



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.
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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