



Energy transformations 1: Comparing cars

Components

| | NAME | DESCRIPTION | AUDIENCE |
|--|--|--|----------|
| | <i>Comparing cars</i> teacher guide | This guide describes how to introduce students to concepts of energy and energy transformation by comparing electric and combustion engine cars. | teachers |
| | <i>REV it up</i> video | Sources of energy involved in driving a vehicle are compared for a combustion engine car and renewable energy electric car. | students |

Purpose

To **Engage** students in learning about energy and energy transformations.

Outcomes

Students:

- understand that energy is required to make a vehicle work;
- understand energy may come from different sources;
- list forms of energy (e.g. heat, electrical, solar);
- list advantages and disadvantages of renewable energy electric vehicles and combustion engine vehicles;
- explain how cars convert energy from one type to another; and
- understand that energy can be lost during transformations.

Activity summary

| ACTIVITY | POSSIBLE STRATEGY |
|--|---|
| Students watch the video, <i>REV it up</i> . | whole class |
| class or small group discussion about issues presented in the video See Teacher notes below. | whole class, small groups or individual |

Technical requirements

The teachers guide requires Adobe Reader (version 5 or later), which is a free download from www.adobe.com.

A modern browser (e.g. Internet Explorer 9 or later, Google Chrome, Safari 5.0+, Opera or Firefox) is required to view the video. A high quality MP4 version of the video is available by download from the SPICE website.

Acknowledgements

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For more information on the REV project, see <http://www.therevproject.com>

Designed and developed by the Centre for Learning Technology, The University of Western Australia.
Production team: Alwyn Evans, Bob Fitzpatrick, Sally Harban, Dan Hutton, Paula Lourie, Dominic Manley, Bec McKinney, Paul Ricketts, Kate Vyvyan and Michael Wheatley with thanks to Beate Ferbert-Booth, Jan Dook, Jenny Gull, Wendy Sanderson and Jodie Ween.

Teacher notes

Class discussion after viewing the video may include the following questions:

- What is the source of energy for vehicles discussed in the video?
*combustion engine: chemical (from petrol)
REV: light from the Sun or electrical (from solar panels)*
- What are some advantages of combustion engine vehicles?
They are convenient, heat from engine can be used to warm passengers, and the vehicles have longer range.
- What are some advantages of renewable energy electric vehicles?
They are environmentally friendly, efficient, cheap to run and quiet.
- Which type of vehicle do you think would better suit your family? Why?
Answers will vary.
- What kinds of energy are involved in using a car?
chemical, electrical, heat, sound, light, solar (for the REV car)
- The video includes a statement that combustion engines are not efficient. What does efficiency measure?
Efficiency is a measure of how much energy is used by a car to move it compared to the wasted energy that flows into the environment.
- Why aren't combustion engines efficient?
Only 30% of energy produced makes the car move — the rest is wasted as heat.

Associated SPICE resources

Energy transformations 1: Comparing cars may be used in conjunction with related SPICE resources to address the broader topic of energy transfer, transformation and conservation.

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| DESCRIPTION | LEARNING PURPOSE |
|---|------------------|
| <i>Energy transformations (overview)</i> | |
| <i>Energy transformations 1: Comparing cars</i> A video compares conventional internal combustion powered cars to REV vehicles and introduces some associated energy transformations. | Engage |
| <i>Energy transformations 2: Investigating energy</i> Students make model vehicles that use different energy sources to investigate energy transformations. | Explore |
| <i>Energy transformations 3: Analysing energy</i> Students develop explanations of energy transformations by analysing data from a simulated electric vehicle journey. | Explain |
| <i>Energy transformations 4: Car choices</i> Students use data about a range of conventional, electric and hybrid vehicles to decide and communicate which car is suited to specific purposes. | Elaborate |