

15- 20 minutes



General household
equipment needed



Medium level of
supervision



Can be done indoors
and outdoors



Internet and camera
access are *optional*

Preparation

- Print/ copy the task sheet [QR](#)
- Create a copy on A4 paper or in a scrapbook

Purpose

- To identify how electricity is used at home, and how it is transformed into other forms of energy.

Description

1. Students explore appliances around the home that use electricity.
Some appliances that can be found at home that use energy include: a toaster, a washing machine, a fridge, a television.
2. Students explore how the appliance uses electricity, and begin to think about electrical energy being transformed into other types of energy by those appliances.
3. Students create a summary of appliances that use electricity, what the electricity is used for, how many hours per week it is used and estimate its energy usage in watts by completing the '*Auditing appliances*' task sheet.

- **Movement:** describes the displacement of an object in time and space.
- **Electrical:** describes the displacement of electrons around a closed circuit.
- **Light:** describes electromagnetic radiation that is detected by the retina in the eye.
- **Heat:** describes the speed at which particles in matter vibrate. The hotter something is, the more energy its particles have and the more vigorously they vibrate.
- **Microwaves:** describes electromagnetic radiation of high frequency and short wavelength that can cause particles such as water molecules to vibrate faster.
- **Sound:** describes waves of pressure travelling through solids, liquids or gases that our ears perceive as sound.
- **Elastic:** describes how certain materials stretch when they are pulled (have opposing forces applied), and store the applied energy. They have the ability to then spring back to their original shape, transforming stored energy to movement energy.
- **Gravitational:** describes how any object near Earth that is not restrained in any way, will drop towards the Earth's centre. Gravitational energy, as it is used here, is a measure relative to position. A book on a high shelf is said to have more 'gravitational' energy than one on a low shelf, since when it falls from the shelf the higher one will gain more movement energy as it falls.
- **Chemical:** describes the fact that all chemicals have a certain amount of energy in the bonds that hold the atoms together. For example, complex carbohydrates and fats have high energy bonds that animals and plants break down to release energy.
- **Nuclear:** describes the energy released when the nuclei of atoms are split (fission) and/or combined (fusion). The Sun is a site of nuclear fusion where hydrogen atom nuclei fuse to form a helium atom nucleus, releasing radiations of many types, including light, heat waves and ultraviolet radiations, that are so energetic they can burn skin and/or damage DNA.

EXAMPLE:

A glossary
naming and
defining different
forms of energy,

Before the task

- Find out what students think they know about the different types of energy. You may prompt them by naming the different types of energy (see example included above).
- OPTIONAL:** View this website to examine the different forms of energy. <https://www.childrensuniversity.manchester.ac.uk/learning-activities/science/energy-and-the-environment/what-is-energy/>
- Discuss that home appliances are machines that transform electrical energy into another form of energy.
- Explain that watts are a measurement of how quickly energy is used - for example, as 75W light globe will use energy quicker than a 15W light globe.
- Note that many appliances will have information on them that displays the amount of energy they use. Examine an appliance together, locating the energy information and discussing what it means.

After the task

- You may like to re-view the website (optional).
- Using the completed task sheet, discuss the appliances that used the most energy.
- Discuss that there are significant costs involved in using high amounts of energy. For example, heating water or running a washing machine.
- Discuss alternatives for these activities, and the type of energy used to complete that - for example, when washing clothes by hand, chemical energy from the body is transformed into movement energy.
- Brainstorm ways of heating water. Identify which ways involve energy transformation, for example, burning chemical energy of gas or wood, and which ways involve energy transfer, for example, solar heating.
- You may wish to share the sheet with others (e.g. classmates, teacher, family members).

Explore some more

Look at the infographic linked to below which explores sources of electricity. Discuss the potential environmental effects of electricity production, and cleaner alternatives.

<https://www.science.org.au/curious/electricity-sources>



SAFETY

Ask students to be careful while they are investigating electrical appliances. Ensure that all appliances are disconnected from their power source. Ensure students do not directly touch appliances that generate heat energy, such as kettles or hotplates, or movement energy, such as fans.

Appliance	What is the electricity used for?	How many hours is it used per week?	How many watts does it use?
Fridge	cool and freeze food	168 hours	555 KWh per year
washing machine	wash clothes	6 hours	309 KWh per year
clothes dryer	dry clothes	4 hours	189 KWh per year

EXAMPLE:

A completed sample of 'Appliances audit' task sheet.

Name:

Date:

In this activity, students will look at what electricity is used for in the home. They are encouraged to look at appliances in and around the home and identify what the electricity is used for, such as to heat something, to make something move, or to produce light or sound. Some examples of appliances might be:

- a hot water heater
- a cooling system
- cooking appliances.

Students record the information on the resource sheet 'Auditing appliances', along with an estimation of how often the appliance is used in a standard week.

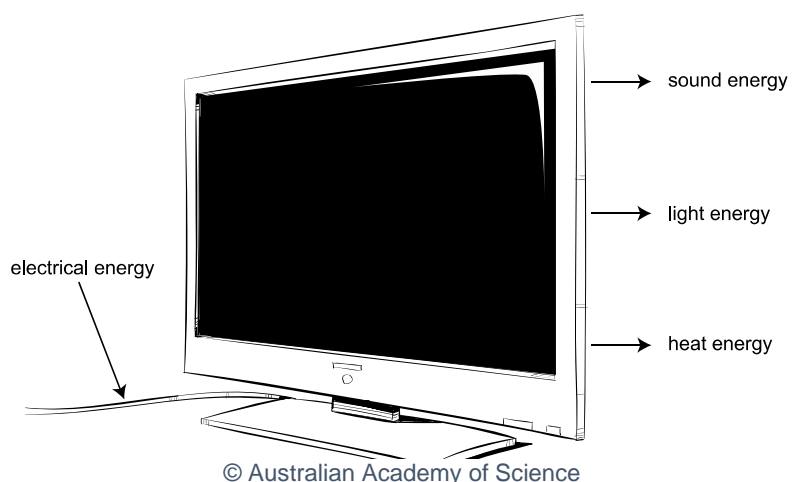
Students should also try to determine how many watts the appliance uses. This information is often:

- recorded on the appliance, or
- they can find this information online. Try website such as
 - <http://www.wrecc.com/what-uses-watts-in-your-home/> (USA based)
 - <https://www.daftlogic.com/information-appliance-power-consumption.htm>

Optional

- Examine past electricity bills to see when spikes of energy usage occur in the home.
- Make a chart or booklet of drawings of appliances that use energy, and include labels and descriptions of what the machines are used for and what types of energy they require
- Take photos of the appliances, and include labels and descriptions of what the appliances are used for and what types of energy they use.
- Calculate the energy rating of your home appliances

<https://www.energyrating.gov.au/calculator>



Name:

Date:

Appliance	What is the electricity used for?	How many hours is it used per week?	How many watts does it use?