## National Curriculum links

## **KS3 Science:** Analysis and evaluation, interpreting observations and data, including identifying patterns and using observations. Earth and atmosphere: the production of carbon dioxide by human activity and the impact on climate

## **KS4 AQA** **Chemistry**: 4.9.2.2 Human activities which contribute to an increase in greenhouse gases in the atmosphere, 4.9.2.4 - The carbon footprint and its reduction

## **KS4 OCR** **Chemistry**: Organic chemistry C6.3d, e

## **KS4 Edexcel:** Earth and atmosphere science 8.24, 8.25

## Lesson Aim

* To understand the benefits and current limitations of electric vehicles

## Lesson objectives

Students will:

## Understand what an electric vehicle is

## Identify the benefits and potential problems currently associated with electric vehicles

## Evaluate vehicle purchases based on differing circumstances

## Key vocabulary

Plug in Hybrid Electric (PHEVs), ultra-low emission vehicle (ULEV), carbon emissions, air quality

## Resources required

PowerPoint presentation, research table – comparing vehicles, Internet access and list of ULEV vehicles or printed vehicle brochures and up to date price list

## Differentiation / expectations

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| --- | --- |
| **Most pupils will**  | **Some pupils will** |
| Understand what an electric car is and some of the benefits and problems | Evaluate in detail different factors effecting electrical vehicles |
| Research different electric vehicles including some facts and figures about them, identifying factors which effect purchasing  |  |

## Introduction

Introduction to what electric vehicles are (this lesson will focus on cars). Students will understand some basics about what electric cars are and compare statistics of different vehicles when making choices about purchasing. There are some good videos from the GoUltraLow website on YouTube at <https://www.youtube.com/user/GoUltraLow> The sceptic videos can be found at <https://www.youtube.com/watch?v=E94PVi-VPlI>

## Group / Class activity

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| **Timings** |  **Activities** | **Notes / resources** |
| 2 minutes  | **Slide 1-2**Introduction to learning objectives and outcomes of the session |  |
| 5-10 minutes | **Slide 3-7**Define what electric vehicles are, very basic functions of how they work and include the environmental/air quality benefits of vehicles.  |  |
| 5-10 minutes | **Slide 8-10** Students to identify the advantages and disadvantages of electric vehicles. Once done they need to rank them from the biggest advantage/disadvantage to least. | **Card sort – benefits and problems**  |
| 5 minutes  | Review as a class and identify if similar choices and reasons. ***Does it depend where the vehicle is or who the person is?*** |  |
| 20 minutes  | **Slides 11 or 12**Slide 11 - If individual or group internet access available – students to research a selection of electric vehicles (ultra-low emissions). They complete the summary table for each (this can be edited in advance). A specific vehicle is selected for different scenarios as described on the PowerPoint, students then identify which vehicle they would select and whySlide 12 – without internet access - as above, but students have printed copies of brochures to pass around (current prices as of April 2019 are provided – but may need updating)Extension: Students create new scenarios where a specific car would benefit or be a problem. | Internet access Vehicle defined as ultra-low emissionsResearch activity sheetVehicle brochuresResearch activity sheet  |

## Extension/homework

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|  **Activities** | **Notes / resources** |
| **Slide 13**Design an advertising board highlighting the benefits of electric vehiclesDescribe how you would tackle some of the problems identified by electric vehicles (i.e. not enough charging points)Write to your local MP and/or councillor asking them about electric charging points and how they intend to encourage more people to buy electric vehicles  |  |