

Activity 3

Understanding energy use of household appliances

Calculate
Section 3

Aims

- To decide what are small and large appliances.
- To decide what are high-powered and low-powered appliances.
- To decide what are long-use and short-use appliances.

Students need

- *Typical power ratings of gas and electric appliances*
- A hand-held calculator
- Energy journal
- Assignment 2, *Looking at household energy bills*

For the teacher

- Copy *Typical power ratings of gas and electric appliances* for each student (Support materials, pages 74–76).
- Discuss what appliances are and ask students to provide examples of appliances that are used in their homes (use the list from Step 1, Assignment 2).
- Discuss the following terms and together develop simple definitions for each (see examples below).
 1. ‘small appliance’ (toaster, kettle, radio, digital clock)
 2. ‘large appliance’ (oven, fridge, freezer, dryer)
 3. ‘high-powered appliance’ (appliances that use more power per hour to run, such as central heating)
 4. ‘low-powered appliance’ (appliances that use a smaller amount of power per hour to run, such as clock radio, toaster, kettle)
 5. ‘long-use appliance’ (appliances used for long periods of time, such as refrigerators, freezers)
 6. ‘short-use appliance’ (appliances used for short periods of time, such as hair dryer, vacuum cleaner)

The above terms are subjective and open to interpretation.

- Explain that electric and gas appliances have power ratings as well as energy ratings. The power ratings for gas and electric appliances are measured in different units.
- Mention that gas is usually used for heating, cooking (including BBQ), and water heating.
- If time permits, students can convert the gas power ratings from MJ/h to kWh using the following conversion: $\text{MJ} \times 0.278$. This will provide comparisons in energy use between gas and electric appliances. (1 MJ is equivalent to 0.278 kWh.)

Action plan

1. As a class discuss the appliances used in your homes as recorded in Assignment 2. Are they electric or gas appliances? How much energy do you think they use?
2. As a class develop some simple definitions to the following terms:
 - ‘small appliance’
 - ‘large appliance’
 - ‘high-powered appliance’
 - ‘low-powered appliance’
 - ‘long-use appliance’
 - ‘short-use appliance’.
3. Using the appliances discussed in Step 1 and your definitions, list four small appliances and four large appliances.

Small appliances

1. _____
2. _____
3. _____
4. _____

Large appliances

1. _____
2. _____
3. _____
4. _____



Is this clock radio a small or large appliance?

4. Write these appliances in the ‘Appliance’ column in Table 3.1.

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Table 3.1. Appliances used in my home

Appliance	Power rating for gas appliances (MJ)	Power rating for electric appliances (W)	Power rating for electric appliances (kW)	Estimated weekly household use (hrs)
Computer		250	0.25	5.5 hours
Gas central heating	50			10 hours

5. Using *Typical power ratings of gas and electric appliances*, fill in the power ratings of the appliances listed.

Be sure to provide the correct units, that is, the power rating for electric appliances are stated in watts (W), convert these to kilowatts (kW) (remember that 1 kW = 1000 W). While gas appliances are stated in megajoules (MJ).

If your appliance is not rated select another one that is.

6. Estimate in hours how often each appliance is used in your home per week. (Remember to include the use of everyone in your household.)

7. As a class each student is to discuss an appliance listed in their table.

Note: During the class discussion listen for any appliances mentioned that you didn't include but that are used in your home. Add these to your table.

8. Using appliances listed in Table 3.1 and your definitions, determine which are:
- high-powered or low-powered (does the appliance require a lot of power to run)
 - long-use or short-use (how long the appliance is used for).

List these appliances in Table 3.2 under the appropriate heading.

Table 3.2.

High-powered	Low-powered	Long-use	Short-use

9. Which of the appliances listed in Table 3.2 use the most power?

10. Which of the appliances listed in Table 3.2 use the least power?

Assignment 3

Looking at household appliances

Calculate

Section 3

Aims

- To look at appliances used in your home and find their power ratings.
- To identify household wasteful practices.
- To suggest possible techniques for conserving energy use.

Students need

- *Origin Energy efficiency tips*
- Table 3.1 from Activity 3, *Understanding energy use of household appliances*
- Energy journal
- Assignment 2, *Looking at household energy bills*

For the teacher

- Make a copy of the *Origin Energy efficiency tips* (Support materials, pages 77–78) for each student.
- Remind students that their household appliances will be either gas or electric and that the power ratings for each are measured in different units.
- If time permits, students can convert the gas power ratings from MJ/h to kWh using the following conversion: $\text{MJ} \times 0.278$. This will provide comparisons in energy use between gas and electric appliances (1 MJ is equivalent to 0.278 kWh).

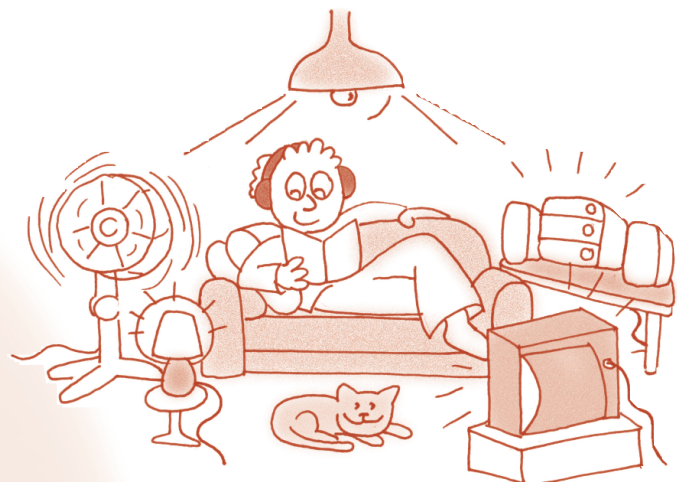
Action plan

1. Show members of your energy team your answers and calculations from Table 3.1 from Activity 3.
2. Then, together, brainstorm and list in Table 3.3 (located on the next page) which appliances you have in your home (you can use your list of household appliances developed in Assignment 2 as a guide).
3. For each of the appliances listed find the power rating (this information is most often located on a sticker on the bottom of the appliance).

If the appliance is electric record the power rating in watts (W) and then convert to kilowatts (kW) (remember that $1 \text{ kW} = 1000 \text{ W}$). If the appliance is gas record the power rating in megajoules (MJ).

If you can't find the power ratings of a particular appliance, don't worry. Find the rating on the *Typical power ratings of electric and gas appliances*.

4. Record the number of hours each appliance is used per week. *Remember to be as accurate as possible and don't forget to include the usage of all household members.*
5. Discuss and develop a definition for wasteful energy use with your energy team.



Is this person wasting energy?

Assignment 3

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6. Looking at the list produced in Table 3.3, discuss whether you think your household's use of some appliances is wasteful. Write comments below.

Include things such as

- Are some people more wasteful than others?
- Do some practices waste more energy than others?
- Do you think your household is energy efficient or wasteful?

7. Are there ways you could conserve energy? Discuss possible techniques (for example, turning off the lights when not in use, ensuring that the dishwasher is full when used, etc.). Write suggestions below.

Include things such as

- How did the discussion go?
- What was discussed?
- Were some ideas liked more than others? Which ones were they? Why do you think this was the case?

Table 3.3. Appliances used in my home

Appliance	Power rating for gas appliances (MJ)	Power rating for electric appliances (W)	Power rating for electric appliances (kW)	Estimated weekly household use (hrs)