

A1 ACTIVITY 1: PRIMARY AND SECONDARY ENERGY SOURCES

Background

The principle of the **Conservation of Energy** states that the total energy of a system cannot be created or destroyed, but can be transformed into different forms as well as being transferred from one object to another.

While energy from our nearest star, the Sun, enters and leaves our planet, the quantity of matter available on Earth is limited. Once used up, it cannot be replaced within a human timeframe. For this reason the Earth is considered an almost closed system.

The first step in this investigation is for the students to clarify what they understand by energy and its role in our lives. The next step centres on the role of the Sun as THE source of energy. Students explore what exactly is meant by a primary energy source and by a secondary energy source. Students are given a list of energy sources and challenged to classify them as primary and secondary, and to explain why some primary forms of energy are not included in the list (for example, it is difficult, if not impossible, to convert sound or lightning energies into useable secondary energy sources).

Equipment required – per group:

- A3-size sheets plus markers
- A list of the following questions (one per group)
 - ❓ **Question 1 – What is the group’s understanding of energy?**
 - ❓ **Question 2 – Why is the Sun important to us on Earth?**
 - ❓ **Question 3 – What is the group’s understanding of primary energy sources?**
 - ❓ **Question 4 – What is the group’s understanding of secondary energy sources?**

TWO SELF-REFLECTION EXERCISES (FOR HOMEWORK OR REVISION)

- ✔ A1.1 Worksheet A: How can we categorise energy sources?
 - ✔ A1.1 Worksheet B: About energy sources
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What to do:

1. Each group should appoint a recording secretary and a chairperson to present their findings to the rest of the class – the form of presentation (oral or poster) can be decided by each group.
2. Having agreed on a time for the discussion session (i.e. 15 minutes) each group should present their findings to the class.

SOME SUGGESTED LEARNING OUTCOMES:

- ❓ **Question 1 – What is the group’s understanding of energy?**
 - Energy is the ability to do work, e.g. move something.
- ❓ **Question 2 – Why is the Sun important to us on Earth?**
 - The Sun is THE original source of energy ... all existing energy on earth emanates from it ... nothing we do on Earth can increase this available energy (fossilised sunlight) ... this is the principle of the **Conservation of Energy**.
- ❓ **Question 3 – What is the group’s understanding of primary energy sources?**
 - Primary energy sources are those directly derived from the Sun, but the energy does not always take a form that is of use to us.
- ❓ **Question 4 – What is the group’s understanding of secondary energy sources?**
 - Energy is not always available in a form that is of use to us. Human intervention is required to transform the primary sources into energy sources that enable us to run our cars, heat and light our homes, run our music players, and charge our batteries. These forms of energy are secondary energy sources.