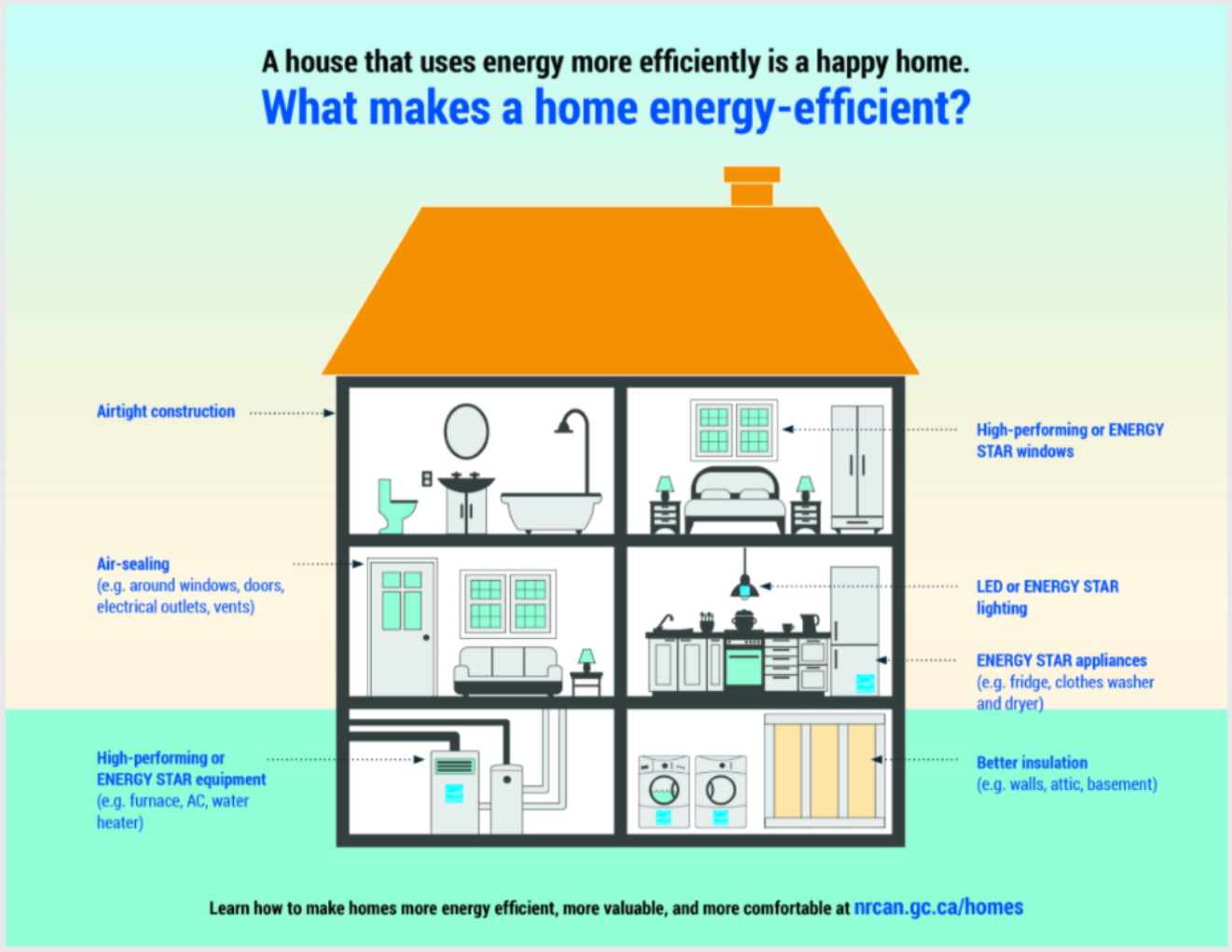
Be efficient	Grade 5 and 6

Energy Efficiency Answers

As we continue to look at how we use the word efficiency, let's look at what we mean when we apply it to an energy efficient home. If we go back to the definition of efficiency that we saw before, when something is efficient it is productive of desired effects. Especially capable of producing desired results with little to no waste (as of time or materials). We want to use the energy coming in, in the best way possible.



In the image, we can see several items that show how to reduce heat loss. Airtight construction, better insulation, air-sealing, and energy efficient windows. These are in place so that any energy that is coming in to generate heat doesn't get lost or transferred out of the house. If there is big heat loss, the furnace then must generate more heat and then more is lost and so on and so forth. The longer the house can keep the heat that the furnace generated, the better.

The rest of the items shown in the infographic relate to energy efficient equipment, appliances, and lighting.

For the next few calculations, let's also consider the concept of ***energy conservation*** in order to contrast with energy efficiency. When we talk about energy conservation, we can think of it as energy that we have chosen not to use at all. For example, we could choose to hang clothes outside on the line instead of using the dryer if the weather permits.

When we are thinking of ***energy efficiency***, this means we will use some energy, but our appliance or equipment will use the least amount possible to get the job done. These machines are designed to limit the amount of energy lost. For example, an energy efficient light bulb won't heat up like an inefficient one. In an efficient bulb, the electrical energy that we have paid for will make light not heat. In an inefficient bulb, we pay to get it hot and light it up.

Let's do a clothes dryer energy calculation. Home energy is measured in kilowatt-hours. If we want to know how much energy our dryer uses, we'll need to know how many watts it has and how long we'll dry the laundry for.

Dryer rating	***Length of dry***	***How many watt-hours?***	***How many kilowatt-hours?***
3 000W	1 hour	3 000 Wh	3 kWh

To find out how many watt-hours the dryer uses, we can multiply the dryer rating by the length of the dry cycle. Once we know how many watt-hours we have, we need to divide by 1000 to get a number in kilowatt-hours. Let's try another.

Dryer rating	***Length of dry***	***How many watt-hours?***	***How many kilowatt-hours?***
3 000W	½ an hour or 0.5hr	1 500 Wh	1.5 kWh
5 000W	1 hr	5 000 Wh	5 kWh
1 800W	45 min or 0.75hr	1 350 Wh	1.35 kWh
2 500W	1 hr	2 500 Wh	2.5 kWh

Different dryers will use different amounts of energy. Energy efficient clothes dryers can use longer cycles with less heat because that dries the laundry with less total energy. They can also incorporate sensors, like a moisture sensor, that can turn the machine off when the laundry is dry instead of tumbling it dry for nothing.

In an energy conservation scenario, every time we hang the laundry to dry, we save the total kWh from use. If we have a 3 000W dryer with a 1 hr dry cycle and we hang the clothes to dry 20 times over the season, how much energy have we saved?
*3 000W * 1hr ÷ 1000 = 3 kWh*
*3 kWh * 20 = 60 kWh*
We will have saved 60kWh of energy

Let's look at energy usage in another appliance, a dishwasher. If we know how many watts our dishwasher uses and the length of the cycle, we can calculate how many kilowatt-hours it uses just like the dryer.

Dishwasher rating	***Length of dry***	***How many watt-hours?***	***How many kilowatt-hours?***
2 400W	½ an hour or 0.5hr	1 200 Wh	1.2 kWh
1 200W	1 hr	1 200 Wh	1.2 kWh
1 800W	45 min or 0.75hr	1 350 Wh	1.35 kWh
2 000W	1 hr	2 000 Wh	2 kWh

In an energy conservation scenario, every time we do the dishes by hand, we save the total kWh from use. If we have a 2 000W dryer with a 1 hr dry cycle and we hand wash the dishes 30 times instead of running the dishwasher, how much energy have we saved?
*2000W * 1hr ÷ 1000 = 2 kWh*
*2kWh * 30 = 60 kWh*
We will have saved 60kWh of energy

In the quest for energy efficiency with laundry and dishes, it is also important to consider what it means to have a 'full load.' If we run the 3 000W dryer with the 1 hr dry cycle to dry one sweater, does that affect its efficiency?

The efficiency of the machine proper isn't affected but we have used more energy per item of clothing. The desired effects of a dryer are to dry laundry but if you can dry more in the same cycle, that is way better!

If we run the 2 000W dishwasher with 2 dishes in it, does that affect its efficiency?

The efficiency of the machine proper isn't affected but we have used more energy/water per dish. The desired effects of a dishwasher are to clean dishes but if you can clean more in the same cycle, that is way better!

If we run the dryer with too much laundry, does that affect its efficiency?
Yes! The machine must work a lot harder to do the turning and the drying. The machine is less efficient when it is overloaded.

'Goldilocks' loads are best for efficiency in these appliances. Not too big and not too small.