Topic: Sustainability

Lesson: The biofuels debate	KS or Year Group: KS 3
Resources: 1. SKY video 2. Resource 1 – Quotes 3. Resource 2 – Sources of quotes 4. Resource 3 – Biofuels factsheet	**Outcomes:** • Students learn about the basics of biofuel production • Students learn more about the complex issues surrounding biofuel production, particularly in terms of food supply and poverty • Students are able to debate whether biofuel production should be continued into the future

National Curriculum

Key Processes: 2.1a, 2.1b, 2.1c, 2.2a, 2.2b, 2.2c
Range and Content: 3e
Curriculum Opportunities: 4a, 4g

Lesson

Are biofuels the promised solution to petrol pollution or a global catastrophe in the making? If we can assume that the ambition to create a less environmentally destructive and more sustainable fuel is accepted as uncontroversial, this lesson looks at how the realities of biofuel production are proving anything but. The growing of crops for biofuels is having immediate and increasingly worrying impacts on food prices, poverty and the global agricultural industry. This lesson will air these issues by asking students to advocate a range of 'positions' towards the industry in groups, ending with a class vote on whether biofuel production should continue into the future.

Starter

- Play **SKY video**. When the news report has finished, ask the students to provide answers to the following questions (sift and combine their suggestions to put the most accurate statements on the board):
  - What are biofuels and where do we get them from?
  - According to the report, what are the knock-on effects of biofuel production?
  - Why might using food crops for biofuels be regarded as a bad thing?
  - What solution is offered by the chemicals company in this report?
  - What are the benefits of biofuel-powered vehicles for city dwellers in places like Helsinki?

Main Activity

Activity 1

- Divide the class into seven groups. Give each group a copy of **Resource 1 – Quotations.** Ask volunteers to read out each quotation to the entire class and clarify any points that the class do not understand.
- Hand out copies of **Resource 2 – Sources of quotations**.
- Both the quotations and their sources should be cut up at this point (or have been cut up prior to the lesson).
- In their groups, ask the students to match each quotation with who might have said it. This activity will give the students a keener grasp of the types of companies and organisations who have a vested interest in the future of biofuels – whether for or against.
- Read out the following answers:
  1. A producer of biofuels
  2. A pressure group in favour of biofuels
  3. Richmond Council
  4. Environmental pressure groups – working together
  5. A human rights pressure group
  6. An organic farming organisation
  7. The British government
- Ask each group to feed back how many answers they got right.

Activity 2

- Allocate each of the seven 'positions' above to a group.
- Give each group a copy of **Resource 3 – Biofuels factsheet**. Ask each group to read through the factsheet and find the information that they think would support their position.
- Incorporating this information into their own argument, the groups should present their 'case' to the class. Allow the rest of the class to ask questions and refute any of the points made.
- Having heard all of the cases, the whole class should vote on the question: 'Should biofuel production be continued into the future?' Ask a small selection of students from the winning side to say what points of information particularly influenced their decision.
- The teacher should award a prize to the group that presented the most persuasive and well-argued case.

Plenary

Ask the students to summarise the 'case' made by their group. What were the flaws in their argument (as identified by themselves or the rest of the class)?

Aim High
Ask students to research and give a short presentation on the question: 'If biofuels are to be developed, what controls would you want to see on the way biofuel crops are grown?'

Summary of key learning

- Students learn that the issues surrounding biofuel production are complex and are able to come to their own conclusions.
- Students are able to recognise that any decision concerning biofuels made now will have a profound impact in the future.

Resource 1 – Quotations

2. Biofuels offer cost effective ways to reduce greenhouse gas emissions and petrol use in road transport, and in this regard can deliver benefits similar to improved vehicle efficiency.

3. A new charging system for permits started on 2nd April 2007. The charge for most parking permits issued by the Council is now based on the vehicle carbon dioxide emission or cylinder capacity 'band'.

1. Our fuel produces fewer exhaust emissions resulting in reduced production of smog and a decline in breathing problems. It also reduces greenhouse gas emissions such as carbon dioxide, the main contributor to global warming, as much as 39 to 46% compared to petrol.

7. By 2010, 5% of all the fuel sold on UK forecourts should come from biofuels. This is expected to save 1 million tones of carbon a year, the equivalent of taking 1 million cars off the road.

4. It is estimated that the EU would have to use 72% of its arable land to supply just 10% of its fuel use.

6. Growing biofuels would probably use more fossil fuels than it saves, since the fertilizers and weed killers take lots of energy to produce. As a minimum, biofuels would have to be produced by organic farming methods.

5. In one Indonesian province - West Kalimantan - the UN has identified 5 million indigenous people who are likely to be displaced because of biofuel crop expansion.

Resource 2 – Sources of quotations

✂	**The British government**	**An organic farming organisation**
✂	**A human rights pressure group**	**Richmond Council**
✂	**Environmental pressure groups – working together**	**A producer of biofuels**
✂	**A pressure group in favour of biofuels**	

Resource 3 – Biofuels factsheet

The plants used to produce the fuel have removed carbon dioxide from the atmosphere. Fossil fuels such as petrol give off carbon dioxide when they are burnt. Biofuels are, in theory, carbon neutral and less likely to increase the amount of greenhouse gases in the atmosphere.
The use of biofuels means we are likely to reduce the amount of petrol we use. The EU embraced biofuels as a key factor in a low-carbon future, and set a target that 10% of transport fuel will be biofuel by 2020.
Biofuels make countries less dependent on energy from overseas. Former US President George Bush's drive to reduce dependence on foreign oil led him to decree that by 2025, the US should replace 75% of imported oil with biofuel.
The plants used to make biofuels are renewable. Therefore they can provide an unlimited supply of fuel.
Biofuels can easily be used in existing car and lorry engines.
The process of making biofuels does as much environmental damage as fossil fuels.
The use of land to grow biofuels means there is less land available to grow food. With millions of people starving and price of food rising around the world, a senior UN official has described biofuels as a 'crime against humanity'. Britain, the United States and Europe are resisting calls to suspend targets for increasing biofuel use over the next decade.
Biofuels have caused world food prices to go up by 75% because so much land is being used to grow crops for biofuels instead of food.
The switch to biofuels in the West is destroying rainforests in Borneo and other places. Environmentalists claim that an area of forest the size of Wales was cleared last year as Indonesia cashes in on the new 'green gold' and plants miles of palm oil trees to meet surging demand. The UN says the entire rainforest will be gone in 15 years, and the native wild orangutan extinct in just 10.
The best performing biofuels, such as ethanol produced from sugar cane in Brazil, can deliver 10 times more energy than that required to produce them. They release a quarter of the greenhouse gas emissions compared to fossil fuels.
The EU's trade commissioner told Sky News that the world shouldn't turn its back on biofuels. He said 'It's not a question of being in favour of biofuels or against biofuels, we have to be in favour of the right biofuels. Those biofuels are friendly to the environment and don't create more environmental problems than they're helping to solve.'