

Combined science - Physics - Key stage 4 - Energy

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Independent practice

1. Describe how the implantable cardiac defibrillator helps save lives.
 - The implantable cardiac defibrillator saves lives by
2. What is the advantage of the SVO battery over a typical battery?



Review

1. Describe how the implantable cardiac defibrillator helps save lives.
 - The implantable cardiac defibrillator saves lives by **helping control the rhythm when the user has an irregular heartbeat.**
2. What is the advantage of the SVO battery over a typical battery? **They last 5 years compared to one year for the typical batteries.**



Independent practice

1. What are the disadvantages of EV battery packs currently? (consider range, weight, cost)
2. Why do we need to move away from fossil fuel powered cars?



Review

1. What are the disadvantages of EV battery packs currently?
 - **High cost of EV at purchase**
 - **Lack of range for EV in use**
 - **Weight of EV is higher than equivalent combustion engined car.**
2. Why do we need to move away from fossil fuel powered cars?
 - **Fossil fuels are running out**
 - **Fossil fuels release lots of carbon dioxide and contribute to global warming.**



Comparing EV and combustion engine cars

	Electric vehicle	Combustion engine
Monthly fuel cost	£30 (at home charging)	£100
Carbon dioxide emissions per km	0	130 g
Servicing	Simple construction, low servicing costs (£100 per year)	Complex moving parts, high servicing costs (£400 per year)
Upfront cost	£50 000	£40 000
Range	300 miles	450 miles
Refuelling time	40 minutes fast charger	5 minutes

Evaluate the use of an electric vehicle for a consumer over a 3 year period.

Compare this with a combustion engine car.



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Evaluate the use of an electric vehicle for a consumer over a 3 year period. Compare this with a combustion engine car.

The upfront cost of the electric vehicle is

However, the range of the combustion vehicle is....

The effect of the combustion engine on the environment is....

Overall I think.....



Model answer

The upfront cost of the electric vehicle is **£10 000** more than the combustion engine vehicle. However, over three years it will save **£900** in servicing costs. The **fuel cost** of the electric vehicle over three years is **£1 080** compared to **£5 400** for the combustion engine. It takes longer for the electric vehicle to charge and it has a smaller range, so for longer journeys the combustion engine would seem more suitable. The combustion engine car has a **more significant impact** on the environment due to the emission of carbon dioxide whereas the electric vehicle does not emit greenhouse gases. Overall, the **electric vehicle** will cost **£4 800 more** to run for three years, but will be **better for the environment** with the supply of fossil fuels running out.

