

LESSON 2: <u>OBTAINING RESOURCES</u>	6 SESSIONS
SESSION 1: <u>ENERGY AND NATURAL RESOURCES I</u>	TIMING: 1 hour
<p>* This indicates the activity can be used for assessment.</p> <p><u>ACTIVITY 1 “What energy is”</u> Grouping: whole group – in pairs</p> <p>Introduce the topic: Energy through the PowerPoint presentation. Slide 2 & 3. <u>Ask:</u> Do you know what energy is? Show them slide 2 and 3. Explain what energy is and give them some examples. Give out worksheet number 2.1. Children write down 5 items that use energy and 5 examples of how it is used. After a few minutes, ask each group for their answers. In pairs, children tell a partner 5 items that use energy. They use the example at the bottom of the worksheet: <i>“I think a washing machine uses energy to clean clothes”</i>.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>RESOURCES: Power Point Presentation document supplied in Support Teaching Resources section. Teachers' glossary supplied at the end of this teaching notes. Worksheet 2.1.</p> </div> <p><u>ACTIVITY 2 “Brainstorming”</u> Grouping: whole group / in pairs</p> <p>Show them slide 4. Explain that humans use energy in everything they do. Tell them that we obtain resources from the Earth to do these activities.</p> <p><u>Ask:</u> Can you say things in which we use energy? Give out worksheet number 2.2. With a partner, children write down activities they do which use energy. There is a square to fill in. Give them a few minutes to write as many activities as they can. Write on the blackboard children's information.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>RESOURCES: Power Point Presentation document supplied in Support Teaching Resources section. Teachers' glossary supplied at the end of this teaching notes. Worksheet 2.2.</p> </div> <p><u>ACTIVITY 3 “Natural resources”</u> Grouping: whole group</p> <p>Introduce the definition of natural resources and how they are classified through the PowerPoint presentation. Show them slides: 5,6,7,8,9,10.</p> <p>Show them slide 5: <u>Ask:</u> What do you think we are going to study? Do you know what a natural resource is?</p>	

Explain what natural resources are and their classification.

Show them slide 6: Ask:

What do you think a renewable resource is?

Explain what renewable resources are.

Show them slide 7: Ask:

What can you see?

What living things can you see? What non-living things can you see?

Explain the classification.

Show them slide 8: Ask:

What do you think an alternative resource is?

Can you think of an alternative resource?

Tell them what an alternative resource is and the classification.

Show them slide 9: Ask:

What do you think a non-renewable resource is?

Can you tell me a non-renewable resource?

Tell them what a non-renewable resource is.

Show them slide 10: Ask:

What can you see?

Do you know what fossil fuels are?

Do you use these non-renewable resources at home?

Point out the different types of non-renewable resources.

RESOURCES: Power Point Presentation document supplied in Support Teaching Resources section. Teachers' glossary supplied at the end of this teaching notes.

ACTIVITY 4 "Memory game"

Grouping: in pairs

Give out **worksheet 2.3a / 2.3b / 2.3c / 2.3d**.

Revise the memory game vocabulary. In pairs, they cut out the cards and play the memory game. To differentiate the picture and word cards photocopy them in different colours. Children put their cards face down. Ask them to match the pictures with the words. When they match a picture with a word, they divide them into renewable or non-renewable resources.

For example, they use the sentences: Natural Gas **is a non-renewable resource** and put the picture and the word below the non-renewable card. The same for: Wind energy **is a renewable resource**. Partner says: That's right / That's wrong. It's my turn / It's your turn.

(Fast finishers can classify the renewable resources into alternative resources, too).

Correct the classification and the picture/word on the blackboard.

Talk about renewable and non-renewable resources. Possible questions:

What is the difference between a renewable resource and a non-renewable resource?

Has any student ever used an alternative resource / renewable resource / non-renewable resource at home? Why?

RESOURCES: **Worksheet 2.3a / 2.3b / 2.3c / 2.3d**. Scissors.

SESSION 2: ENERGY AND NATURAL RESOURCES II**TIMING:** 1 hour**INTRODUCTION “Natural resources”****Grouping:** whole group / in pairs

Revise the topic: Natural resources through the PowerPoint presentation. Slide 6,7,8,9,10.

Explain the main differences between renewable and non-renewable resources.

Ask them some questions about:

- . Natural Resources
- . Classification between Renewable Resources and Non-renewable resources.
- . Vocabulary

Encourage children to recognize and reproduce the vocabulary. Children compare the different features in a renewable and non-renewable resource. Use activity 1: “Think link”.

ACTIVITY 1 “Think link”**Grouping:** in two groups.

Show them slide 11.

Divide the class into two teams, A and B. Give an example of a sentence linking two of the images e.g. The Sun and wind are alternative energies. One child from group A says a sentence linking 2 images and the other team says if it is a good sentence. If it is, they get 1 point. Repeat with team B. Play for 5 minutes and see which team wins.

RESOURCES: Power Point Presentation document supplied in Support Teaching Resources section.

ACTIVITY 2 “That’s right / That’s wrong”**Grouping:** in pairs.

Give out **worksheet 2.4**. Teach the sentence structure and give them some oral examples. Put students into pairs. Student A asks questions to Student B who must guess if it is a renewable or non-renewable resource.

RESOURCES: **Worksheet 2.4.**

ACTIVITY 3 “Mind map”**Grouping:** in pairs.

Give out worksheet 2.5a for faster students and 2.5b for weaker students.

In pairs, children fill in the gaps in the mind map with the renewable and non-renewable resources.

Give them some examples and clues.

They can use the work bank on worksheet 4.

Correct the mind map on the blackboard. Children can count how many words they got right.

RESOURCES: **Worksheet 2.5a & 2.5b.**

SESSION 3 & 4: ENERGY AND NATURAL RESOURCES III**TIMING:** 2 hours**INTRODUCTION “Can you remember?”****Grouping:** whole group

Remind the children about the information given in sessions 1 and 2. Use the children's Mind Map. Encourage children to talk about what is on it.

ACTIVITY 1 “Let's investigate each different resource”**Grouping:** whole group

Show them slide 12: Tell the children that we are going to investigate each different resource. After each slide, ask children for examples of where they have seen the resources e.g. the dam outside Tarragona / a wind sock near the motorway.

Show them slide 13: *Start with renewable resources.*

Show them slide 14: Wind turbines. Elicit the energy resource they use.

Show them slide 15: Solar panels. Elicit the energy resource they use.

Show them slide 16: Tidal. Elicit the energy resource they use.

Show them slide 17: Biomass. Use the pictures to explain what this energy resource is.

Show them slide 18: Geothermal. Use the diagram and picture to explain this energy resource.

Show them slide 19: Hydro-electric. Use the pictures to explain what this energy resource is.

Show them slide 20: Wave power station. Use the diagram and picture to explain this energy resource.

Show them slide 21: *Follow with non-renewable resources.*

Show them slide 22: Nuclear power plant. Explain what this energy resource is.

Show them slide 23: Oil & gas power stations. Explain what this energy resource is.

Show them slide 24: Mines. Explain what this energy resource is.

Ask some questions for each resources, such as:

What can you see?

Which natural resource is it?

Is this resource renewable or non-renewable?

Do you know how it works?

What is good about this resource?

What is not good about this resource?

Do you have solar panels in your home?

Can you see some wind turbines / dams / power stations in your region?

Do you use natural gas for your central heating?

Let them think and discuss the answers.

RESOURCES: Power Point Presentation document supplied in Support Teaching Resources section. Teachers' glossary supplied at the end of this teaching notes.

ACTIVITY 2 “Jigsaw game” ***Grouping:** whole class, individual, in pairs**STEPS:**

1. Hand out copies of the first natural resource: Biomass to each child (**worksheet 2.6k**). Elicit what they can see in the picture. They listen to the teacher as he/ she reads the information on the left. Read the questions out loud one by one and ask what the answers are. Children then write them. Teach the first question: What is the resource? and the answers: Yes, it is / No, it isn't
2. Hand out the next natural resource: Wave Power Stations (**worksheet 2.6j**). Children read, then write the answers. When finished, they check answers with a partner first, and afterwards as a class with the teacher.
3. Put students into pairs. They exchange the information about eight more natural resources. Student A asks questions about the natural resource to Student B. Student B answers the questions. Student A writes the answers. And vice-versa.

Wind turbines / Solar Panels

Tidal / Power Station

Hydro-electric / Nuclear Power Plant

Coal / Geothermal

RESOURCES: Worksheets 2.6a, 2.6b, 2.6c, 2.6d, 2.6e, 2.6f, 2.6g, 2.6h, 2.6i, 2.6j, 2.6k.**ACTIVITY 3** “Minibook”**Grouping:** individual

Children make a minibook. They colour the pictures on each resource. They cut out the information on the fact files and the questions/answers they have written about the resources (fact files). They match and stick them together.

Use fasteners to make the minibook.

RESOURCES: Worksheets 2.6 (a-k), scissors, felt tip pens and fasteners.

SESSION 5: LET'S MAKE A MURAL**TIMING:** 1hour**ACTIVITY 1 ‘Let’s make a mural’****Grouping:** in pairs

Children make a mural for each renewable and non-renewable energy resource.

They choose a natural resource themselves.

Children glue some pictures of the resource and write about it.

The mural must include: the title of the resource, pictures of this resource, what this resource is, where we can see / find it and write two good things and two bad things about it.

Give out **worksheets 2.7 and 2.8**, where they can find the steps and an example of how to make the poster and a presentation (pre-teach language frame). They can find pictures on the internet.

RESOURCES: Internet, a colourful board, glue, scissors, felt tip pens and blank papers.
Worksheets 2.7 and 2.8

SESSION 6: QUIZ**TIMING:** 1 hour**ACTIVITY 1 “Mural presentation” *****Grouping:** in pairs

Children present the mural that they have done to the rest of the class.
Teacher and children display the murals on the classroom walls.

RESOURCES: Children's murals and blu tack.

ACTIVITY 2 “Quiz”**Grouping:** individual, whole class

Give out **worksheet 2.9**. Children read the text. After reading the text, tell the children that they are going to do a quiz.

Give out **worksheet 2.10**. Read the questions aloud and children answer them.

Give out children **worksheet 2.11 and 2.12**. Correct the quiz answers and give them a reason for each answer using worksheet 2.12.

Children count how many answers they have guessed. Depending on their score they get different feedback, for example: “Well done! You know a lot about natural resources.”

RESOURCES: **Worksheets 2.9, 2.10, 2.11, 2.12.**

TEACHERS' GLOSSARY**OBTAINING RESOURCES****ENERGY AND NATURAL RESOURCES****What is energy?**

We use energy in everything that we do. We need energy to walk to school; we need energy to play, to run a computer or to cook food Plants need energy, too and a lot of our devices / items need energy to work.

Electricity can be made from renewable or non-renewable energy sources.

Renewable

Wave (alternative)

Geothermal

Hydro-electric

Solar (alternative)

Wind (alternative)

Biomass

Tidal (ocean tides)

Wood

Non-renewable

Oil (Petroleum / diesel) and Natural Gas

Coal

Nuclear

RENEWABLE RESOURCES

Renewable energy resources like the sun, wind, waves and the heat of the earth are also used to make electricity.

Renewable resources can be used again and again and should not run out.

Renewable resources are either carbon neutral or do not produce greenhouse gases so are much less harmful to the environment. Alternative resources are all renewable but they do not need regeneration.

WAVE

Waves are created by the wind blowing across the sea and by the gravitational force of the moon. Wave power uses the energy of the waves to turn turbines that make electricity.

Advantages

Waves are free and will not run out so the cost is in building the power station.

Wave power does not produce greenhouse gases.

There are very few safety risks with wave power generation.

Disadvantages

Waves can be big or small so you may not always be able to generate electricity.

You need to find a way of transporting the electricity from the sea onto the land.

Not many people have tried to generate electricity this way yet so the equipment is expensive.

GEOTHERMAL

Geothermal power uses the heat that comes from deep rocks under the surface of the Earth. The temperature of the Earth increases towards its centre. The hot water or steam that comes from deep within our planet can be used to make electricity. It shows itself in the fountains of boiling water and steam known as geysers.

Advantages

Geothermal energy does not produce greenhouse gases. The energy source is free and will not run out.

Disadvantages

There are not many places where we can build geothermal power stations.

Harmful gases and minerals may occasionally come up from the ground below. These can be difficult to control.

HYDRO-ELECTRIC

Hydro-electricity is generated from running water. Dams are built across a lake or river in a valley to trap water. The water flows through tunnels and turns the turbines which make electricity.

Advantages

When the electricity is generated, no greenhouse gases are made.

The water used is free. It is a renewable energy resource.

Disadvantages

The dam is expensive to build.

By building a dam, the nearby area has to be flooded and this could affect nearby wildlife and plants.

If it does not rain much we may not have enough water to turn the turbines.

SOLAR

The Sun releases an amazing amount of energy due to the nuclear fusion of hydrogen taking place within its core. Solar panels, called photovoltaic cells are used to convert the Sun's energy into electricity. The Sun can also be used to heat water passing through special solar collectors.

Advantages

The energy from the Sun is free.

The sun does not produce greenhouse gases.

The Sun will always be there during our lifetime.

Disadvantages

It is relatively expensive to build solar power stations.

When it is cloudy or at night there is not enough light so no electricity can be made.

Some people don't like the look of solar panels.

WIND

Wind is made when the Sun heats the Earth and the area above land gets hotter than the area above water. The hot air above land rises upwards leaving an area of low pressure. Cooler air moves into this area of low pressure. Cooler air moves into this area of low pressure making wind which we use to turn wind turbines and make electricity. Wind used to be used to turn windmills to grind wheat into flour.

Advantages

Wind is free and will not run out so the cost is in building the wind turbine.

Wind power generation does not create greenhouse gases.

There are very few safety risks with wind turbines.

Disadvantages

We can only use windmills in areas where there is a lot of wind. Sometimes there may be days where there is little wind.

We need a lot of turbines to make a lot of electricity.

Some people don't like the way wind turbines look. They think they spoil the countryside.

BIOMASS

Biomass uses the energy from plants and waste materials to make electricity. For example, wood or animal droppings can be burnt to make steam that turns turbines to make electricity. This is garbage! As bacteria decomposes, organic waste such as food garbage makes compost. Some cities produce electricity by burning the compost in specially-designed power plants.

Advantages

The fuel is cheap and can use things that we might otherwise throw away.
We can find waste everywhere and it should not run out.

Disadvantages

When the fuel is burned greenhouse gases are made which pollute the environment.
Sometimes people grow biomass crops where we could grow food.
We may not have enough space to grow enough biomass fuel.

TIDAL

Tidal energy comes from the movement of water in the sea by the tides. These tides happen twice a day. The flow of water that is created by the tides is used to turn generators that make electricity.

Advantages

Tides are free once the power station has been built and will not run out.
No greenhouse gases are produced when we make the electricity.
We know exactly when the tides happen so we know when electricity will be made.

Disadvantages

You may need to build a large wall called a dam to make the water flow through the generators.
This may not be good for plants and animals that live nearby.
The tides only happen twice a day so can only produce electricity for that time.

NON-RENEWABLE RESOURCES

Most of our electricity comes from power stations that use fossil fuels like coal, oil and gas to generate the electricity.

Fossil fuels are referred to as non-renewable energy sources because, once used, they are gone. They are called non-renewable resources because you can't make any more and they will eventually run out. Unfortunately, burning fossil fuels produces greenhouse gases like carbon dioxide which may cause global warming.

OIL & NATURAL GAS

Oil (petroleum & diesel) and Natural Gas are fossil fuels which were formed in the Carboniferous period millions of years ago. As more and more layers of sediment covered the sea creatures, they were crushed by the massive pressures and the carbon in their bodies eventually turned to oil and gas. We burn this oil and gas in power stations today.

Sometimes natural gas is confused with gasoline, the fuel in cars. They are not the same. Gasoline is a mixture of liquids, and natural gas is mainly methane and is piped into homes where it is used as an energy source for heating and drying. Oil is the black, thick liquid pumped from below the earth's surface. To make it useful, it is refined.

Advantages

Oil and natural gas are found in lots of places in the world.
We can transport oil and gas in pipes and by using tankers or ships.

Disadvantages

Environmental damage can be caused when building the rig and by accidental oil spillages.
Oil and gas are not renewable, so once the supplies are used, they will run out.
Burning these fuels releases greenhouse gases into the air. This may add to global warming.
The price of oil and gas will increase because supplies are running out and lots of people will want it.
Working on an oil or gas rig can be dangerous due to the risk of explosions and bad weather.

NUCLEAR

Nuclear fuel is made from radioactive Uranium Ore which occurs naturally in the ground, particularly in Australia, Canada and America. It is also known as yellowcake for its distinctive bright yellow colour. They purify it to provide the shiny Uranium metal used in nuclear power plants.

Advantages

Nuclear fuel does not make harmful greenhouse gases.

You only need a very small amount of nuclear fuel to make a lot of energy.

Disadvantages

The waste that is produced when using nuclear fuel is radioactive and very harmful. It needs to be disposed of carefully.

Nuclear power stations are at risk from terrorist attack and sabotage.

World uranium supplies may run out in about 50 years.

COAL

Coal is a fossil fuel which was formed in the Carboniferous period millions of years ago, (before the dinosaurs!), when the earth was covered with oceans, trees and plants!!! When the trees and plants died they formed a layer of peat, which over time became buried by more and more layers of clay, sand and rock. Over millions of years, the pressure of these extra layers turned the peat into the coal we put on our fires and fuel our power stations with today.

Advantages

Coal can be found in lots of places in the world and there is still plenty in the UK.

Coal can be easily transported to the power stations and coal is a relatively cheap energy source.

Disadvantages

To dig up coal, we have to create mines which can be dangerous and not very nice to look at.

Transporting coal by lorry and train from the mine to the power station causes pollution.

Burning coal produces polluting gases like sulphur dioxide which make acid rain.

Burning coal releases the most greenhouse gases which may add to global warming.

Coal is a non-renewable resource and will run out in about 100 years.

Coal miners can be affected by black lung disease or pneumoconiosis and also emphysema if they breathe in too much of the coal dust.

TEACHERS' GLOSSARY ADAPTED FROM CHILDREN'S, THE UNIVERSITY OF MANCHESTER