Applicable standards
National Geography Standards 2nd Edition

Geography Element of the curriculum	Lessons							
	1	2	3	4	5	6	7	8
The world in spatial terms								
• Standard 2: How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information	✓	✓			✓			
Physical systems								
• Standard 7: The physical processes that shape the patterns of Earth's surface	✓			✓				
Environment and safety								
• Standard 15: How physical systems affect human systems	✓	✓						
Physical systems								
• Standard 18: How to apply geography to interpret the present and plan for the future.		✓		✓	✓	✓	✓	

SCHEME OF WORK

Lesson 1: What is the global atmospheric circulation model?

Overview

In this lesson students will learn about jet streams, the global atmospheric circulation model and how they affect the weather around the world. Students will be able to explain the global circulation atmospheric model through the use of either a drawing, a model or a physical display.

Learning outcomes

- Identify different atmospheric events that will affect weather
- Describe the global atmospheric circulation model
- Explain how global atmospheric circulation affects weather

Resources

Slideshow 1: What is the global atmospheric circulation model?

Student Sheet 1a: Air pressure and jet streams

Student Sheet 1b: Global atmospheric circulation model

Student Sheet 1c: Jet stream

Thinglink: How do weather cells affect the global climate?

Subject Update: Learn more: Global atmospheric circulation

Lesson 2: What impacts the weather in NW Europe?

Overview

In this lesson students will use all their knowledge of weather systems and use a variety of satellite maps of Northwestern Europe to predict the weather for the next day. Students will then go on to use satellite images to describe the weather of Northwestern Europe and explain what has caused this weather and what conditions would be expected as a result of what is shown on the satellite images.

Learning outcomes

- Label the countries in Northwestern Europe
- Describe and explain the climate of different countries in Northwestern Europe
- Explain what could affect variations of weather and climate in Europe

Resources

Slideshow 2: What impacts the weather in NW Europe?

Student Sheet 2a: Map of Northwestern Europe

Student Sheet 2b: Climate data for Europe

Student Sheet 2c: European climate data exam questions

SCHEME OF WORK

Lesson 3: How can we predict the weather of the future?

Overview

This lesson for higher ability students extends student knowledge of climate models and how they can be used in policy development. The HIWAVES research team wrote an academic paper investigating the impact of predicted climate on renewable energy production. This lesson looks at how the research team used climate models as part of their work and then focuses on the academic journal article written by the team and supports students to access information from this level of research output.

Learning outcomes

- Examine the need to understand what the future climate may look like
- Name and evaluate the effectiveness of climate models
- Describe the findings from the academic journal article

Resources

Slideshow 3: How can we predict the weather of the future?

External Link: Meteological conditions leading to extreme low variable renewable energy production and extreme high energy shortfall (2019) Van der Wiel et al.

External Link: Carbon brief Q&A: How do climate models work?

Subject Update: Learn more: Climate models

Subject Update: Climate and Energy HIWAVES journal article student summary

Lesson 4: How is energy produced?

Overview

In this lesson students will learn about how different types of energy are generated and stored, focussing on examples of renewable and non-renewable sources. Students will also look at the energy production matrix of the UK, the Netherlands and the European union, comparing and contrasting them.

Learning outcomes

- Describe the different types of energy
- Explain how energy is produced and stored
- Analyse the different energy matrices

Resources

Slideshow 4: How is energy produced?

Student Sheet 4a: Renewable energy

Student Sheet 4b: Non-renewable energy

Lesson 5: What are the issues with renewable energy?

Overview

Renewable energy is currently responsible for approximately 30% of energy production in the UK. This figure has steadily risen since 1990, but is the increase enough? Can we produce enough energy via renewable sources to meet energy needs? What are the issues faced when generating renewable energy? In this lesson students will evaluate the positives and negatives of renewable energy production. They will also consider how renewable energy is affected by the weather.

Learning outcomes

- Map the location of renewable energy production
- Consider the threats to the production of renewable energy
- Explain the effectiveness of renewable energy production

Resources

Slideshow 5: What are the issues with renewable energy?

Student Sheet 5a: Mapping UK renewable energy production

Student Sheet 5b: UK climate data

Lesson 6: What will our future energy needs be?

Overview

In this lesson students will be thinking about what our energy needs may be in the future, and how we will generate enough energy to meet those needs. Students will also study a diagram from an academic journal article to evaluate the reliability of renewable forms of energy.

Learning outcomes

- Outline the generation and storage of renewable energies
- Predict future energy demand
- Evaluate the reliability of renewable energy

Resources

Slideshow 6:
What will our future energy needs be?

Student Sheet 6a:
Electricity consumption

Student Sheet 6a:
How reliable is renewable energy?

Lesson 7: How can governments plan for a low carbon future? Part 1

Overview

This summary lesson sees students work in groups to propose how a low carbon future could be achieved through carefully planned electricity production. Working in small groups students will consider how electricity should be generated in the future as part of a low carbon strategy. Students will need to evaluate different strategies to ensure that their proposals are robust enough to cope with the risks identified in the research. This research will be presented in the next lesson. Students will need access to computers for research, planning and creating a presentation.

Learning outcomes

- Assess the need for low carbon electricity generation
- Propose methods for generating electricity in the future
- Evaluate strategies to manage any risks involved

Resources

Slideshow 7:
How can governments plan for a low carbon future? Part one

Student Sheet 7a:
How can governments plan for a low carbon future?

Mark Scheme 7a:
Assessment Criteria

Lesson 8: How can governments plan for a low carbon future? Part 2

Overview

In their small groups, students will be presenting their ideas for a low carbon future to the class. Each student group will evaluate the other presentations. Once the presentations are finished, students will reflect on the whole experience. They need to consider what they contributed, what they discovered, what sources of information they used, and what they might change.

Learning outcomes

- Present with confidence and clarity, providing evidence for your ideas
- Propose an energy solution for a low carbon future
- Evaluate success for yourself and others using criteria

Resources

Slideshow 8:
How can governments plan for a low carbon future? Part two

Student Sheet 8a:
Group peer assessment

Student Sheet 8b:
Self-assessment evaluation sheet