**Weather and Climate: a Teachers’ Guide**

**This is an overview of what this scheme can offer. Obviously, all classes and schools are different. You will be able to pick and choose the topic areas and adjust lessons as you see fit.**

**Lesson resources can be printed in colour or greyscale, or students could be asked to copy text or images into their books.**

| Key idea | Objectives | Outcomes | Resources | Time | Activities | Differentiation | Skills | Homework and assessment |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Weather in our lives | To be able to define what the weather is​To explain how the weather can have a direct impact upon our lives​To think about how the weather can VARY from place to place and time to time | A completed definition of weather written downWritten explanations of how the weather affects sporting events Annotations of the school building explaining how weather varies around it plus verbal answers in the lesson review | Weather\_in\_our\_Lives.pptxWeather in our lives easier pptxWeekly weather diary homework sheet<https://quizlet.com/_8y56zy?x=1jqt&i=38anvz>  | 1 hour | C - In pairs get the students to consider the following - How did the weather affect you on the way into school today?S - Diagrams from text - Try to draw the text as you speak, they can only use simple sketches. The students then try to “read” the diagrams back to the person next to them in as much detail as possible. Copy the definition of weather.A – Get the students to think of any examples of weather.A - Explain how both of the sporting events have been affected by the weather. Be sure to mention what the weather conditions are and why it affected the sport. Can the students think of any other weather conditions and how they could affect sport? Produce a mind map to show thisD - Do we get different weather in different parts of the school grounds? Place a picture of your school on slide 6 and get the students to consider the questionR - Verbally describe 3 ways in pairs that the weather can vary from place to place and time to time. Evaluate how much of an impact the weather has on human lives and activities.CC - Climate change will mean stormier winters and drier hotter summers for the UK, with a greater risk of coastal and river flooding. ​What will affect you most?​T - ***“Do tall people experience the weather differently to short people?”*** | Extension – Get the students to think about your school and all of the classrooms. - Which classrooms do you like the climate of, and why is that (consider light, temperature, air quality and humidity)?does this change with the seasons. How do we regulate (control) the weather of a building?There is an easier version of this lesson available too. Here, we have removed one of the sporting events to allow students to focus just on one event. | Mind mapping. Drawing diagrams from text.Annotating satellite images | Complete the weekly weather diary sheet |
| Weather measurements | To be able to describe the weather instruments and units of measurement for various weather variables (e.g. temperature, wind speed, rainfall)To evaluate a range of sites for the SUITABILITY to host a weather stationTo understand what we do with weather measurements once we have them | A completed table of the weather instruments and units of measurement for various weather variables (e.g. temperature, wind speed)An appropriate choice and written reasons for a weather station at the University of ReadingA completed Isotherm map | Weather\_measurements.pptxWeather\_measurements\_Easier.pptxWeather\_measurements\_WorksheetWeather\_Measurements\_Worksheet\_EasierWeather measurements complete<https://quizlet.com/_8y575t?x=1jqt&i=38anvz>  | 1 to 2 hours depending on how much of the lesson you do. The core activity is the weather instruments table. | T - ***“Where in the world is there most weather??”***C – Get the students in pairs to define the term Weather, name as many different weather variables as possible and explain how the weather has affected you in the past week. Or attempt this Quizlet set - <https://quizlet.com/_8a48aa?x=1qqt&i=ay3h>S – Go through slide 5 as a review of key weather terminologyA – The students are to sort out the slips of card so that they can complete the table. **You will need to cut up the completed table first** and put those into envelopes for each student (or pair of students). There are 6 weather variables. Once you have sorted out your information slips complete the table –this could be written, or the slips glued down.D - Label the image of a weather station, which instrument do they think goes with which box?S – some images of various different ways to get weather measurements – the students can discuss why we need more than just weather station data from on land.D – Decision making exercise - For the 5 sites shown on the map EVALUATE their site characteristics for a weather station. Consider completing a table like the one on the slideExtension activity – you could get the students to complete the drawing isotherms exercise on slides 21 and 22R - Look at the rainfall radar for today - at <http://www.raintoday.co.uk/>. What does this animation show? How can we use this information (as a forecast)CC - How do weather measurements help our understanding of climate change?​ | Allow weaker students to glue down the slips or use the easier version for the weather measurements table.Use the easier lesson PowerPoint and worksheet – here we have added a scoring system for the DME and removed the need to draw isotherms | Drawing Isothermsfieldwork | The isotherms exercise or locating the weather station exercises could become the homework |
| Weather and climate – using climate graphs | To be able to distinguish between WEATHER and CLIMATETo understand and be able to PLOT a climate graphTo be able to INTERPRET climate graphs for different places and make COMPARISONS | Sentences contrasting weather and climateA completed climate graph for Dalwhinnie in Scotland, accurately drawn with temperature and precipitation plotted on the correct axisSentences contrasting the climate in Dalwhinnie and Reading | Weather\_and\_climate.pptxWeather\_and\_climate\_Easier.pptxClimate\_graph\_worksheetClimate\_graph\_worksheet<https://quizlet.com/_8y57d0?x=1jqt&i=38anvz>  | 1 Hour | C - Name the weather measurements for pressure, temperature, wind speed, wind direction and humidityS – Define the terms weather and climate and watch the YouTube clip which explains the difference - <http://www.youtube.com/watch?v=e0vj-0imOLw> A – Students have to decide if the 7 statements on slide 6 are Weather or if they are climateA3 – using the table of climate data for Dalwhinnie the students have 4 questions to answerS – Explain what climate graphs show using slide 8D - Plot the data for Dalwhinnie in Scotland. D – Contrast the 2 graphs in a paragraphD – Students have to SUGGEST reasons why the climates of these 2 places are so different?​R – Out of 5 how did the students do on the lesson’s objectives?T – ***Do you Talk More about Weather or climate?”***CC - If climate is the average of 30 years’ weather, how much weather data do you need before you can talk about climate change?​ | The climate graph axes are already set up and there are sentence starters for the students to useUse the easier lesson PowerPoint and worksheet. Here, the climate graph needs completing rather than plotting from scratch.There is an extension ppt and homework activity looking at chloropleth maps.  | Plotting climate graphsTallying, calculating a mean |  |
| Global atmospheric and oceanic circulation | To understand why different parts of the World receive different amounts of energy from the SunTo understand how that difference in energy received by the Earth causes air and ocean water to move from Equatorial regions to the PolesTo be able to describe key features of how the air and water move around the globe. | A simple explained sketch diagram of differential heating A paragraph of writing on where the Earth is warmest and coldest using a thermal image of the EarthA sketch of the Earth's atmosphere and how air moves within itTo be able to explain what happened during a game where you will travel through the Earth’s Ocean and atmospheric system | Atmospheric\_Oceanic\_Circulation.pptxAtmospheric\_Oceanic\_Circulation\_Easier.pptxAtmopsheric\_Oceanic\_Circulation\_Game.pubAtmospheric\_Oceanic\_WorksheetAtmospheric\_Oceanic\_Worksheet\_Easier<https://www.youtube.com/watch?v=7fd03fBRsuU><https://quizlet.com/_8y57gx?x=1jqt&i=38anvz>  | Up to 2 hours | C - In pairs get the students to discuss the difference between weather and climate. They could also consider – what does the graph of temperature stripes show?S – Either discuss “What has the Pacific Garbage Patch got to do with weather and climate?” Or “What has Finding Nemo got to do with weather and climate?”. Both are basically to get the students to consider the importance of ocean currentsS – Discuss slides 6 and 7 on how latitude influence climate and energy distribution across the EarthA – How does changing latitude affect the climate? Students draw a simple labelled sketch on the diagram and in a paragraph explain why it generally gets colder as we move from the equator to the poles​A -Watch the video twice. First, they can write down all the key points they can remember from the film. Then answer the questions on differential heating on slide 11 <https://www.youtube.com/watch?v=7fd03fBRsuU> S – explain slides on how atmospheric circulation and ocean currents workD - Draw a SIMPLE SKETCH of the Atmospheric model​. In 3 sentences, describe how the atmosphere moves air around the Northern HemisphereA – Play the ocean and atmospheric currents dice game. You will need the game printed on A3 and one dice per team. Groups of 3-4 would work fine. The students can record their individual progress on the tableD – complete the flow charts on the oceanic and atmospheric circulationsR – complete the Venn diagram review – this is designed to show the students what the oceanic and atmospheric circulations have in common and what characteristics are distinct.T- ***Do the Atmospheric and oceanic circulation affect me?***CC - ***The Arctic is warming faster than the rest of the planet as the climate changes. How could this affect the circulation of the oceans and atmosphere?​*** | The game is designed to be a fun way of learning this activity. The sequences remove the need to write and focus on the sequenceThere is an easier version of the ppt and worksheet available – the Pacific Garbage Patch article has been removed from this version | Sequencing informationUsing Venn Diagrams | Atmospheric circulation HW  |
| Global climate zones | To be able to DESCRIBE the major world climate types To know WHERE the world’s major climate types are foundTo understand what happens to precipitation and temperature with increasing distance from the sea | A completed table of world climate typesA coloured map of the world climate types together with a paragraph on where tropical rainforests are found Completed calculations for a maritime and a continental climate | Global\_Climate\_Zones.pptxGlobal\_Climate\_Zones\_Easier.pptxGlobal\_climate\_Zones\_WorksheetGlobal\_climate\_Zones\_Worksheet\_Easier<https://quizlet.com/_8y57l6?x=1jqt&i=38anvz>  | 1 hour | C – Are the scenarios on slide 1 Weather or climate?A – complete the table on the global climate zones – this is designed to get the students familiar with what the 6 major climate zones are. They will need to cut out and print the photos to glue onto the table.A2 - students then get to colour in the appropriate areas on the map, matching the climate zone statement with the map locationsA3 - spot the differences exercise between the biomes map and the world climate zones mapD – students have to describe and explain where tropical climates can be found – there is a writing frame for thisA3 – the impact of distance from the sea on climate. Students complete the maths exercise on slide. The climate graphs on the next slide will help them decide which climate is the most extreme.R – Students attempt the plenary quiz or the QuizletT - ***is the climate zone inside the building the same as the one outside?***CC - As the climate changes, why don’t the climate zones simply shift towards the poles?​ What OTHER factors might come into play?​ | There is a writing frame for tropical climates writing task on slide 9There is a reduced, easier version of the PowerPoint and worksheet with the climate graphs exercise removed and more assistance on the exercise using climate data tables provided. | Mapping skillsClimate graphs | Global climate zones homework Also a homework connecting climate zones with ecosystems |
| Past climate change | To be able to DESCRIBE the major changes to temperature over long periods of timeTo be able to explain why climate changes over time | The ability to verbally describe what has happened to temperature over different time scalesA sequenced chart on how volcanoes affect climate change2 labelled diagrams on how changes to the Earth’s orbit affect temperature. | Past\_Climate\_Change.pptxPast\_Climate\_Change\_Easier.pptxPast\_Climate\_Change\_WorksheetPast\_Climate\_Change\_Worksheet\_Easier<https://quizlet.com/_8y57ol?x=1jqt&i=38anvz>  | 1 to 2 hours | C – Get the students in pairs to name the world climate zones A to G in the key and list 2 reasons why we get different climate zones across the globeT – ***Weather matters more than climate***S – Discuss the difference between glacial and interglacial periods on slide 7S & A - Describe the graph from Vostok on Temperature. Students answer 5 questions based upon the graph.A – Students describe the changes on the 11,000 year record, get them to note the difference between the rates of the 2 major periods of warming.A2 – Watch <https://www.youtube.com/watch?v=RleDV5tzIZo> and get the students to reorganise the information in the table in a logical order.A3 – watch the animation on orbital changes. Students have to annotate the 2 diagrams (or 1 on the easier lesson)R – students have to discuss the lesson’s learning objectives in pairs – there is a table of information to help them with this.CC - Is it important to understand past climate change before trying to predict future climate change? ​ | The easier version of the lesson has only one orbital change to consider & the more recent climate change graph has been removed. | Interpreting graphsExplainingThinking skills (via mystery) | Homework - Christopher Columbus is charged with causing the Little Ice Age! Find the evidence to prove this or exonerate him! The students have to respond to this using all of the information on the mystery slips.  |
| Air masses | To be able to describe the 5 major air masses that affect the UKTo be able to explain what weather the major air masses bring to the UKTo be able to draw compass rose diagrams and infer which air masses affect the UK mostTo consider how air masses affect day to day life in the UK | Video notes and a completed table on the 5 air masses affecting the UKA completed compass rose diagramExplained decisions on air mass “most likely to” statements | Air\_Masses.pptxAir\_Masses\_easier.pptx<https://www.youtube.com/watch?v=kvk-hBFnBTI> Air\_Masses\_TableAir\_masses\_Table\_EasierAir\_Masses\_information\_sheet\_StudentsWind\_Compass\_Rose\_Diagram<https://quizlet.com/_8y57s7?x=1jqt&i=38anvz> | 1 to 2 hours | C – attempt the timed task to draw the atmospheric circulation or try this Quizlet set; <https://quizlet.com/_8y57ol?x=1jqt&i=38anvz> S – Students attempt the diagrams from text exercise - Try to draw the words as I speak them – no words allowed, only pictures/sketches. The text for this is in the notes section of the slide. They can then write down a definition of Air masses. If you do not like diagrams from text, you could just start with the definition. A – Watch the weather bytes video and take notes. Then watch again and students answer the video questions using the YouTube clip.A2 – Go through slides 17 and 18 with the students, they then complete the table using the information sheet for students.A3 – To get the students to consider seasonality of air masses, students consider how PC would change from summer to winter.A4 – OPTIONAL SKILLS PRACTICE – get the students to draw the compass rose diagram and answer the questionsD - Which air mass is most likely to…R – Attempt the Quizlet set - <https://quizlet.com/_8y57s7?x=1jqt&i=38anvz> T - ***Where in the UK is there the most weather?***CC - How might Polar maritime air, our dominant air mass, change as the Atlantic warms?​ | Extension – Can you work out what the air masses of the UK have to do with global atmospheric circulation? On slide 27An easier lesson is available with a simpler air masses table, no compass rose exercise. | Drawing compass rose diagrams | The compass rose diagram could be the homework |
| Pressure and winds | To understand that air has a mass and exerts a pressureTo contrast high and low pressureTo be able to explain why winds are created and the factors that affect the windTo be able to interpret weather charts | Written answers on a pressure experimentA completed table comparing high and low pressureThe ability to explain the 2 factors that create and affect windsAnswers to questions about a weather map | Pressure\_and\_Winds.pptxAir\_Pressure\_winds\_Easier.pptxAir\_Pressure\_Winds\_WorksheetAir\_Pressure\_Winds\_Worksheet\_Easier<https://quizlet.com/_8y57vx?x=1jqt&i=38anvz>  | 1 hour | C - Name the air masses, their codes and sources on the map on the slideS – discuss slide 4 – how does the model of atmospheric circulation link to high and low pressure areas?S - Watch the video - <https://www.youtube.com/embed/cNh3N_1e4wQ> What happens to the water level in the glass? Why? In Which DIRECTION does the water level go? Why? How does this relate to atmospheric pressure in our ATMOSPHERE?A – read through slides 5 to 10 about high and low pressure. Students have a table to completeA2 – Slide 13 - winds - In pairs what effect do you think our rotating planet might have on the WIND? A3 – Watch <https://youtu.be/zH4nrgozVGk> and answer the 7 questions based upon it on slide 14D – answer the 4 questions based on India and China using the world pressure mapsR – Visit [http://earth.nullschool.net](http://earth.nullschool.net/) Can you identify areas of High and Low pressure? Or attempt the Quizlet set.CC - In the UK, we expect it to get stormier in winter as the climate changes. How should we make use of this and prepare for it? ​T - ***Where does wind matter most?***  | This lesson has significant challenge in the concepts contained within it.An easier lesson is available with some of the tasks on wind removed, you could also remove the skills exercise on China and India for students | Reading synoptic charts. |  |
| Water in the atmosphere | To understand why clouds form within the atmosphereTo be able to explain 2 ways in which cloud formation can take place | A completed set of video tasks explaining the relationship between evaporation and condensationAn explanation of why it is wetter in the west of the UK than the East | <https://youtu.be/2i-vwooEC6g> Water\_in\_the\_atmosphere.pptxWater\_in\_The\_atnmosphere\_worksheetWater\_in\_the\_atmosphere\_Easier.pptxWater\_in\_The\_atnmosphere\_worksheet\_easierBack to back image<https://quizlet.com/_8y57vx?x=1jqt&i=38anvz>  | 1 to 2 hours | C – <http://earth.nullschool.net> Can you identify: Areas of High and Low pressure? Areas where the wind is being deflected?S – Get the students to attempt the 2 questions based upon water in the atmosphere, they could do this verbally in pairsS – go through slides 5 and 6 on the states of water in the atmosphere, answer the discussion questions together as a classA – copy down the definitions of evaporation and condensation – where have they seen these processes in real life? (expect references to kettles and their breath on a cold day!!)A2 – watch the video on cloud formation and answer the questionsA3 – use the diagram on slide 8 to explain why clouds formA4 – relief rainfall - Get the students into pairs & sit back to backOne of them will be given an image (on slide 10), their job is to describe the image and EVERYTHING on it to their partner. The other person in the pair must draw exactly what is describedD – link this to why it is wetter in the West of the UK than the EastA5 – talk through fronts on slide 12A6 – diagrams from text on convectional rainfall – an explanation is available on slide 14R - 180 seconds to draw 3 diagrams explaining convection, relief and frontal rainfallCC - As the climate warms, the water cycle intensifies. What positive consequences might that have around the world? ​***T - Is a river an ex-cloud?*** | An easier lesson is available, without the experiment and focussing only on relief rainfall – there is still information on frontal rainfall and convectional rainfall but no tasks.There is a challenge task on slide 15 | Describing and explaining |  |
| Polar Climate | To understand why it is cold in our polar regionsTo understand why our polar areas are classified as desertsTo have the ability to calculate means, totals and interpret climate graphs | A labelled sketch diagram on how latitude affects temperatureA list of reasons in a table on why snow fall rates are very low in the Arctic and Antarctic regionsCalculated and interpreted means and totals | Polar\_Climate.pptxPolar\_Climate\_Easier.pptxPolar\_Climate\_WorksheetPolar\_Climate\_Worksheet\_EasierBeast\_From\_East\_homework<https://quizlet.com/_8y583a?x=1jqt&i=38anvz>  | 1 hour | C – Students have to identify climate zones using the map.C – Get the students to try to link the tri cell model of atmospheric circulation to the polar regions. This will need teacher Q and A - What is happening to the air in the global circulation model in our **Polar regions**? What type of pressure would there be? What does this mean for the climate experienced in the Arctic (north) and Antarctic (south)?S - Spot the differences! In pairs get the students to try to explain the differences between Antarctica and the Arctic. What do the 2 areas have in common? Give them the answers afterwardsS – show the animations on slides 7 to 9 on why it is colder at the poles than at the Equator.A – Get the students to draw a sketch of the diagram on slide 7 Then answer the following - In a paragraph explain why it generally gets colder as we move from the equator to the poles. In a paragraph, consider how this would affect you at your LATITUDE on the globe. Based on this information – where would YOU like to live and why?A2 – Time to think – get the students to think about the questions on slide 8 – the answers will appear by animationA3 – Can it be too cold to snow? - Calculate the mean annual temperature and the total precipitation for all 3 stations. Look at the temperature data – can you **explain** why it is so cold at all 3 stations referring back to what we have just learnt? Is there a lot of precipitation or a small amount? Look at the temperature and precipitation data. **What happens to the amount or precipitation as the temperature falls?** Could any of the information around the map help to **explain** this pattern?D – complete the summary table on slide 14R – 60 seconds in pairs to talk without stopping on Polar WeatherT - ***Would you rather live somewhere with an extreme hot climate or an extreme cold climate?***CC - Polar regions are warming faster than the rest of the world. Summarise this flow chart with a tweet of 280 characters ​ | There is an easier version of this lesson with less data to handle and a sketch outline diagram of why temperature decreases with increasing latitude | Calculating a mean. Adding up for totals.Polar weather | Visit <https://www.spri.cam.ac.uk/museum/diaries/scottslastexpedition/page/2/> for one week of the diary, complete the following table in your class books. Not all the information will be available for every day OR Beast from the East research task |
| Hot deserts | To be able to describe the characteristics and location of a hot desertTo understand WHY hot deserts are hot and dryTo be able to draw and interpret climate graphsTo understand animal and plant adaptations to the hot desert climate | Descriptions of desert photographs and a map showing the location of hot desertsA sequenced flow chart on why hot deserts are dryCompleted climate graph with descriptionAnnotated camel and cactus pictures, plus your own INVENTED animal for a hot desert | Hot\_Deserts.pptxHot\_Deserts\_Easier.pptxHot\_Deserts\_WorksheetHot\_Deserts\_Making\_Plants\_AnimalsHot\_Deserts\_HomeworkHot\_Deserts\_Plants\_Animals\_Info\_Sheet<https://quizlet.com/_8y587i?x=1jqt&i=38anvz>  | 2 hours | C – Students have to identify 2 climate types that could be considered deserts and name 3 desertsS - Why did Flowers bloom in the Atacama Desert? Answer at the end of this lesson!! Students can watch <https://www.youtube.com/watch?v=0WZPI6AVLKE> A – students copy the definition of a desert and describe the images on slide 5A2 - Describe where we find hot deserts. What do they have in common? – write a bullet pointed list.A3 - Use the diagram on slide 10 to organise the slips to explain WHY hot deserts are found where they are.A4 - Plot the climate data for Timbuktu. Add up the total precipitation – does Timbuktu have less than 250mm (the classification of a desert)?A5 – annotate the images of the camel and the cacti with how they adapt to hot climates.D – Make a plant and an animal to survive in the desert climate.D2 – show second YouTube video on how a shift in El Nino made the desert bloom.R – Mini testR2 - Students start the lesson by trying to decipher 7 anagrams of desert namesT - ***Is someone in Africa seeing the same sky as someone in Antarctica?*** CC - As the climate changes, the Hadley cell is expected to widen, moving the world’s dry climate zones. How could local communities reduce the impacts of desertification?​ | There is a shorter lesson available with El Nino and climate graphing removed | Plotting climate graphsInterpreting maps | Deserts and GIS – use the Hot Deserts homework sheet for this.NB there is flicker in the video for the homework, making it unsuitable for some.  |
| Changing global climate | To be able to DESCRIBE the major changes to temperature and CO2 over short and longer periods of timeTo be able to explain global warming and human reasons why climate changesTo EVALUATE what might happen to CO2 levels and temperature in the future | A paragraph describing the link between CO2 and temperature since 1850Video notes and a diagram showing how global warming works and why climate changesThe ability to discuss verbally what might happen with extra global warming in the future | <https://youtu.be/lrPS2HiYVp8>Changing\_global\_Climates.pptxChanging\_global\_Climates\_WorksheetChanging\_global\_Climates\_Easier.pptxChanging\_global\_Climates\_Worksheet\_EasierChanging\_global\_Climates\_homework<https://quizlet.com/_8y58ao?x=1jqt&i=38anvz>  | 1 to 2 hours | C – Why can climate change because of natural reasons?S – Go through the concepts of natural and human causes of climate change.S – Slides 6 and 7 is a repeat of material in lesson 6 – this could be skipped or done orally.A – Students have to describe the changes from recent history on this GLOBAL graph on slide 8. What happens to the temperature over time? What are the start and end values for temperature? What happens to the CO2 over time? What are the start and end values for CO2? A2 – Human Causes of Climate Change - watch video 1 and answer the questions on climate change.A3 – students then draw a copy of a diagram on how global warming works from slide 11A4 – watch the video on the causes of climate change - <https://www.youtube.com/watch?v=uHbxSYDqTR8> then answer the questions based upon that resource.R - In pairs verbally explain both of the key learning points from today’s lesson.T - ***Is the sunlight ever yours?*** CC - Compare the climate stripes for England, Egypt and Greenland​ | There is an easier version of this lesson which omits the longer pattern, has a writing frame for the graph task and a diagram to complete on global warming (rather than draw from scratch) | Sketching, interpreting line graphs | Homework – global warming scenarios sheet |
| UK climates | To understand how the UK’s climate varies regionallyTo be able to explain why the UK’s climate varies regionallyTo be able to relate the UK’s climate to where you live | A completed map task providing data on the UK’s 4 climate zonesWritten answers to reasons for UK’s variable precipitation and temperaturesContrasting statistics on where you live to the UK average | UK\_Climate.pptxUK\_Climate\_WorksheetReasons for UK climate differencesUK\_Climate\_Graph\_homework<https://quizlet.com/_8y58fb?x=1jqt&i=38anvz>  | 1 to 2 hours | C – What climate zone is the UK in? what does that mean about the climate we experience?S - Visit <https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages> Complete the table below for your most LOCAL weather station. How does your data compare to the UK average? You should discuss each element of data in the table. [this is intended as a whole class activity – individual computer access is not required). A – attempt the comparison activity on slide 5 about mean annual temperatures for the UK. The activity is designed to show the students how to interpret this type of map.A2 - Using the maps of climate features of the UK complete all of the tables for all 4 zones. Take the dominant (The one that appears the most) colour in the zone for your value. Which zone do you live in? Draw a dot to represent you on the map! You will need a copy of slide 7 for this task.D – which climate zone goes with which descriptor task on slide 8A3 - Read carefully the text on Local climate variations in the UK then answer the following: Explain how the prevailing wind affects precipitation levels in the UK. Which factors affect the temperature across the UK? Make a list. Why does it generally get cooler as we move North through the UK? Which factors most affect where you live?R - As a class annotate the map of the UK with as much information about its varying climate as possible. Include any of the information you have learnt this lessonT - ***We don’t get extreme weather in the UK?***CC - What would your perfect UK climate be? Who would be disadvantaged by the climate changing to that?​ |  | Reading climate maps | Ask 2 members of your extended family or friends who live elsewhere in the UK and find out how the climate there differs from the climate at the school. Then find out why. Alternatively, complete the UK climates graph homework |
| Changing UK climates | To understand how climate (precipitation & temperature) has changed over time in the UKTo be able to classify the potential impacts of changing climate on the UK | A summary table of changes to both temperature and precipitation in the UKA colour coded table on the impacts of climate change on the UK | Changing\_UK\_Climate.pptxChanging\_UK\_Climate\_Easier.pptxChanging\_UK\_Climate\_Worksheet\_EasierChanging\_UK\_Climate\_WorksheetChanging\_UK\_Climate\_HomeworkChanging\_UK\_Climate\_Futures\_Hoemwork<https://quizlet.com/_8y58nw?x=1jqt&i=38anvz> | 1 lesson | C – Answer the questions based upon the climate in the UK. This will lead into how the climate in the UK is changingA1– There are 5 graphics with different activities on, one for temp and one for precipitation would suffice.Use the CET data to complete the means and ranges. The students then have to compare these values OVER TIMEDescribe the patterns on the graph of the CET – what is happening to temperature change over time?Show the precipitation graph, the students need to pick up on that the trend for precipitation is UP and that it is becoming more extremeFinally - What does the extreme rainfall graph show: About the change in extreme rainfall from 1960 to 2014? How could this impact upon people?D – complete the summary table on slide 11 about HOW the UK’s climate has changedS - discuss the concepts of opportunities and challenges with the students on slide 13A2 - Classify the slips in the table as either **OPPORTUNITIES** or **RISKS**. The goal is to understand what could happen to the UK climate in the future and what impacts this could have on human life.***T - Who owns the water in clouds?***R - Based upon what you have discovered today – should the UK government act on climate change? Discuss in pairs​ OR​ <https://quizlet.com/_8y58nw?x=1jqt&i=38anvz>CC - Out of these options, which climate change impact in the UK do you think will impact on you most? ​Summer heat and fires; ​Summer flash floods; ​Winter river floods; ​Winter storms; ​Climate migrants to the UK; ​Coastal flooding​ | I have produced a simplified version with only 2 graphics for temperature and precipitation, and a reduced number of impacts slips with the vocabulary modified. | Calculating mean and range, interpreting line and bar graphs | There are 2 homework activities here, you can pick or choose |
| Climate crisis  | To consider a range of facts and opinions on climate changeTo decide if we are in a climate crisisTo understand what tipping points are and their impact on climate change | Verbal statements on what is a fact and what is an opinionCompleted tasks on sea level change helping to decide if we have a climate crisisAn explained example of ice melting and tipping points | The\_Climate\_Crisis.pptxThe\_Climate\_Crisis\_Easier.pptxThe\_Climate\_Crisis\_WorksheetThe\_Climate\_Crisis\_Easier\_Worksheet<https://www.youtube.com/watch?v=TMrtLsQbaok> Climate\_Crisis\_Global\_Effects\_Homework | 1 hour | C – Students answer 6 questions on Global warming scenarios on slide 1 – in pairs!S – get the students to watch the YouTube clip and consider: Do we need to act on Global Warming? Is Greta correct? What arguments does she make? Write down a quote that catches your imagination.A - The Climate Crisis – who said it? Students decide which person said which quote. It doesn’t matter if they can’t work it out, the goal is to get the students to read the quotes and form opinions on them.A2 – slide 6 - Which statements do you think are facts? Which ones are opinions? What separates a fact from an opinion? Why do we need to be cautious when considering quotes like these? Which quote do you agree with most? Why? Can you think of counter arguments to one of the quotes you disagree with?A3 - Students should read the Guardian article and consider if we should use climate change or climate crisis**Is there a crisis?**A4 - Use the website below to complete your table DESCRIBING what would happen to the places with different amounts of sea level rise. It may be worth naming places affected and what % of the place could be affected <http://www.floodmap.net/> No IT access for students? You could do the GIS tasks on the board and the students can record the answers.A5 – answer the questions on slide 11 on sea level rise.A6 – Discuss as a class what “topping points” are then complete the feedback loop on slide 12.R – tell the students about the Paris climate deal and what progress has been made using slides 14 and 15.EXTRA – there is a GIS exercise for students to compare who pollutes, who strikes and who gains or suffers losses from climate change.R2 - OPINION LINE - Line up across the room, one side of the room for strongly agree, in the middle for maybe and the other side for strongly disagreeCC - Who has or had the biggest opportunity to mitigate (prevent) climate change – your great-grandparents, grandparents, parents or you? ​T **- *Is a student strike the same as a teachers strike?*** | I have produced a simplified version of this lesson. | Interpreting line graphsDistinguishing facts and opinionsUsing GIS | Attempt the climate crisis homework activity classifying the slips and commenting upon them |
| Anticyclones | To understand what an anticyclone isTo be able to distinguish between the weather in a winter and summer anticycloneTo be able to explain why we get high pressure in an anticycloneTo understand the positive and negative impacts of anticyclones in summer and winter | The ability to draw and explain diagrams from textA table of weather characteristics for winter and summer anticyclonesAn annotated diagram showing high pressure in an anticycloneA completed table on extreme weather in summer and winter anticyclones | Anticyclones.pptxAnticyclones\_Easier.pptxAnticyclones WorksheetAnticyclones\_Easier\_Worksheet<https://quizlet.com/_8y58t4?x=1jqt&i=38anvz> Anticyclone\_Homework | 1 hour | T – ***Why does the wind blow?***S - Diagrams from text – there is a passage of text in the notes area of the slide, you read it and the students have to attempt to draw it in pictures only.D – the students then “read” their diagrams back to one anotherA - **Define** the term anticyclone based on the passage from the last activity. Use the diagram on the same slide to **describe the characteristics** of an anticyclone. Mention isobars, wind direction and size in your answer.Discuss the information on slide 6 with the students.A2 – Watch <https://youtu.be/SWHj71qS_NA> . The students then have to consider what weather conditions would anticyclones bring to the UK: In summer and in winter. There are information slips to put onto the Venn diagramA3 - **Why do we get high pressure in an anticyclone?** Try to organise the information on slide 7 into a logical order. Now add the information to a logical part of their diagramA4 - Case studies of summer and winter anticyclones – from 2013 & 1963. The students watch the clips and add to a table of positive and negative effects on people.R - Decide whether the statements about anticyclones on the review slide are true or falseCC - Write a slogan warning people about the fire danger in drought conditions.T - ***How old is the Wind*** | There are sentence starters on slide 5. There is an easier version of this lesson with some of the skills exercises dropped out and fewer words for the Venn diagram. | Reading synoptic charts and interpreting satellite images. | Anticyclones homework - Skills practice – students attempt the activities on the synoptic chart and satellite images from the summer of 2018 |
| Depressions | To know what low pressure isTo know what weather a depression system brings to the UKTo be able to draw and explain weather frontsTo understand how weather changes in the UK as a depression passes over | Reordered slips on how low pressure worksDetailed notes on what weather Storm Desmond brought to the UKCompleted video notes on frontsA completed table on the sections of a depression | Depressions.pptxDepressions\_WorksheetDepressions\_Easier.pptxDepressions\_Worksheet\_EasierDepressions\_HomeworkDepressions\_animation\_worksheetPop up depression<https://quizlet.com/_8y58xj?x=1jqt&i=38anvz>  | 1 hour | C - Why do we get high pressure in an anticyclone?​S - Why do we get LOW Pressure? The students have to reorganize the information on the slide to explain why we get low pressureA - Write a paragraph on why we get depressions in the UK using the diagram.S2 – discuss slide 9 on what fronts areA2 – watch the 2 video explainers (<https://www.youtube.com/watch?v=naarbGHoAGU> & <https://www.youtube.com/watch?v=G7Ewqm0YHUI&t=25s> ) about fronts and answer the questions on slide A3 – show the students slide 14 and the video on the passage of a depression over the UK. The students then complete a table on what happens over time.A4 – create a pop up depression.S – Get the students to watch the 2 clips ([**https://www.youtube.com/watch?v=rQXKaL2iYQo**](https://www.youtube.com/watch?v=rQXKaL2iYQo) & [**https://www.youtube.com/watch?v=aV\_V\_4bMwPI**](https://www.youtube.com/watch?v=aV_V_4bMwPI)**)**- What weather do depressions like Storm Desmond of 2015 bring to the UK? What hazards does this bring with it?D - Add the labels to an appropriate part of the Synoptic chart. Draw arrows from the cloud types to where you might find then on the depression.R - In which of the 5 sectors of a depression are you most likely to; 1. Need a woolly hat? 2. Be unable to see the sun? 3.Need an umbrella? 4. Stay dry?CC - As the climate warms, we expect to see more intense depressions in the UK in winter. List 5 consequences.​T - ***Is any weather bad for everyone?***  | There is a slightly easier version of this lesson, with the skills section and one of the videos taken out. The animation of low pressure will help at the start. I have divided the process of how depressions are created across several activities to scaffold the learning for students | Reading synoptic charts | Depressions Homework sheetThe alternative is depressions animation worksheet |
| Microclimates | To understand that climate can vary over short distancesTo be able to define what a microclimate isTo be able to explain how 6 major factors can contribute to the microclimate of an area | A completed table contrasting the weather of 2 close, local weather stationsA written definition of microclimatesA completed mind map explaining how altitude, shelter, land surface, land/sea differences, aspect and buildings affect an area’s microclimate | Microclimates\_About.pptxMicroclimates\_worksheetMicoclimates\_minmap \_EasierMicroclimates\_Homework<https://quizlet.com/_8y592y?x=1jqt&i=38anvz>  | 1 to 2 hours | C – Explain how to read synoptic charts to the students using slide one then add the labels to an appropriate part of the Synoptic chart on slide 2. Draw arrows from the cloud types to where you might find then on the depression. Using slide 3 remind students of which weather instruments are used to measure different weather characteristics.T & S - When does ‘Climate’ become ‘Microclimate’?A - Look at this map from the Met Office <http://wow.metoffice.gov.uk> Focus in either on the area around your school or part of London, choose 2 locations, A and B.​ Complete the table on the slide then get the students to consider are all of the values the same? Why do we get variation in weather characteristics when places are reasonably close together? Make a list of reasons in pairs.A2 – on slide 6 students need to consider What is a Microclimate? Can they put the parts back together to make up a definition for a microclimate?**Factors that can help create a microclimate**A3 – run through the information on slides 8 to 10. You could have these slides printed for the students to use too.D – Get the students to make a mind map of the factors that can affect an areas climate. Include explanations and simple sketch diagramsR - How might your school have microclimates? – students make a list of ideas with a partner. They could annotate the map from Google mapsT ***- Do some classrooms have a better microclimate than others***?CC - “To help existing populations of threatened species respond to climate change, we can adapt the microclimates of the area they are living in” - ​How do you think this can be done and why is this important?​ | There is a mind map template with diagrams already on that can be printed for the students. These diagrams could be labelled by the students to help them complete their mind map | Mind mapping | Video task looking at microclimate impacts of rainforest deforestationTake photographs or sketch various microclimates where you live. This could be your local park, a back garden or yard, rooms in the place where you live, on your journey to school etc.Annotate the images to explain why these areas have a microclimate |
| Microclimates fieldwork | To explore microclimates in the local environmentTo understand how to collect and analyse data from real placesTo be able to explain any reasons for differences in climate found around a school site | A completed project including an introduction, location, methodology, plotted graphs, analysis, conclusions and an evaluation | Microclimates\_Fieldwork.pptxMicroclimate\_Data\_Collection\_SheetMicroclimates\_Example\_Data\_SheetMicroclimates\_Graph\_Analysis\_WorksheetMicroclimates\_fieldwork\_ChecklistMicroclimates\_fieldwork\_Marking\_Sheet | 4 to 6 hours | This is an example fieldwork exercise we conduct with Year 7 at my school. I have left all images, maps etc of my school on the slides for illustrative purposes. Obviously, you would replace these with similar images for your school. Our project is to determine which group of students have the best microclimate in their yard (we have 4 yards around the building). An alternative to this could be where is the best place a picnic table for Year X? You could then direct the students to different microclimate areas around your school site.We allow the students to collect climate data during a 1-hour lesson. Weaker groups just look at the data for that one hour. If you have higher ability groups, they could compare morning and afternoon data.This project takes between 4 and 6 lessons depending upon the group and the data processing conducted with them. | The help sheets will assist the students, in particular the data analysis sheet. A lo of differentiation will be in class through constant teacher guidance in this project style activity | Conducting a scientific fieldwork enquiry.Analysing graphs. Concluding. Evaluating | There are lots of opportunities for homework during the project, from doing extra graphs at home to locating the study in detail |
| Urban climates | To understand how urban areas affect temperature, wind and precipitation levels.To be able to explain why urban areas affect temperature, wind and precipitation levelsTo create a plan to combat urban climate effects | A completed table on how urban areas affect various weather characteristicsA written explanation of why London has a heat islandAn annotated building with strategies on to combat urban climate | Urban\_Climates.pptxUrban\_Climates\_Easier.pptxUrban\_Climates\_HARDER\_ISOLINE.pptxUrban\_Climates\_Worksheet.docUrban\_Climates\_Worksheet\_HARDER.docUrban\_Climates\_Worksheet\_EASIER.doc<https://quizlet.com/_8y5983?x=1jqt&i=38anvz>  | 1 hour | C – Students have to describe past and future changes to temperature for the UK using the resourcesS – students copy the definitions of rural, urban and urban heat island. Then they try to guess what urban areas do to a table of climate characteristicsA1 – Students complete the plotting exercise for London’s heat IslandD – Students can then describe and try to explain why central London is much warmer than surrounding areas. It would be worth pointing out the impact of parks etc.S – Explain the urban heat profile diagram on slide 9A2 - Urban heat island profiles - Describe the urban heat profile on the diagram on slide 8. Get the students to label their copy of the urban heat profile with the 6 statements – where do they best fit on the diagram? Now explain why the CBD is much hotter than the rural areasA3 – Urban winds – using slide 12 - Explain what impact cities can have on winds using the diagram. Read the box and consider why are cities cloudier and wetter? What sources of pollution are there in cities that make it cloudier and wetter?A4 – students consider the tasks on slide 14 about air pollution and qualityD – Decision Making Exercise - Redesign the building to make it better for urban microclimates. Their goal is to reduce the local temperatures and the impact of the building on urban winds and precipitation. They have £50,000 to do it!R - Can you now explain the patterns in the chart?CC - As more and more people live in urban areas and climate changes, why is it important to adopt the strategies on this slide? ​T - ***I live in a rural area so urban climates can’t affect me?*** | CHALLENGE – the Urban heat island effect is often more noticeable at night – can you suggest a reason why?There is an easier version of the lesson that has no isotherm drawing, no information on precipitation and fewer items to explain in the review chartThere is also a harder version of the lesson where isoline drawing skills can be extended.  | Decision making, drawing isotherms, interpreting maps |  |
| Tropical cyclones | To understand what weather and hazards are associated with a Tropical CycloneTo be able to describe the structure of a tropical cycloneTo be able to explain how and why tropical cyclones form | Completed answers to questions on a video about Hurricane DorianA diagram of a tropical cycloneExplained annotations on your diagram of a tropical cyclone | <https://youtu.be/T-jEj8Bh5Kc>  Tropical\_Cyclones.pptxTropical\_Cyclones\_WorksheetGIS\_EXCEL\_explainer<https://quizlet.com/_8y59ir?x=1jqt&i=38anvz> Hurricane Dorian Student data Excel file | 1 hour | C – using Null school and the NOAA map students have to identify ocean currents and patterns in wind in the Atlantic. You could update these resources with today’s data using the hyperlinks on the slide.S – Complete the “what am I” activity on slide 1, the information slips will animate in. The students then describe the satellite image of a tropical storm.S – Watch the YouTube clip, Describe the weather during Hurricane Dorian. Describe the impacts of this tropical storm on people and the environmentA - Complete the diagram on slide 8 by adding each word from the box into the gapsThen annotate the cross section of a hurricane diagram to explain how they form – the next slide will help tooA2 - Map from memory exercise – Tropical Storm location. The students are in groups of 3, they will get to come to the front of the class and look at the picture for 30 seconds, then go back to their table to reproduce what they sawThen show them map 2 – explain that there are no tropical storms between 5°N and S of the Equator because of the lack of Coriolis effect to spin the storm.D - Describe the location of tropical stormsEXTRA exercise – plot the track of Hurricane Dorian using the Excel sheet and instructions on slideA3 - Take notes on <https://youtu.be/Ik2GPo6-AvY>D – Discuss the impacts of TS using slide 19 and the ways we can prepare for TS on slide 20.R – true or false exerciseCC - In a warming world what will the consequences be for people living in areas that suffer tropical cyclones?​T – ***Does the sky weigh more on a cloudy day?*** | There are sentence starters for the description of the location, and the diagrams of tropical storms just need completing | Using video for information, memory skills | Revision for an end of topic test? |

Code for activities – **C** = **C**onnect the learning **S** = **S**tarter/ give new information **A** = **A**ctivity, **D** = **D**emonstrate understanding, **R** = **R**eview learning **CC** = **C**limate **C**hange link **T** = **T**hunk