

Handout 4.4: Home Energy Audit Checklist and Sample Bill

Name: _____ Date: _____ Team: _____ Zone: _____

Directions: Day 1: fill in Part 1 during the slides, do Part 2 with a partner and a calculator. Day 2: use the checklist in Part 3 on your zone of the classroom and again on the apartment in Part 4, rank the fixes, then read the bill in Part 5.

Word bank in other languages

[Check with a native speaker before printing.]

English	Turkish	Portuguese	Spanish
energy	enerji	energia	energía
water	su	água	agua
save (conserve)	tasarruf etmek	economizar (conservar)	ahorrar (conservar)
cost	maliyet	custo	costo
bill	fatura	conta	factura (recibo)
light bulb	ampul	lâmpada	bombilla (foco)
thermostat	termostat	termostato	termostato
leak	sızıntı	vazamento	fuga (gotera)

Part 1: Where it goes

Energy in a typical home (fill in the share as I show it)

Use	About what share
Heating and cooling	
Heating water	
Everything else (lights, fridge, laundry, electronics, cooking)	

Water in a typical home

Use	About what share
Toilets	
Showers	
Faucets	

Laundry	
Leaks	

Phantom load means: _____

Conservation means: _____

Efficiency means: _____

Part 2: The math

Use the template every time. Watt-hours are pennies. Kilowatt-hours are dollars.

The template

Step	Write it
watts x hours a day x days a year = watt-hours (Wh)	___ x ___ x ___ = _____ Wh
divide by 1,000 = kilowatt-hours (kWh)	_____ Wh / 1,000 = _____ kWh
kWh x price per kWh = dollars	_____ x \$0.25 = \$_____

Worked with me: a 60 W bulb, 5 hours a day, 365 days, at \$0.25 per kWh.

60 x 5 x 365 = _____ Wh. Divide by 1,000 = _____ kWh. Times \$0.25 = \$_____ a year.

The LED: 9 W. 9 x 5 x 365 = _____ Wh = _____ kWh = \$_____ a year. Savings for one bulb: \$_____

Practice 1. A TV is left on 6 hours a day. It uses 100 W. Price \$0.25 per kWh. Cost for a year?

_____ x _____ x 365 = _____ Wh = _____ kWh = \$_____

Practice 2. A game console in standby draws 15 W all day, 24 hours, 365 days. Cost for a year at \$0.25?

_____ x _____ x 365 = _____ Wh = _____ kWh = \$_____

Practice 3. A faucet drips once a second. That is about 5 gallons a day. Gallons in a year? A bathtub holds about 60 gallons. How many bathtubs?

5 x 365 = _____ gallons. _____ / 60 = about _____ bathtubs.

Thermostat. Each degree you set back for 8 hours saves about 1 percent of the heating bill. A family heats for \$1,800 a year and sets back 7 degrees at night. Savings: 7 percent of \$1,800 = \$_____

Part 3: The audit checklist

Score every line: OK, Fix (free), or Fix (\$). Use this on your classroom zone (Day 2, Step 1).

Line	What to look for	OK	Fix (free)	Fix (\$)	What exactly
Lights 1	Lights on where nobody is				
Lights 2	Bulbs are LED (check the label or the shape)				
Phantom 1	Chargers plugged in with nothing attached				
Phantom 2	Screens, consoles, printers on standby				
Heat 1	Thermostat setting (write it if you can read it)				
Heat 2	Windows or doors open while heat or AC runs				
Heat 3	Vents or radiators blocked by furniture				
Heat 4	Drafts at doors and windows (hold a hand near the edge)				
Water 1	Any faucet dripping				

Water 2	Toilet running (listen)				
Appliance 1	Fridge door seal holds a sheet of paper				
Appliance 2	Dishwasher or laundry run only when full				

The planted waste in our zone was: _____

Part 4: Audit the apartment

The Marchetti-Oyelaran apartment. Two adults and one child, age 8, in a rented two-bedroom apartment. The landlord pays for heat. The family pays for electricity and hot water.

Living room. The TV is on all day for the dog. A cable box and a game console are on standby under it. Three lamps have the old round bulbs that get hot. A window air conditioner is still in the window in January with a towel stuffed around it. The couch sits in front of the radiator.

Kitchen. The refrigerator door has a torn seal at the bottom; a sheet of paper slides out. The dishwasher is run every night, half full. The faucet drips about once a second. The microwave clock is on. The range hood light is on all day.

Bathroom. The shower runs about 15 minutes per person, three people a day. The showerhead is the original from when the building was built. The toilet runs for a minute after each flush, then stops.

Bedrooms. Two phone chargers and a laptop charger stay plugged in with nothing attached. A space heater runs in the child's room all night with the window cracked open "for fresh air." A lamp with an old bulb is on in the empty adult bedroom while everyone is in the living room.

Score the apartment on the same twelve lines:

Line	OK	Fix (free)	Fix (\$)	What exactly
Lights 1				
Lights 2				
Phantom 1				

Phantom 2				
Heat 1				
Heat 2				
Heat 3				
Heat 4				
Water 1				
Water 2				
Appliance 1				
Appliance 2				

Rank the fixes

Twelve fixes with a cost and an estimated saving per year. Cross out the two that cost more than \$50. Rank the other ten by savings, highest first. For the three that cost money, compute payback: cost divided by savings = years.

Fix	Cost	Saves per year (estimate)	Rank	Payback (years)
Turn off lights in empty rooms	\$0	\$20		
Unplug the chargers and put the TV, cable box, and console on a power strip you switch off	\$20 (strip)	\$50		
Swap the ten old bulbs for LEDs	\$30	\$230		
Set the thermostat back 7 degrees at night (in a home that pays for heat)	\$0	\$125		
Cut showers from 15	\$0	\$150		

minutes to 8 (three people)				
Fix the dripping faucet (a new washer)	\$2	\$15		
Low-flow showerhead	\$15	\$70		
Wash laundry in cold water	\$0	\$60		
Weatherstrip the drafty window and door	\$25	\$80		
Run the dishwasher only when full	\$0	\$30		
Programmable thermostat	\$80	\$150		
New refrigerator with a good seal	\$900	\$90		

Why the top three are the top three:





Teacher key

Part 1: Heating and cooling about half; water heating about a fifth; everything else about a third. Toilets about a quarter (24 percent); showers a fifth (20); faucets a fifth (19); laundry a sixth (17); leaks about a tenth (12). Phantom load: power a device draws while “off” or in standby. Conservation: using less of a resource on purpose so it lasts. Efficiency: getting the same result with less.

Part 2: Worked: $60 \times 5 \times 365 = 109,500 \text{ Wh} = 109.5 \text{ kWh} = \27.38 . LED: $16,425 \text{ Wh} = 16.4 \text{ kWh} = \4.11 . Savings \$23.27 (accept \$23). Practice 1: $100 \times 6 \times 365 = 219,000 \text{ Wh} = 219 \text{ kWh} = \54.75 . Practice 2: $15 \times 24 \times 365 = 131,400 \text{ Wh} = 131.4 \text{ kWh} = \32.85 . Practice 3: 1,825 gallons; about 30 bathtubs. Thermostat: \$126.

Part 3, classroom: answers depend on the room and the planted wastes. *[Sal: list your planted wastes here before Day 2 so the check is fast.]*

Part 4, apartment: Lights 1: Fix (free), the bedroom lamp and the range hood light. Lights 2: Fix (\$), ten old bulbs. Phantom 1: Fix (free), three chargers. Phantom 2: Fix (free or 20 strip), cable box and console, and the TV for the dog. Heat 1: cannot read it; landlord's heat, the AC in the window in January; take it out or seal it, weatherstrip. Water 1: Fix (\$2), the drip. Water 2: Fix (free to 8), the toilet runs a minute, check the flapper. Appliance 1: Fix(), the torn seal (a new gasket is about \$50, a new fridge is the landlord's). Appliance 2: Fix (free), the half-full dishwasher.

Ranking (the ten under \$50, by savings): 1. LED swap \$230 (payback 0.13 years, about 7 weeks). 2. Shorter showers \$150. 3. Thermostat setback \$125 (but this family does not pay for heat, so a good answer notes it saves the landlord, not them). 4. Weatherstrip \$80 (payback 0.3 years). 5. Low-flow showerhead \$70 (payback 0.2 years). 6. Cold laundry \$60. 7. Power strip \$50 (payback 0.4 years). 8. Dishwasher full \$30. 9. Lights off \$20. 10. Faucet washer \$15 (payback 0.13 years). Crossed out: programmable thermostat (\$80, and the landlord's heat) and the new refrigerator (\$900). Landlord: the fridge seal, the thermostat, the window unit removal; family: bulbs, strips, showers, laundry, dishwasher, the faucet washer if the landlord is slow.

Part 5: 650 kWh; \$180.50; \$0.25 per kWh; the basic service charge; about \$19.