Electric Vehicles

The future or downfall of sustainable transportation?

Open Education Resource made by Yannic Borchert

Overview

Topic	How do you prepare and evaluate a survey about electric vehicles in the framework of sustainable transportation?
Aims	Students will develop critical thinking skills while covering the topic of electric vehicles by carrying out a survey and presenting their results. They activate their knowledge by comparing pictures from Germany and New Zealand. They gain insight into possibilities and limitations of sustainable transportation by reading topical articles and websites. They are able to prepare questions for a survey about sustainable transportation. They reflect on the information gathered by analysing their findings. They are able to compare the interview results with the previously gained knowledge. They can present their results in a short presentation.
Level	Grade 12
Time	2x 90 minutes or 4x 45 minutes + time in between for conducting a survey
Content	- Pictures about electric vehicles in Germany and New Zealand - Articles about electric vehicles and sustainable transportation - Article about qualitative and quantitative data - Short texts and instructions - Product: a survey on sustainable transportation asking about their possibilities and limitations, carried out among other students.
Materials	- OER with didactic considerations, background information and keys for teachers - (Digital) worksheets - Presentation PDFs with instructions and QR-Codes (mirroring worksheets)

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Didactic Considerations

You could use the OER as the basis for planning a lesson sequence. You can take any individual task, or the whole package for 2x 90 minutes. It works both as lessons in presence or as a digital counterpart. Make sure to use breakout-rooms as groupwork is needed and moderate along the way. Before starting, make sure everyone has internet access and a QR-Code app on their phone, or any digital device.

1st 45 minutes:	think!, research!
2nd 45 minutes:	data!, tools!, questions!
in between lessons:	survey!
3rd 45 minutes:	analyse!
4th 45 minutes:	present!

The task think! helps to activate the students' knowledge on electric vehicles. For activating the students' knowledge, use leading questions to make them find out where these places could be. The first image is from Dunedin, New Zealand (NZ is indicated in the #RIGHTSIDE**NZ**) and the other picture was taken in Leipzig (indicated by the license plates). They should work with a partner to analyse these images. Alternatively, you could carry out a mini-survey on a similar but different topic by using Mentimeter yourself for a nice lead-in (maybe covering the topic "cars based on fossil fuels"?).

The next task research! is where they (in groups) can use their devices to find out more information. Please make sure that they have free Wi-Fi provided by the school, or let them use their smartphones as hotspots. The article links don't require much mobile data, so they should not worry. Make sure that everyone has some person next to them with internet access. In this task, students can already decide the topic they want to cover in their survey, so it should be clear **why** they research information before starting this task.

The next tasks are data! and tools!, which cover the technicalities of conducting a survey. Make yourself acquainted with the tool Mentimeter and read the linked article beforehand! These two tasks should not take longer than 20 minutes - this way they have enough time to write down questions! in the next task for their survey and to prepare the survey on Mentimeter. Each free account can only add up to two question slides! Make them share their questions in different surveys to cover all their questions in the group.

The next task survey! can be situated in between the lessons and is carried out by the students themselves. Because they designed the survey in the group, they should also divide the work of finding participants between them. Let them think about how many participants they want to have data from! The survey can easily be entered by anyone using the eight-digit code, provided by Mentimeter (on top of the slides).

In the next lesson, you can let them analyse! their surveys outcome by using the provided leading questions. It is still advisable to go into more detail by using the groups main topics as a starting point to formulate even more leading questions yourself.

In the last task present!, they should prepare a short presentation. They can present their findings in front on the class or record a video of their presentation, if you were working digitally with the class.

The provided worksheets are meant to be used digitally, if possible. Printing them out in colour for 25 students would not be a sustainable option. If you still want to print the material, please consider printing in black and white in Eco-Mode.

The provided "Presentation PDFs" can be used to present the individual tasks while using a PDF viewer on a smartboard, projector or while sharing your screen.
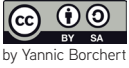
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Background Information

Background information needed is as follows:

You should read all the attached articles to get a general overview and you should invest in some extra research yourself so that you could offer more inspiration if needed in the task research!.

Figure out the ways to use Mentimeter.com (see tools!) and make some mock-up slides for the students to see the aesthetics and usability of this amazing free tool. They should (as a back-up) make screenshots of their results, otherwise the results gathered could be lost! Each free account can only add up to two questions! That is why more than one survey is needed to host all the questions. This also helps with them sharing the work of finding enough participants.

Keys and Mock-Ups

Scaffolding for data!:
- make them use reading technique "skimming" -> only look for parts in the article that they need information from! Look out for the headline "What is quantitative/qualitative data?"

Key data!:
Quantitative data:
- refers to any data that can be counted or measured, given a numerical value
- "how much", "how many", "how often", etc.

Qualitative data:
- is descriptive, expressed by words
- answers to "why" and "how"
- describes certain ideas & characteristics
- open ended and open for interpretation

Ideas for question!:
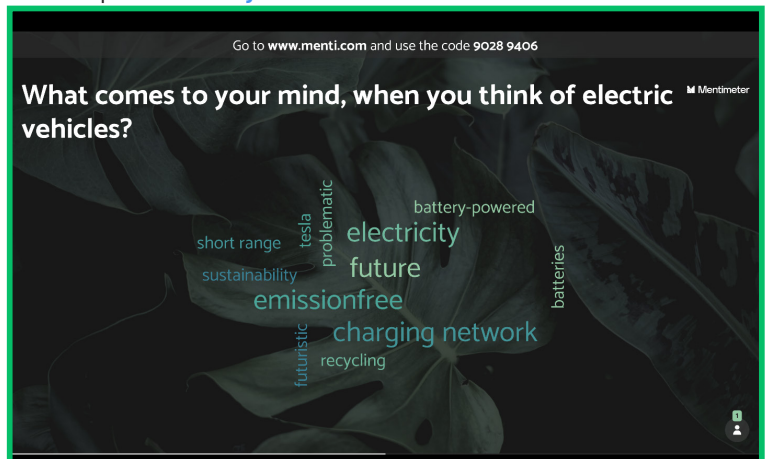What comes to your mind, when you think of...
What is your opinion on the following statements... (+ use slider on Mentimeter)
Do you know how far EVs can drive?
Can you guess how many German citizens drive an EV?
Do you think EVs are the future?

Mock-Up for survey!:

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Sources:

Idea & Concept:
https://oxfamilibrary.openrepository.com/bitstream/handle/10546/620842/edu-sustainable-develop-ment-guide-15072019-en.pdf?sequence=4&isAllowed=y
https://www.globalcompact.de/themen/sustainable-development-goals
https://padlet.com/yannicborchert/sbpsiwc3ut0uxal1

Illustration & Colour:
https://publicdomainvectors.org/en/free-clipart/Electronic-Circuit-Vector-Graphics/8359.html
https://color.adobe.com/de/create/color-wheel

Articles to inform yourself:
https://www.questionpro.com/blog/types-of-interviews/
https://driveelectric.org.nz/ev-myths-1/
https://mossy.earth/guides/energy/electric-cars-pros-and-cons
https://www.nytimes.com/2021/03/02/climate/electric-vehicles-environment.html
https://www.adac.de/rund-ums-fahrzeug/elektromobilitaet/info/sicherheit-elektroauto/
https://www.theverge.com/2022/2/15/22933022/cobalt-mining-ev-electriv-vehicle-working-conditi-ons-congo
https://www.fullstory.com/blog/qualitative-vs-quantitative-data/

Online services:
https://www.mentimeter.com
https://muellmail.com
https://www.qrcode-monkey.com/de/
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