

LESSON PLAN — PRODUCT LIFE CYCLE ANALYSIS

This unit explains that products have life cycles that can be studied to estimate the ecological impact of the product. Students are challenged to research and qualitatively analyse the life cycle of one product, and then create an alternative design that could meet the same need with lower ecological impact.

Learning outcomes

Students will be able to:

- clarify the difference between human needs and wants.
- research and assess the life cycle of a product, listing inputs and outputs.
- compare and contrast resources that are renewable or non-renewable.
- list guidelines for choosing or making sustainable products
- apply those guidelines to the redesign of a product and its life cycle

Resources

- Packet of potato chips in aluminium foil packet
- *EcoLogic: creating a sustainable future*, by McEwen S, Powerhouse Publishing, 2004. Chapter 2
The life cycle of a packet of chips is described on pages 24 to 26.
Guidelines for choosing sustainable products are on pages 28 to 31.
- Worksheet — Product life cycle
- Photos bauxite, alumina, aluminium and packaging, potatoes, salt, oil
- Powerhouse Museum sustainable design database

Starting point

- How many people like potato chips? How many of us know where our chips come from? What's really in a packet of chips? It's not just the contents but the packaging as well.
- All manufactured items are made from plants or animals, water and/or mined resources such as metals, stone, and crude oil.
- A packet of chips contains potatoes, sunflower oil, salt, aluminium (made from mined bauxite and coal), plastic, inks and dyes. The aluminium is transported around the world. Everything else gets driven around the country. Are the resources used to make a packet of chips renewable or non renewable?
- A renewable resource is one that can be replaced eg potatoes, sunflowers and wind power.

Activities

- Discuss the life cycle of a packet of potato chips.
- Introduce the notion of design as a powerful tool for reducing the impact of each person on the environment. Innovation in design at every stage in the life cycle can have enormous cumulative effects.
- There are a number of ways to design for ecological sustainability.
 - reduce the volume of resources used by creating lightweight designs to minimise the amount of material in a product. For example: cars
 - reduce dependence on energy from fossil fuels. Use solar or wind power. For example: solar-powered radio
 - reduce waste. For example: use rechargeable batteries

- reuse items. eg package jam in containers that can be drinking glasses when the jam is finished.
 - recycle and use recycled materials. For example: a beanie made from old drink bottles, cricket balls made from wine corks
 - design for long life. For example: durable backpack
 - design for short life. For example: biodegradable packaging.
- Ask students to pick a product that they need or want in their lives. Ask them to do a life cycle analysis of that product and complete the product life cycle worksheet.

What is the product made from?

Where did the components come from?

Who made it?

Where was it made?

How is it packaged?

How is it transported to market?

What are all the inputs and the outputs of the product?

What will happen to the product at the end of its life?

- Ask students to draw a detailed product life cycle.
- Ask students to investigate an alternative way to meet the same need or want using fewer resources. Could the product be made using fewer materials or be powered more sustainably? Investigate future trends in materials and technologies. Design a prototype solution.