

Intermediate Activity: EnergyGuide Labels

Goal

To have students develop an awareness of life cycle cost analysis, payback period, and energy-efficient technologies.

Concepts

- Some appliances are more energy-efficient than others.
- The energy efficiency of major appliances can be quantified.
- The federal government requires most major appliances to carry labels to inform consumers of their energy efficiency ratings.
- Efficient appliances are usually more expensive to buy than less efficient models, but the life cycle cost of efficient appliances is usually much less than the less expensive models.
- Payback period is the operating time for an energy-efficient appliance before the higher up-front (purchase) cost is recouped by lower energy costs.

Background

The federal government requires appliance manufacturers to provide information about the energy efficiency of their products to consumers so that they can compare the life cycle cost of the appliances, as well as the purchase price. The life cycle cost of an appliance is the purchase price plus the operating cost over the projected life of the appliance. The law requires that manufacturers place EnergyGuide labels on all new refrigerators, freezers, water heaters, dishwashers, clothes washers, room air conditioners, central air conditioners, heat pumps, furnaces and boilers. The EnergyGuide label lists the manufacturer, the model, the capacity, the features, the average amount of energy the appliance will use a year, its comparison with similar models, and the estimated yearly energy cost.

For refrigerators, freezers, water heaters, dishwashers, and clothes washers, the labels compare energy consumption in kWh/year or therms/year. For other appliances, the rating is not in terms of energy consumption, but in energy efficiency ratings, as follows: room air conditioners—Energy Efficiency Rating (EER), central air conditioners—Seasonal Energy Efficiency Rating (SEER), heat pumps—Heating Season Performance Factor (HSPF), and furnaces and boilers—Annual Fuel Utilization Efficiency (AFUE). The estimated annual operating cost is based on recent national average prices of electricity and/or natural gas and assumes typical operating behavior. For example, the cost for clothes washers assumes a typical washer would be used to wash eight loads of laundry per week. In addition, the U.S. Environmental Protection Agency (EPA) designates the most energy-efficient appliances as ENERGY STAR appliances.

Procedure

1. Introduce the activity to the class, discussing why the federal government is involved in labeling the efficiency of appliances.
2. Review the concepts of life cycle cost and payback period.
3. Allow students time to complete the Comparing Appliances worksheet.

Comparing Appliances

Your parents need to buy a new water heater. You need to help them choose the better one. Water heaters usually last a long time—10 to 20 years—so you can save a lot of money on an energy-efficient one. Use the chart below to calculate which water heater to buy.

How many years will it take before you begin to save money?

How much money will you have saved after seven years?

Water Heater 1 Purchase Price: \$600

Water Heater 2 Purchase Price: \$300

| MODEL 1 | EXPENSE | COST TO DATE | MODEL 2 | EXPENSE | COST TO DATE |
|----------------|---------|--------------|----------------|---------|--------------|
| Purchase Price | | | Purchase Price | | |
| Year One | | | Year One | | |
| Year Two | | | Year Two | | |
| Year Three | | | Year Three | | |
| Year Four | | | Year Four | | |
| Year Five | | | Year Five | | |
| Year Six | | | Year Six | | |
| Year Seven | | | Year Seven | | |

Based on standard U.S. Government tests

ENERGYGUIDE

Water Heater - 60 gallon
Natural Gas

Model 1

Compare the Energy Use of this Water Heater
with Others Before You Buy.

This Model Uses
185 therms/year

Energy use (therms/year) range of all similar models

Uses Least

Energy
180

Uses Most

Energy
295

Therms/year is a measure of energy use. Your utility company uses it to compute your bill.
Only models with first hour ratings of 56 to 64 gallons are used in this scale.

Water heaters using more energy cost more to operate.
This model's estimated yearly operating cost is:

\$248

Based on a 2005 U.S. Government national average cost of \$1.34 per therm for natural gas.
Your actual operating cost will vary depending on your local utility rates and your use of the product.

Important: Removal of this label before consumer purchase violates the Federal Trade Commission's Appliance Labeling Rule (16 C.F.R. Part 305)

Based on standard U.S. Government tests

ENERGYGUIDE

Water Heater - 60 gallon
Natural Gas

Model 2

Compare the Energy Use of this Water Heater
with Others Before You Buy.

This Model Uses
275 therms/year

Energy use (therms/year) range of all similar models

Uses Least

Energy
180

Uses Most

Energy
295

Therms/year is a measure of energy use. Your utility company uses it to compute your bill.
Only models with first hour ratings of 56 to 64 gallons are used in this scale.

Water heaters using more energy cost more to operate.
This model's estimated yearly operating cost is:

\$369

Based on a 2005 U.S. Government national average cost of \$1.34 per therm for natural gas.
Your actual operating cost will vary depending on your local utility rates and your use of the product.

Important: Removal of this label before consumer purchase violates the Federal Trade Commission's Appliance Labeling Rule (16 C.F.R. Part 305)