kWh = Cost per year

CFL: 23 kWh x \$.07 per kWh = \$1.61 per year

INC: 75 kWh x \$.07 kWh = \$5.25 per year

How long each bulb lasts

CFL: life expectancy of 10,000 hours

INC: life expectancy of 750 hours

Simple Payback

Incremental purchase price / Incremental cost saving
(\$6.00 CFL - \$1.00 INC) / (\$5.25 - 1.61) = \$5 / \$3.64 = 1.37 years

Comparison

Information	CFL	INC
Price of bulb	\$6.00	\$1.00
Amount of energy the bulb uses, or kilowatt hours (kWh)	23 kWh	75 kWh
Cost of energy per kWh	\$.07	\$.07
How long each bulb lasts	10,000 hours	750 hours
Simple Payback equals	1.37 years	

Conclusion

The CFL will be the cheapest alternative after about 1.37 years or about 17 months.

The compact fluorescent bulb has a life expectancy of 10,000 hours and the incandescent bulb, 750 hours. If we use the bulbs about 1000 hours per year, you will continue to use the CFL bulb for 10 years. The incandescent bulb will have to be replaced every 9 months or 13 times in the 10 year period.