Lesson: Fuel Cells

ACTIVITY OUTLINE

Students consider how fuel cell technology may bring some advantages over current technologies.

Students describe how fuel is oxidised electrochemically within a fuel cell to produce a potential difference. The overall reaction in a hydrogen fuel cell involves the oxidation of hydrogen to produce water.
They can write an overall equation for the reaction and more able students can write half equations.

Students consider alternative low tech microbial fuel cells and how these can be used to provide electricity for some of the world's poorest people.
There is the opportunity throughout the lesson to consider the priorities that are being addressed with research and development in the technology field.

Students watch the short Oxfam video about pee powered lights.
They can recognise the same principles at work in the hydrogen fuel cell and the microbial fuel cell.

Students carry out reflective exercise identifying how access to electricity shapes their lives and imagining the difference microbial fuel cells can make, they produce a justified argument for the development of this technology.

Students work in pairs to produce a report which presents the advantages and disadvantages of hydrogen fuel cells and rechargeable batteries.
Each person will evaluate one technology, use the "On balance" sheets as a writing frame for this activity

Alternative: the final pros and cons exercise is an easier/quicker exercise than the advantages/disadvantages/evaluation exercise so can be used as an alternative as appropriate

Having considered the considerable advances that are being made with technology, there is now time to take a broader perspective and consider whether exchanging the fuel source on vehicles addresses the wider problems of the consumption levels in the material economy.

Students should understand that we can address this through the changing behaviours of governments, businesses and individuals.

Finally students identify personal and governmental behaviour change for action.

SCIENCE KS3

Energy

Leeds DEC Development Education Centre — Educating for a just and sustainable world

Lesson: Fuel Cells

CURRICULUM OUTCOMES

Describe how fuel is oxidised electrochemically within a fuel cell to produce a potential difference. The overall reaction in a hydrogen fuel cell involves the oxidation of hydrogen to produce water.

Explain how Hydrogen fuel cells offer a potential alternative to rechargeable cells and batteries.

Evaluate the use of hydrogen fuel cells in comparison with rechargeable cells and batteries.

Write the half equations for the electrode reactions in the hydrogen fuel cell

GLOBAL LEARNING OUTCOMES

BIG IDEAS

CLIMATE ACTION

Students can give examples of new technologies that could help in the fight against climate change and can assess their advantages and disadvantages

AFFORDABLE AND CLEAN ENERGY

Students understand how national, international and individual actions can have a positive impact on global challenges

SMSC / British Values - Understanding of the consequences of their behaviour and actions

Action

In 2002 the motor vehicle stock in OECD countries was 550 million vehicles (75% of which were personal cars). A 32% increase in vehicle ownership is expected by 2020. At the same time, motor vehicle kilometres are projected to increase by 40% and global air travel is projected to triple in the same period.
How do you think the government should respond to this?

Write a letter to your MP or local council sharing your suggestions.

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