Triple - Chemistry - Key stage 4

Energy Changes

Fuel Cells

Mrs. Begum

Independent task

1. What do simple cells need to work?
2. What are the 2 types of batteries?
3. Why do alkaline batteries go flat?
4. How do rechargeable batteries regain their charge?
5. Why is hydrogen a better fuel to use?

Independent task answers

1. What do simple cells need to work? **Chemicals (electrolyte) and 2 metal electrodes**
2. What are the 2 types of batteries? **Alkaline and rechargeable**
3. Why do alkaline batteries go flat? **The electrolyte gets used up.**
4. How do rechargeable batteries regain their charge? **The reaction is reversible.**
5. Why is hydrogen a better fuel to use? **It doesn’t produce any pollution, just water as a waste product.**

Independent task

Evaluate the use of hydrogen fuel cells compared with rechargeable lithium-ion batteries to power electric cars.

	Rechargeable lithium-ion battery	**Hydrogen fuel cell**
Distance travelled before a recharge/refuel is necessary (miles)	200	400
Time taken to recharge/refuel (mins)	40	10
Cost of refuel/recharge (£)	3	60
Minimum cost of car (£)	11000	50000

Independent task answers

The hydrogen fuel cell can travel **twice** the distance as the lithium-ion battery before it needs to refuel. This is good if you are travelling a long journey and you don't have to stop to refuel.

The hydrogen fuel cell takes **much less** time to refuel/recharge, only **¼** of the time of the lithium-ion battery – again making journeys shorter.

The cost of recharging the lithium-ion battery is **much less** than the hydrogen fuel cell, it costs **20x more** to refuel the hydrogen fuel cell.

The cost of a lithium-ion car is much less than a hydrogen fuel cell car, the lithium-ion car is about **4.5x cheaper** than the hydrogen fuel car.

Judgement