GREEN ENERGY IN CLWYDIAN RANGE AND DEE VALLEY

SUPPORT MATERIALS

If you need further support on specific aspects of outdoor learning these materials can enhance the engaging experiences you are providing. They can support you as you design, plan and implement your curriculum. Outdoor learning is a great way to develop learners' integral skills (creativity and innovation, critical thinking and problem-solving, personal effectiveness, planning and organising). You will want to focus on why learning matters and ensure you are meeting your learners' needs.
These materials show a path that could be taken through the activity. This is not meant to be prescriptive. You should adapt your approach depending on your learners' needs and interests and your local area.

OVERVIEW

Learners consider what energy is, the different types of energy and how electricity is generated from different sources. They visit the local area to look for evidence of onshore renewables and use their ideas to create a class display. Learners explore information about Shotwick Solar Park and design a solar farm using set criteria. They find out about the proposed Gaerwen Wind Farm and consider the arguments for such a development. Learners consider the pros and cons of renewable energy developments and find a suitable place locally, where they think a new renewable energy installation could be built.

CURRICULUM FOR WALES

Areas explored:

- Health and Well-being
- Humanities
- Languages, Literacy and Communication
- Mathematics and Numeracy
- Science and Technology

Activity also incorporates aspects of cross-curricular skills outlined in the LNF and DCF.

RESOURCES

Internet enabled device and internet access.
Access to Find out what every symbol means on an OS Explorer map - OS GetOutside.

DOING THE ACTIVITY

- Most tasks require learners to work in pairs or groups.
- Encourage learners to share their ideas, and through open questioning, explain and justify their ideas when possible. Focus questions have been suggested to guide learners through the tasks.
- To access the scale in Google maps, click on 'View larger map'.
- Some tasks might be more effective if pairs or groups of learners have access to an internet enabled device.
- When taking learners outdoors, it is essential that the Countryside Code is adhered to and any relevant risk assessments have been carried out with risks mitigated.

TASK 1

WHAT IS GREEN ENERGY?

Explain to learners that in this task they will consider what energy is, the different types of energy and how electricity is generated from different sources. They visit the local area to look for evidence of onshore renewables and use their ideas to create a class display.

Screens 3-4

Ask learners to consider what energy is and discuss the questions posed.

Focus questions

- What is energy? Why do you think that?
- What types of energy are there? How do you know?
- What activities do you do that require energy?

Explain there are different types of energy and invite them to discuss the questions posed.

Focus questions

- What types of energy are used in your home and in school? List them and give an example of how each is used.
- Where do you think this energy comes from? Why?

Screen 5

Invite learners to consider the pie chart showing typical usage of electricity in a house and to discuss the questions posed.

Focus questions

- How can you estimate the percentages used for each category?
- How does your house use electricity? Sketch a pie chart to show your ideas.
- How is your pie chart different and/or similar to the one shown here? Why do you think that is?

Screen 6

Explain to learners that electricity is generated from a range of sources and that solar energy is seen as 'clean energy'.

Invite them to sort each type of energy generation into 'dirty' or 'clean' in the Venn diagram on screen.

Screen 7

Ask learners to read about how electricity is generated and to discuss the questions posed.

Focus questions

- Which sources are renewable? Why?

Screens 8-9

Invite learners to read further information about how electricity is generated and to complete the drag and drop task to show their ideas. Then, ask them to discuss the questions posed.

Focus questions

- What do you think 'green energy' means?
- What ways do you know about that generate green energy? Why do you think each of these ways is green?

Screen 10

Explain to learners that there are different terms we use to categorise energy generation and invite them to match each term with its definition using the drag and drop facility.

Screen 11

Ask learners to read the information and to discuss the questions posed.

Focus questions

- If green energy is no harm to the environment even when building or siting structures, are any of these renewable energy sources really green? Why?

Screens 12-13

Inform learners they will walk around the local area to look for evidence of onshore renewables and that while outside, they should take notes and photographs of any evidence they find to use in a display. Ask learners to discuss the questions posed.

Focus questions

- What will you look for? Why?
- Where would you expect to find these things? How do you know?

Then, take learners outside look for evidence of onshore renewables.

Screen 14

Invite learners to produce a class display of their evidence, possibly categorising their evidence into the different onshore renewables.

TASK 2

WHICH ONSHORE RENEWABLES DO WE USE?

Explain to learners that in this task they will explore Shotwick Solar Park and design a solar farm using set criteria. They find out about the proposed Gaerwen Wind Farm and consider the arguments for and against such a development.

Screens 3-4

Inform learners there are many onshore renewable energy installations planned or already in existence just outside the Clwydian Range and Dee Valley National Landscape.

Ask them to use the aerial view in Google Maps to find Shotwick Solar Park and to discuss the questions posed.

Focus questions

- What does the park look like from the air? Why do you think that?
- How do you know this is the solar park?
- How could you use the scale on the map to estimate the area of the solar park?
- What do you think the area of the solar park is? How did you work it out? Why?
- How does your estimate compare to others in the class?

An acre is a unit of land measurement. One acre is equivalent to 4,047 square metres.

- How many acres do you estimate the solar park covers? How did you work this out?

Screen 5

Ask learners to look at the information about Shotwick Solar Park and to consider the questions posed.

Focus questions

- How close was your estimate to 220 acres? How could you have been closer? Why do you think that?
- How many kWh does each solar panel generate? How do you know? How did you work this out?
- How many kWh does the average household use every year? How can you work it out?

Screen 6

Inform learners that there has been much discussion about the use of solar farms in and around the Clwydian Range and Dee Valley National Landscape. However, solar energy is clean and is seen as a widespread solution to address global energy costs and climate change. Explain that photovoltaic cells are often arranged in arrays and that a large numbers of arrays together makes a 'solar farm'.

Screen 7

Explain to learners that one challenge to solar farms is the amount of land required to site the arrays. Engineers have to undertake a cost-benefit analysis in their planning, taking into consideration any potential ecosystem impacts. Inform learners that their task is to design a solar farm using the 'Designing a solar farm criteria' sheet provided.

Screen 8

Invite learners to follow the link to find out more about the proposed Gaerwen Wind Farm: Gaerwen Wind Farm Pre-application Consultation and to discuss the questions posed.

Focus questions

- What did you find out about the wind farm development?
- Do you think it should go ahead? Why?
- What might a 200m tall turbine look like? Go outside and measure 200m. What do you think? Why?
- How would this turbine compare to the tallest building in Wales? Find out. What do you think? Why?

Screen 9

Inform learners that many people have opposed the Gaerwen Wind Farm development.

Ask them to read the newspaper article from 2022 Ex-pop star's alarm over plan for wind turbines as tall as the Gherkin at beauty spot - North Wales Live and discuss the questions posed.

Focus questions

- What information can you find in the article?
- Why are people against the wind farm?
- Why do people support the wind farm? What do you think? Why?
- How do you think articles such as this affect new developments? Why?
- What changes have RWE made to the original proposal? How do you know?
- Why do you think they have done this?

TASK 3

A NEW WIND OR SOLAR INSTALLATION?

Explain to learners that in this task they will explore the pros and cons of renewable energy developments and find a suitable place locally, where they think a new renewable energy installation could be built.

Screen 3

Explain to learners that increasing the number of renewable energy developments can cause differences of opinion. Ask learners to consider the questions posed and use the on screen table to record their ideas.

Focus questions

- What are the benefits of a renewable energy development? Why do you think that?
- Who benefits? How do you know?
- What might be the disadvantages (cons) of a renewable energy development? Why do you think that?
- How do you think and feel when you see solar panels and onshore wind turbines? Why?

Screen 4

Inform learners that they are going to find a suitable place locally, where they think a new renewable energy installation could be built. Ask learners to use Google Maps of the local area as a starting point and to discuss the questions posed.

Focus questions

- What sort of locations are you looking for? Why?
- Where are the possibilities?
- Are there any issues with these possible locations? What are they? Why are they issues?
- How will using the map help you when you walk around the local area looking for locations? Why do you think that?

Screens 5-7

Inform learners they will walk around the local area to find possible locations for the installation, taking notes and photographs of possible locations and asking people who live nearby their thoughts about a new installation. Ask them to discuss the questions posed.

Focus questions

- What sort of locations might be suitable? Why?
- Where couldn't you build a new installation? Why not?
- Why are the views of local people important?

Then, take learners outside to look for suitable locations where they think a new renewable energy installation could be built. Ask learners to choose two or three possible locations and to discuss the questions posed.

Focus questions

- What are the pros and cons of each location?
- Which are more important – the pros or cons? Why?
- Which location will you choose? Why?

Screen 8

Inform learners that they are going to present their ideas for the location of a new renewable energy installation to the class. Prior to carrying out research ask them to discuss the questions posed.

Focus questions

- What technologies could you use? Why?
- Which is the best technology to choose? Why?
- What arguments will you use to convince others that you have chosen the most suitable location?
- What will you do if people disagree with your ideas?

Screens 9-11

Ask learners to prepare their presentation taking account of what the audience will know and understand and to ensure they include why they chose this technology, how it works and why the site was chosen.

Invite learners to present their ideas and to ask for class feedback these things.