

Engineering challenge: Project zero – Electric car hire

The challenge brief

The Scottish Government is keen to place Scotland at the forefront of sustainable transport systems. Their aim is to be the first country in the world which has a city where its citizens own or rent vehicles which have zero exhaust emissions. Cities across Scotland are currently placing their bids to be considered for the initiative.

As part of this project they are going to implement an electric vehicle hire system, giving residents and workers affordable and flexible options for transport. A few options are available:

- Quick: Charge and Ride – short commutes, vehicle dropped off at local station
- Solo use: room for a single user and a laptop bag or rucksack
- Family use: space to carry a family of five
- Holiday vehicle: ample space for family, luggage and pets

Your challenges are to:

- cost the different options and present these to Scottish Government to help inform their planning
- design an electric vehicle suitable for this scheme. Your design should be suitable for use by a range of people, however there are no limits on size or vehicle type; the government are keen to see innovative and creative concepts
- provide detailed technical information regarding battery technology, and other relevant scientific information
- develop a working model of the drive train that would be used to power your vehicle

Required evidence

In order to fulfil the brief, you should submit evidence of:

- team name
- team members and roles
- planning
- sketches of initial ideas
- evidence of concept development
- working model of the drive train that would be used to power your vehicle
- rendered presentation of final design, using CAD software
- documentation clearly explaining the science behind the technology
- clear justification of your proposal, for example, how will your vehicle be used?
- your decisions identified and justified

Each team will have to present their work to Government representatives. They should prepare a short presentation (any format is suitable) explaining the design features and the science behind their final working prototype.

Learning intentions

Learning intentions will be shared with you at the beginning of the project and you will get the opportunity to discuss how you will show evidence of what your team learned by helping to form the success criteria. Your team will be given feedback based on these success criteria, including areas where you did well and next steps. You will also get the opportunity to give feedback to other teams.

Reflecting on learning

Which knowledge and skills learnt in different curriculum areas did we apply to the challenge?

Which other skills and knowledge did we use during this project?

What skills are required to make a difference in the world of science, technology and maths?

Sort these statements into science issues, technology issues maths/numeracy issues or more than one curriculum area:

- the development of lithium-ion batteries
- enabling solutions to meet people's needs
- discovering a new way to power transport
- enhancing the quality of human experiences
- ensuring our human needs and environment can co-exist
- managing time in relation to using an electric car