Unit 10 Weather patterns over Europe

About the unit

This unit focuses on patterns and processes associated with weather and climate. Pupils carry out this work in the context of the European Union, which enables them to extend and consolidate their knowledge of places and environments.

Pupils are encouraged to work together to produce a weather forecast for a particular location and to choose a suitable holiday destination for a family with particular interests. In carrying out these activities they engage in enquiry-based learning and problem solving, interpret weather maps and satellite images, use ICT skills and learn to draw and interpret climate graphs.

Pupils distinguish between weather and climate and identify how human activities may be linked with climate patterns; the more detailed study of air masses is left until key stage 4.

This unit is expected to take 8–11 hours.

Key aspects

Geographical enquiry and skills

Pupils will:
- ask geographical questions
- analyse evidence and draw conclusions
- use extended geographical vocabulary
- use atlases/globes/maps
- use secondary evidence
- draw maps, plans and graphs
- experience decision making

Knowledge and understanding of places

Pupils will:
- locate places and environments
- describe scale contexts

Knowledge and understanding of patterns and processes

Explored through:
- weather and climate

Knowledge and understanding of environmental change and sustainable development

Not focused on

Expectations

At the end of this unit

most pupils will: describe and begin to explain patterns of weather and climate in a European-scale context; describe and begin to explain how physical and human processes interact to produce distinctive characteristics of places which people may select to visit for holidays; recognise some of the links between weather and climate and how they affect people's lives and work patterns; suggest relevant geographical questions about the physical characteristics of Europe; select and use appropriate skills and sources of evidence to investigate weather and climate patterns; suggest plausible conclusions and present their findings both graphically and in writing

some pupils will not have made so much progress and will: begin to recognise and describe patterns of weather and climate in a European-scale context; recognise and describe how physical and human processes interact to produce distinctive characteristics of places which people may select to visit for holidays; begin to recognise how weather and climate affect people's lives and work patterns; begin to suggest relevant geographical questions about the physical characteristics of Europe; use a range of geographical skills and sources of evidence to investigate weather and climate patterns; use primary and secondary sources of evidence and communicate their findings using appropriate vocabulary

some pupils will have progressed further and will: describe and explain patterns of weather and climate in a European-scale context; appreciate the relationships between physical and human processes and show how these create geographical patterns to produce distinctive characteristics of places which people may select to visit for holidays; describe and explain how and why weather and climate affect people's lives and work patterns; identify relevant geographical questions about the physical characteristics of Europe; select and use effectively a range of skills and sources of evidence to investigate weather and climate patterns; present well-argued reports and begin to reach conclusions that are consistent with the evidence

Prior learning

It is helpful if pupils have:
- studied local weather and climate and what happens for rain to form
- investigated relationships between data in a computer spreadsheet
- used political and physical atlas maps

Language for learning

Through activities in this unit pupils will be able to understand, use and spell correctly words relating to:

- meteorology, *eg weather, climate, physical, hydrological cycle, condensation, evaporation, stratus, cirrus, cumulus, precipitation, relief, convectional, frontal, satellite image, temperature*

Speaking and listening – through the activities pupils could:

- describe how the work was undertaken and what led to the conclusions

Resources

Resources include:

- class set of atlases with climate maps of Europe, current satellite images of Europe (from METFAX – tel (index page) 09003 40 04 02, or (Helpline) 08700 75 00 75), or internet sites, *eg www.eumetsat.de/en/; www.nottingham.ac.uk/meteosat*
- OHT sheets
- outline maps of Europe
- video with animated weather footage and/or textbook diagrams
- 'Geography – it makes you think', *Teaching geography*, Vol 22, No 3, July 1997 (Geographical Association)
- a week's weather forecasts (television)
- climate graphs for European localities
- newspaper weather maps
- meteorological records, *eg school or local weather station*
- supporting video programmes:
  - *The geography programmes – Geography in animation, programme 8: European climates* (BBC Schools)
  - *Geographical eye – Weather and climate, programme 5: Climates in Europe* (Channel 4 Education)

Future learning

This unit provides a basis for GCSE units concerned with knowledge and understanding of weather and climate patterns and processes. It might also lead to the study of global climate, microclimates and named climatic types and associated ecosystems later in key stage 3.

Links

The activities in this unit link with:

- other geography units – unit 14 'Can the earth cope?', unit 24 'Passport to the world'
- mathematics – interpreting data and drawing conclusions
- ICT – projecting or drawing images, using the internet databases and spreadsheets
- key skills – working with others, improving own learning and performance
- science – work on the water cycle

1	Learning objectives Pupils should learn:	Possible teaching activities	Learning outcomes Pupils:	Points to note
What is Europe like?				
	• to investigate the physical characteristics of Europe using atlas maps by asking relevant geographical questions • to identify geographical patterns on a series of maps	• Using a class set of atlases, ask pupils to consider the significance of lines, colours, symbols on a variety of maps of Europe, *eg physical, climate, vegetation*. Discuss with pupils such questions as *What patterns are shown? Are the patterns on different maps similar/different? Why? Which lines on the maps really exist on the earth's surface, for instance coastlines, rivers*? It may be helpful to reduce the number and variety of maps for lower-attaining pupils.	• name and locate correctly the main physical features of Europe • relate cartographic representations to the reality of the earth's surface • identify how physical characteristics/patterns are interrelated	• Make reference to pupils' glossaries and to previous definitions of patterns.
What is the difference between weather and climate? What can satellite images tell us about the weather?				
	• to investigate the nature of the information shown on weather satellite images and climate maps • to interpret satellite images and relate them to current weather conditions • to draw a sequence of sketch maps • to determine how and why aspects of weather vary from place to place	• Discuss with pupils the difference between weather (here and now) and climate (averages over time) using atlas climate maps, and weather satellite images and forecasts for Europe. • Using a 'recent' weather satellite image of Europe (visible or infrared) projected on to a whiteboard, ask pupils to describe what is shown, *eg country outlines, shades of grey, different cloud patterns*. 'Draw in' important features and annotate using a board marker. Mark in places on the image and discuss the cloud cover. Ask pupils to relate the image to the sky outside the classroom. *How is the sky different seen from below and above? Why?* Illustrate basic cloud types (cirrus, cumulus, stratus). Ask pupils to draw and annotate the cloud patterns on a prepared outline map of Europe. • Repeat this activity at the start of each lesson, using an up-to-date image, to reinforce and build on understanding. Encourage pupils to assume greater autonomy in their recording. Eventually they should have a sequence of dated sketch maps.	• describe the difference between weather and climate • describe what a weather satellite image shows, using annotated sketch map(s) • know the names of different cloud types	• ICT can be used to project and draw on the image. A computer linked to a large screen or TV, an interactive whiteboard or other system could be used. • Satellite images can be obtained from a number of internet sites, the Meteorological Office's METFAX service or a school satellite system.
What are clouds and why does it rain?				
	• to recall information about the components and links in the water cycle • to use information/vocabulary about the water/hydrological cycle to identify reasons for different types of rainfall	• Ask pupils what they remember about the hydrological cycle and the states of water. Use a variety of sources to demonstrate condensation, *eg on a cold window, animated sequences from video, diagrams*. Ask pupils to note new vocabulary. Provide pupils with the story of a water molecule completing the water cycle, written in non-geographical terminology. Ask pupils to use the vocabulary bank to write it correctly.	• identify the components of the hydrological cycle and use appropriate vocabulary to describe it	• Science: links with key stage 2 work on the water cycle.

Learning objectives Pupils should learn:	Possible teaching activities	Learning outcomes Pupils:	Points to note
What can weather maps tell us?			
• to interpret weather maps and compare their information with that shown on satellite images	• Use an up-to-date weather satellite image of Europe to investigate the possible reasons for the different types of cloud, *eg relief, frontal, convectional* (alternative images may also be used if recent weather conditions prove inappropriate). Use suitable animated sequences from video/textbook diagrams to support learning. • Ask pupils to carry out an exercise to match sequences of sentences on cards to diagrams showing different types of rainfall. It might be helpful to focus on fewer rainfall types with some pupils. • Use an appropriate recent weather map of Europe and ask pupils to investigate the different aspects of weather shown. Ask them to compare weather information provided by maps with that shown on a satellite image for the same period of time and evaluate the usefulness of each. • Ask pupils to draw and annotate a sketch map showing the weather conditions over Europe using information from both the satellite image and map.	• describe and begin to explain cloud patterns • describe and explain weather features over Europe from weather maps and satellite images	
How does the weather change?			
• to investigate weather patterns and relationships over time • to predict weather using weather maps and satellite images	• Watch a weekly weather forecast (for Europe or Britain). Discuss the sequence of maps/information shown in order to identify patterns, trends and relationships. • Provide pupils with meteorological records in a suitable ICT format for them to carry out a mini-enquiry into weather patterns and relationships. Carry out a whole-class problem-solving activity – ask pupils to use their accumulated knowledge, weather maps, statistics and satellite images to generate their own weather forecast for a named place(s) in Europe for the following 24 hours. Ask them to evaluate the accuracy of their forecasts using actual details and to review the method of working.	• identify that weather systems move across Europe and that conditions change accordingly • understand that some aspects of the weather are related and their change can be predicted • forecast the weather and evaluate the accuracy of their prediction	• Records from the Meteorological Office, a local weather station or the school automatic or manual weather station might be used. • Database files are more effective for enquiries where pupils need to search for specific instances. Spreadsheet files are more effective where calculations, *eg averages*, are required or more graphing is needed. • Mathematics: pupils interpret data and draw conclusions. • Language for learning: this activity provides pupils with the opportunity to describe how the work was undertaken and what led to the conclusions.

Learning objectives Pupils should learn:	Possible teaching activities	Learning outcomes Pupils:	Points to note
What affects Europe's climate?			
• to use atlas maps to identify patterns	• Using enquiry questions ask pupils to use atlas maps to investigate factors influencing climate in Europe, *eg latitude, relief/altitude, distance from sea, prevailing winds.*	• identity the factors affecting patterns of European climate	• This activity builds on work done in the 'opposites' section of unit 5 'Exploring England'.
Where shall we go on holiday?			
• to determine how and why aspects of weather and climate vary from place to place • to investigate climatic and other data/information to reach a group decision • to describe the geographical location and contexts of areas studied	• Ask pupils to carry out a family role play in groups of four/five on where in Europe they should go on holiday. Each member of the family is given a role card with the criteria for their preferred holiday and the group is provided with a map of Europe with a number of possible destinations described in terms of their characteristics, *eg Dordogne (food and wine), a river (water sports), historic towns, limestone caverns and gorges*. The group must first discover the climate of each of the places on the map and should then debate, in role, the best choice of destination for the whole family. Ask one member of each group to feed back the group decision to the rest of the class.	• describe and explain how and why the climate varies in areas selected • describe and explain how physical and human factors can influence decision-making processes • accurately describe the national contexts of areas studied	• There is an opportunity to make a link with the 'Ecosystems' theme in the programme of study. • Key skills: links with working with others – pupils work on a one-to-one or group basis and plan with others what needs to be done, confirm their understanding of the objectives, their responsibilities and working arrangements, carry out tasks and review progress.
How does climate influence human activity?			
• to interpret climate graphs	• Introduce pupils to climate graphs and show and explain how they are drawn. In pairs ask pupils to carry out a number of 'living (climate) graph' exercises for a variety of places across Europe. This will involve them in relating annual temperature and rainfall patterns to 'seasonal' human activities. *What happens and why?*	• describe and explain how annual climate variations influence human activities	
What is the difference between weather and climate?			
• to use a range of sources to identify the difference between weather and climate	• Provide pupils with a range of European weather or climate 'sources', *eg newspaper weather forecast, a satellite image, average July temperature map*. Ask them to identify each one as an example of either weather or climate.	• describe and explain the difference between weather and climate, using examples	
What types of climate are found in Europe?			
• to interpret and locate climate graphs	• Give pupils a map of Europe with a number of named localities marked and a selection of 'unnamed' climate graphs. Ask them to match the graphs with the named places and to write a rationale for their choices.	• describe and explain patterns of climate across Europe	