PROVISIONAL

DELIVERY GUIDE

Theme: 2.3 Environmental Threats to Our Planet

June 2015

GCSE (9–1) Geography A (Geographical Themes)

GCSE REFORM

OCR
Oxford Cambridge and RSA

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CONTENTS

The learner resources featured in this guide are also available to download as stand-alone resources from OCR website.

Introduction

Delivery guides are designed to represent a body of knowledge about teaching a particular topic and contain:

- Content: A clear outline of the content covered by the delivery guide;
- Thinking Conceptually: Expert guidance on the key concepts involved, common difficulties students may have, approaches to teaching that can help students understand these concepts and how this topic links conceptually to other areas of the subject;
- Thinking Contextually: A range of suggested teaching activities using a variety of themes so that different activities can be selected which best suit particular classes, learning styles or teaching approaches.

If you have any feedback on this Delivery Guide or suggestions for other resources you would like OCR to develop, please email resourcesfeedback@ocr.org.uk.

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Curriculum Content

2.3 Environmental Threats to Our Planet

Climate change and extreme weather conditions cause many threats to both people and the environment. This theme develops understanding of these key environmental threats affecting countries and the world as a whole. Learners will explore the changing climate, including possible causes, and the current consequences. An introduction to the global circulation of the atmosphere leads to a study of extreme weather conditions and subsequent drought which can impact both people and the environment at a range of scales.

Section	Key Ideas	Content	Scale
2.3.1	The climate has changed from the start of the Quaternary period	• Overview of how the climate has changed from the beginning of the Quaternary period to the present day, including ice ages • Key periods of warming and cooling since 1000AD, including the medieval warming, Little Ice Age and modern warming • Evidence for climate change over different time periods, including global temperature data, ice cores, tree rings, paintings and diaries	G
2.3.2	There are a number of possible causes of climate change	• Theories of natural causes of climate change including variations in energy from the sun, changes in the Earth's orbit and volcanic activity • How human activity is responsible for the enhanced greenhouse effect which contributed to global warming	G
2.3.3	Climate change has consequences	• Summary of a range of consequences of climate change currently being experienced across the planet	G, R, N, L
2.3.4	The global circulation of the atmosphere controls weather and climate	• Distribution of the main climatic regions of the world • An introduction to how the global circulation of the atmosphere is controlled by the movement of air between the poles and the equator	G
2.3.5	Extreme weather conditions cause natural weather hazards	• Outline the extreme weather conditions that are associated with tropical storms and drought • The distribution and frequency of tropical storms and drought and whether these have changed over time	G
2.3.6	Drought can be devastating for people and the environment	• **Case study** of **one** drought event caused by El Niño/La Niña - How El Niño/La Niña can lead to drought - Effects of the drought event on people and the environment - Ways in which people have adapted to drought in the case study area	G, R, N, L

Thinking Conceptually

Approaches to teaching the content

This theme is split into two sections. The first section addresses the big picture of longer term climate change; what has caused it and what impacts it is having around the world. The second section addresses how our atmosphere works; how it creates extreme weather events and focuses on short term climate changes using El Niño as an example.

There are clear links between the two sections of the theme, which will help students to gain a deeper understanding of them both. For example while teaching about extreme weather students will investigate the frequency of extreme weather events and if they have changed over time, leading students to investigate a possible link to longer term climate change.

It is key, when delivering this theme, to place great emphasis on the use of evidence to support climate change theories. Students will inevitably start this theme with a range of opinions and it is vital to use a variety of evidence to support the climate change theories that will be taught. This theme presents a clear opportunity to introduce the concept of qualitative and quantitative data as well as primary and secondary sources of evidence.

Common misconceptions or difficulties students may have

Students may already hold strong views on climate change and this coupled with the large amount of information spread via the media, potentially makes this theme engaging and thought provoking. It is important from the outset that students are shown the bigger picture of climate change since the beginning of the quaternary so that they can see the current warming in context.

It is also very important, to teach or often re-teach exactly what the greenhouse effect is and that it is vital to life on Earth, and then to teach the enhanced greenhouse effect. This helps to address any misconceptions and ensure that all are starting from the same open mind-set. It is not necessary to teach this in the very first lesson, but you may inevitably find yourself correcting student's misconceptions until this is taught.

Students sometimes struggle to comprehend the complexities of weather and climate and the delicate balances and relationships that exist in our atmosphere. It is beneficial during this section of the theme to provide some examples of feedback mechanisms so that students can have a better contextualised understanding of how nature or human activity could affect the atmosphere on a global scale.

Thinking Conceptually

Conceptual links to other areas of the specification – useful ways to approach this theme to set students up for topics later in the course.

This theme provides numerous opportunities to develop a range of skills that will support students in 'Geographical Skills' unit. Examples include the use of a range of graphs and photographs while looking at evidence for climate change and the use of synoptic charts while tracking extreme weather events.

This theme has clear content links to the 'People of the Planet' theme. Shared case studies could be developed for the 'impacts of climate change' and 'extreme weather' and for the 'causes of uneven development' or 'factors that contribute to a country's economic development'.

There are also clear content links between the sections on climatic regions of the world and the 'Ecosystems of the Planet' theme and links could be made between El Niño and its effects on coral reefs, again linking to the 'Ecosystems of the Planet' theme.

There are also some fantastic links to other curriculum areas such as the study of Frankenstein in English which was written after the eruption of Tambora in what became known as the year without a summer. Another interesting link is with History and the increase in the burning of women for witchcraft during the 'Little Ice Age'

ACTIVITIES

In order to fully understand this theme students need to have an awareness of geological time so that they can put the quaternary period into context. They also need to be presented with the data that shows current warming trends in the context of historical changes in climate.

Activities	Resources
THE CLIMATE HAS CHANGED FROM THE START OF THE QUATERNARY PERIOD **1) What was the temperature like in the past?** This resource can be used in the early stages of teaching the Environmental Threats to our Planet theme. The resource is from www.discoveringantarctica.org and shows carbon dioxide and temperature records from the past 800,000 years from the EPICA Ice Core in East Antarctica. It could be used as starter activity with an enquiry question such as 'Does this graph disprove manmade climate change?' Or it could be used to explore the link between carbon dioxide and climate change. There is also good potential to use this as a data response activity asking, asking some targeted questions about the graph where students can annotate it with responses. http://www.discoveringantarctica.org.uk/alevel_img/12_using_icecore_graph.jpg	Click here Click here
'KEY PERIODS OF WARMING AND COOLING SINCE 1000AD, INCLUDING THE MEDIEVAL WARMING, LITTLE ICE AGE AND MODERN WARMING' **2) What was life like during the little ice age?** This activity provides students with an introduction into what life was like during the little ice age and is ideal for use as a starter activity. Using the painting 'The Hunters in the Snow' students annotate around the painting prompted by the geographical questions. Students are then provided with the story behind the painting and this is then linked to the time period known as the 'Little Ice Age'. Teachers can find lots of detailed and accurate information by typing the name of the painting into a search engine, as it is one of the most famous winter landscape paintings of its time.	Learner Resource 1

Thinking Contextually

Activities	Resources
EVIDENCE FOR CLIMATE CHANGE OVER DIFFERENT TIME PERIODS, INCLUDING ICE CORES, TREE RINGS, PAINTINGS AND DIARIES **3) What is the evidence for climate change?** Become an expert market place activity: Students are divided into small groups, each group is going to learn and then ultimately teach another group about a different source of evidence for climate change e.g. ice core data. Each group is provided with information about their source of evidence which they have to read, understand and summarise. The groups then divide up and teach other groups about their source of evidence until everybody has a complete summary sheet of the different sources of evidence for climate change. It is useful to model this activity by teaching about one type of evidence yourself before the students begin the activity. You could use glacier retreat as an example, this BBC video is a useful starting place. http://www.bbc.co.uk/education/clips/ztm3cdm	Learner Resource 2 Click here
EVIDENCE FOR CLIMATE CHANGE OVER DIFFERENT TIME PERIODS, INCLUDING ICE CORES, TREE RINGS, PAINTINGS AND DIARIES **4) How compelling is the evidence for climate change?** This activity culminates in the students completing a diamond ranking exercise. It enables the students to firstly re-cap what they have learnt about the different types of evidence for climate change and then to consider the strengths and weaknesses of each type of evidence. Finally they evaluate the importance of the evidence and rank them in order of importance. Students then justify their decisions.	Learner Resource 3
THERE ARE A NUMBER OF POSSIBLE CAUSES OF CLIMATE CHANGE **5) Do humans contribute to climate change?** This activity encourages students to evaluate whether or not current warming is natural or man-made. Students split into groups of four and are given a statement to debate. They are told to either argue that the statement supports natural, or man-made climate change theories. They can be provided with web links and newspaper reports and are given 20 minutes to construct their argument. The teacher then constructs a boxing ring in the classroom and a team member from each group takes part in a series of 'verbal boxing' rounds in which they 'battle' to win the argument The teacher decides when a 'knock out' punch has been delivered (a debate winning statement has been presented). This activity can be followed up by a piece of extended writing. As well as the students evaluating evidence this exercise teaches them the importance of using evidence to back up opinions. You could also ask students to prepare for this lesson by telling them if they will be debating on the 'man-made' or natural causes' side of the fence and asking them to complete a home investigation task to research this.	Learner Resource 4

Thinking Contextually

Activities	Resources
CLIMATE CHANGE HAS CONSEQUENCES. **6) What are the consequences of climate change?** The aim of this lesson is for students to investigate a small number of consequences of climate change from a variety of locations around the world. The activity should provide a good breadth of knowledge and then lead to students studying one consequence in more depth. This has been designed as a computer based lesson but can also work as a conventional lesson if the teacher provides paper copies of the news stories. Students use the Consequences of Climate Change slide with a world map that has enquiry questions attached to different parts of the globe. These enquiry questions are hyperlinked to news stories about different impacts of climate change around the globe. Students visit the links and summarise the impacts. They then pick one to research further and produce a presentation about. http://www.epa.gov/climatestudents/impacts/signs/oceans.html http://www.epa.gov/climatestudents/impacts/signs/sea-ice.html http://klima-tuvalu.no/tuvalu-and-climate-change/the-consequences-of-climate-change-on-tuvalu/ http://wwf.panda.org/about_our_earth/aboutcc/problems/weather_chaos/floods_droughts/ http://www.independent.co.uk/news/science/climate-change-is-increasing-the-risk-of-malaria-for-people-living-in-mountainous-regions-in-the-tropics-9174448.html	Learner Resource 5 Click here Click here Click here Click here Click here

Learner Resource 1 What was life like during the Little Ice Age?

See page 8

Where is this place?

Why is this place like this?

What is happening in this painting?

When was this painted?

How has this happened?

Learner Resource 2 What is the evidence for climate change?

Evidence for Climate Change

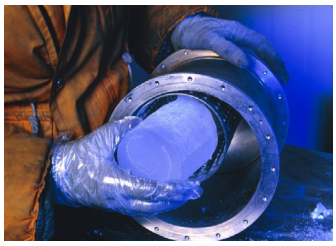
See page 9

In each box summarise how it provides evidence for climate change and include any strengths and weaknesses of the evidence

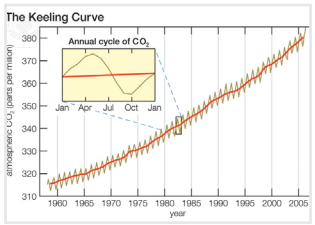
Retreating Ice Sheets

Tree Ring Data

Ice Core Data



Evidence from Graphs



Warning signs from nature

Evidence in art and literature

Learner Resource 3 How compelling is the evidence for climate change?

See page 9

How compelling is the evidence for climate change?

Look at the different pieces of evidence that you have analysed while investigating climate change . Arrange them in order of importance in a diamond-6 shape, with the most important and compelling piece of evidence at the top and the least important and least convincing piece of evidence at the bottom.

I put _____ as my most important piece of evidence because....

I put _____ as my least important piece of evidence because....

1.

2. **2.**

3. **3.**

4.

Learner Resource 4 Do humans contribute to climate change?

Geography Boxing

See page 9

You are going to split into groups of 4

You are going to have a verbal boxing match

Group A B & C are going to argue that global warming is **manmade**.

Group D, E,& F are going to argue that global warming is **natural**.

Each group will be given a statement that they have to prove or disprove according to the viewpoint they are taking

Your task is to use the evidence to construct a persuasive argument

You will then have to pick a team member to be the 'boxer' who will represent you in the verbal boxing match

ROUND 1
Group A vs Group D

"Current available evidence suggests that the current rise in global temperature is unlike anything seen before"

ROUND 3
Group C vs Group F

"There is a clear, strong and undeniable link between atmospheric levels of CO2 and global temperature"

ROUND 2
Group B vs Group E

"Climate has always fluctuated from colder to warmer periods"

Learner Resource 5 The consequences of climate change around the world

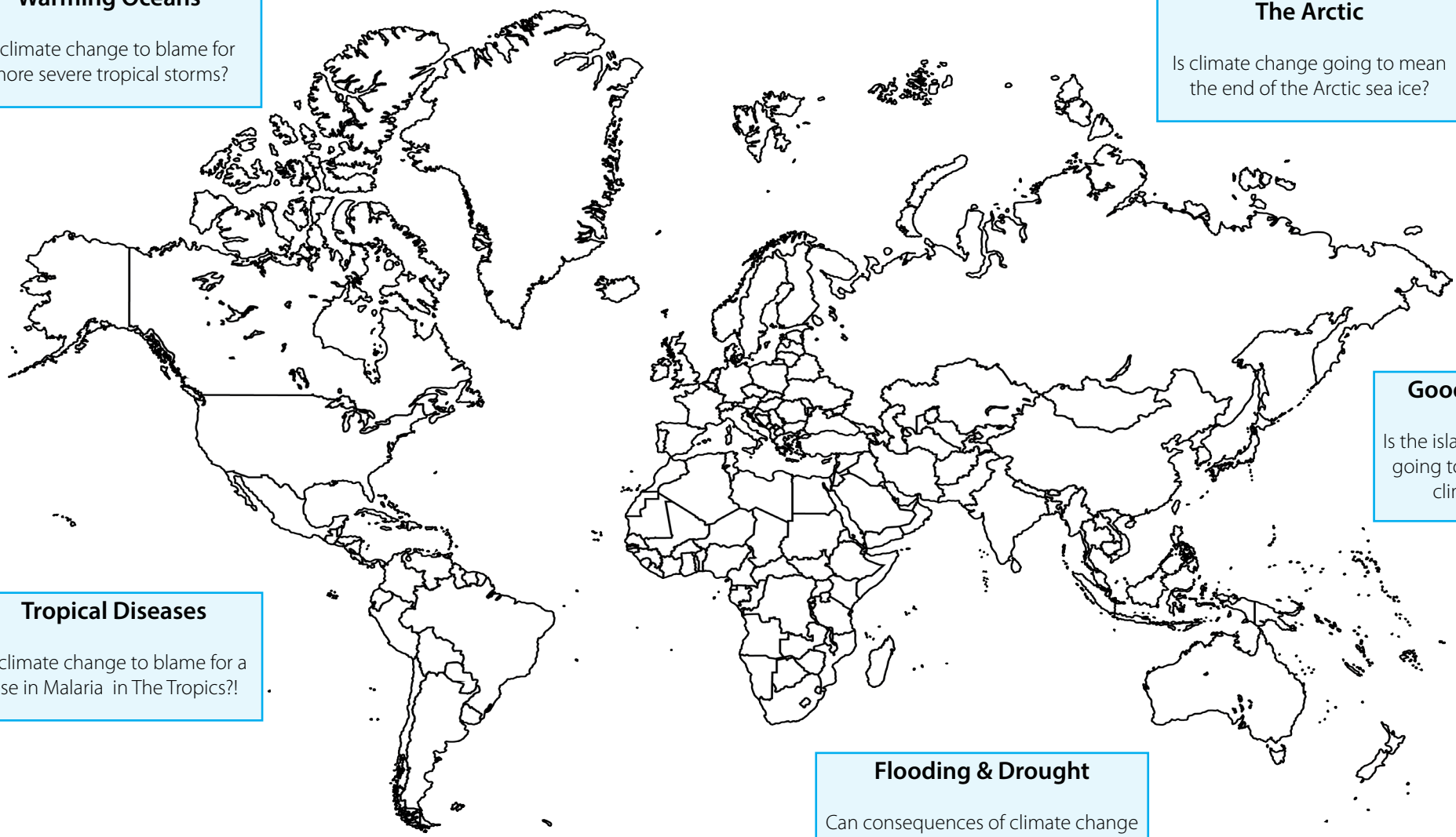
See page 10

Warming Oceans

Is climate change to blame for more severe tropical storms?

The Arctic

Is climate change going to mean the end of the Arctic sea ice?



Goodbye Tuvalu?

Is the island nation of Tuvalu going to disappear due to climate change?

Tropical Diseases

Is climate change to blame for a rise in Malaria in The Tropics?!

Flooding & Drought

Can consequences of climate change be both flooding and droughts?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