

Where on Earth? Our world from the International Space Station

This chapter continues to explore the world at global, national and regional scales from the perspective of the International Space Station (ISS). Through a focus on map representations and projections, it looks at different ways in which the world can be presented. It features a focused lesson on time zones and concludes with a short enquiry looking at the best maps and images for conveying information about geographical features.

Chapter at a glance

Curriculum objectives

Geographical skills and fieldwork

- To use maps, atlases, globes and digital/computer mapping to locate countries and describe features studied.

Locational knowledge

- To name and locate counties and cities of the UK, and understand how some aspects have changed over time.
- To identify the position and significance of latitude, longitude, equator, northern hemisphere, southern hemisphere, the tropics of Cancer and Capricorn, Arctic and Antarctic Circle, the prime/Greenwich meridian and time zones (including day and night).

Human and physical geography

- To describe and understand key aspects of physical geography, including: climate zones, biomes and vegetation belts.
- To describe and understand key aspects of human geography, including: types of settlement and land use and economic activity including trade links.

Week	Lesson objectives	Summary of activities	Expected outcomes
1	<ul style="list-style-type: none"> • To revise and identify features on a world map and globe. • To describe the characteristics and significance of some features on a world map and globe. 	<ul style="list-style-type: none"> • Revising key facts about the International Space Station (ISS). • Identifying which countries lie on key lines of latitude. 	<ul style="list-style-type: none"> • Can locate features on a world map and globe. • Can describe the characteristics and significance of some features on a world map and globe.
2	<ul style="list-style-type: none"> • To identify key features on different map representations of the world. • To describe how the world has been represented on maps in different ways for different purposes and at different times. 	<ul style="list-style-type: none"> • Exploring the difficulties of portraying a 3D globe on a 2D map. Investigating at different map projections and their purposes. • Labelling features on different projections. 	<ul style="list-style-type: none"> • Can identify key features on different world map representations. • Can describe how the world has been represented on maps for different purposes at different times.
3	<ul style="list-style-type: none"> • To identify day and night on a digital globe and world map. • To describe the daily pattern of day and night and the significance of time zones. 	<ul style="list-style-type: none"> • Using an interactive map to explore time zones. • Identifying and ordering places that experience New Year first. 	<ul style="list-style-type: none"> • Can identify day and night on a globe and world map. • Can understand reasons for day and night and can describe the daily pattern. • Knows about the prime meridian and the International Date Line. • Can use zone information to predict times in different places.
4	<ul style="list-style-type: none"> • To locate and describe key features and geographical regions of England and Wales. • To explain how some features and regions have changed over time. 	<ul style="list-style-type: none"> • Using maps and images to identify changes over time in the regions of England and Wales. 	<ul style="list-style-type: none"> • Can locate and describe key features and geographical regions of England and Wales. • Can explain changes in features and regions.
5	<ul style="list-style-type: none"> • To locate and describe key features and geographical regions of Scotland and Northern Ireland. • To explain how some features and regions have changed over time. 	<ul style="list-style-type: none"> • Using maps and images to identify changes over time in the regions of Scotland and Northern Ireland. 	<ul style="list-style-type: none"> • Can locate and describe key features and geographical regions of Scotland and Northern Ireland. • Can explain changes in features and regions.
6	<ul style="list-style-type: none"> • To identify features on different map and image representations of the UK and the world. • To give reasons for choosing locations of features and types of map. 	<ul style="list-style-type: none"> • Identifying key global and UK features and locating them on maps. • Linking images to map features on a range of map projections. 	<ul style="list-style-type: none"> • Can identify features of UK and world maps and images. • Can give reasons for choosing locations of features and types of map.



Expected prior learning

- Children will have completed the chapter for Year 3 Spring 1 'What on Earth? Our world from the International Space Station'.



Overview of progression

- Progression in this chapter involves gaining familiarity and confidence in using an increasing range of map projections. It also involves using maps to identify time zones and to explore historical perspectives.



Creative context

- Looking at change over time in UK regions has links to the history curriculum in terms of settlement patterns arising from pre-1066 invasion and settlement. It also has potential links to the study of local history at Key Stages 1 and 2. Different map projections are essentially responses to design and technology tasks to meet the needs of a range of users.



Background knowledge

- A map projection is a transformation of the latitudes and longitudes of locations on the surface of the globe into locations on a flat surface or map. All map projections distort in some way. Depending on the purpose of the map, some distortions are acceptable and others are not; therefore different map projections exist in order to preserve some properties of the globe at the expense of other properties. Useful guidance on choosing map projections for different purposes, can be found at www.geography.org.uk. (Search for 'choosing a map'). Some recommended map projections for classroom use are detailed below.

- **Mercator:** useful for navigation. Popular with British cartographers in the 19th century as it exaggerated the size of the British Empire.
- **Peters:** popular with aid agencies as it emphasizes the relative sizes of developed and developing countries.
- **Polar:** also called a hemispheric projection because it shows either the northern or southern hemisphere, with the pole at the centre.
- **Upside down:** a south-up map, which addresses the northern hemisphere bias of most projections.
- **Mollweide:** an interrupted Mollweide (with cuts in the oceans) is an accurate and visually appealing flat representation of the globe.
- **Eckert IV:** the equal area map chosen in the 1995 revision of the National Curriculum.
- **Goode:** an interrupted world map with cuts in oceans and continents.
- A time zone is one of the 24 longitudinal divisions of the Earth's surface in which a standard time is kept, the primary division being that bisected by the Greenwich meridian. Each zone is 15° of longitude in width, with local variations, and observes a clock time usually one hour earlier than the zone immediately to the east. Some time zones follow country boundaries rather than a line of longitude.
- The International Date Line (IDL) follows the 180° line of longitude and demarcates one calendar day from the next. The IDL is on the opposite side of the Earth to the prime meridian and passes through the middle of the Pacific Ocean.

Curriculum objectives

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- To identify the position and significance of latitude, longitude, equator, northern hemisphere, southern hemisphere, the tropics of Cancer and Capricorn, Arctic and Antarctic Circle.
- To describe and understand key aspects of physical geography, including: climate zones, biomes and vegetation belts.
- To describe and understand key aspects of human geography, including: types of settlement and land use and economic activity including trade links.

Lesson objectives

- To revise and identify features on a world map and globe.
- To describe the characteristics and significance of some features on a world map and globe.

Resources

Interactive activity 'Mapping the world' on the CD-ROM; globe or class wall map of the world; images of countries and/or places that are located on key lines of latitude (source online – see *Group work* for suggested places); a video showing how day and night move around the Earth (source online); a video showing night to day to night again from the ISS (source online)

Vocabulary

Antarctic, Arctic, equator, latitude, longitude, prime meridian, tropic

Latitude and longitude

Introduction

- Ask the children what they remember from Year 3 about the International Space Station, and revise key facts about it and its orbital path. (The International Space Station (ISS) is a modular artificial satellite. Its first component was launched in 1998. It is now the largest artificial body in orbit and can often be seen with the naked eye from Earth. The ISS consists of pressurised modules, solar panel arrays and other components orbiting at an altitude of between 330km and 410km. It orbits at 17,500 miles per hour taking about 90 minutes to make one orbit (45 minutes in daylight and 45 minutes of night) and making 15.7 orbits every day. The Earth rotates under the orbit so that each successive path across the Earth's surface is displaced to the west.)
- Open the interactive activity 'Mapping the world' on the CD-ROM. Invite the children to help you label the map by dragging and dropping the key features into the correct boxes.
- Use a globe or world map to find out or revise which countries the key lines of latitude (Arctic Circle, Antarctic Circle, tropics and equator) pass through. Share some images (sourced online) of these countries to introduce the activity.

Group work

- Ask the children to work in groups to match a set of images (sourced online) with locations on the lines of latitude.
- Notable locations and features on the tropic of Cancer, moving west to east, include Lake Nasser in Egypt (one of the largest artificial reservoirs on Earth, resulting from the building of the Aswan Dam across the River Nile), Abu Dhabi, Gujarat in India, Burma, Yunnan in China, Hawaii, several states in Mexico and Western Sahara.
- On the equator, moving west to east, are Kampala and Lake Victoria in Uganda, the Maldives, Borneo, the Galapagos Islands, Colombia and the mouth of the Amazon.
- On the tropic of Capricorn, moving from west to east are Botswana, Mozambique, Madagascar, Western Australia, Northern Territory and Queensland in Australia, Chile, Argentina and Sao Paulo in Brazil.
- For this activity, the groups could use different world map projections (for example, Mercator, Peters, Polar, upside down, Mollweide, Eckert IV, Goode) as an introduction to the following week's lesson.

Review

- Share the children's work. Explain that in future weeks, you will be looking at lines of longitude. Show the children lines of longitude on a globe or world map.
- Show a video (sourced online) illustrating how day and night move around the Earth. Introduce the prime meridian and the idea that times will vary at other points on the globe – if it is 12.00 noon at the prime meridian then to the east it will be later in the day and to the west, earlier.
- Refer back to the ISS and how its very rapid orbit means that it passes very quickly from day into night and then back again – 16 times in any 24 hours! Show a video (sourced online) of night to day and back again from the ISS.

Curriculum objectives

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- To identify the position and significance of latitude, longitude, equator, northern hemisphere, southern hemisphere, the tropics of Cancer and Capricorn, Arctic and Antarctic Circle, the prime/Greenwich meridian and time zones (including day and night).
- To describe and understand key aspects of physical geography, including: climate zones, biomes and vegetation belts.
- To describe and understand key aspects of human geography, including: types of settlement and land use and economic activity including trade links.

Resources

Maps of the world showing large-scale features in different projections; access to the internet; modern-day and historical maps of your local area; photocopiable page 124 'Map projections'

Vocabulary

Antarctic, Arctic, change, cities, countries, equator, features, latitude, longitude, map, prime meridian, mountains, projection, regions, rivers, time zone, tropic

World view**Revise**

- Use a range of map projections to practise finding key features. Play a game of 'What am I?', giving clues to help the children find a feature on the map. For example, *I am in Africa. I lie north of the equator. The Atlantic Ocean lies to the west of me. The Mediterranean Sea and Atlas Mountains lie to the north. I am the hottest and third largest desert in the world. My name comes from the Arabic word for desert.* (Answer: Sahara Desert.) Ask the children to raise their hands as soon as they have identified the feature and found it on the map.
- Make a list of the places you identify in the 'What am I?' activity, then find out the local time in those locations, possibly using a website such as www.timeanddate.com.
- Remind the children that in this chapter they have also explored how places change over time. Show the children a map of your local area and a historical map of the same location. Point out one or two of the changes that you can see and explain to the children that later you are going to ask them to work independently to identify some more.

Assess


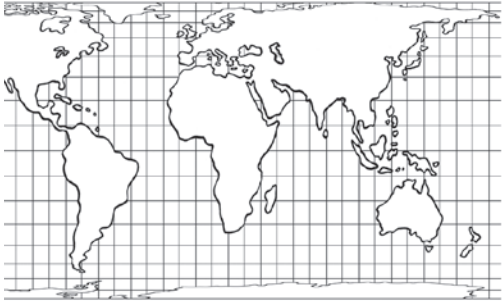


- Give the children two different map projections, for example, Eckert IV and Peters and ask them to examine the maps carefully, then write down three differences that they can see between the two projections. Explain that they should work independently on this task.
- Alternatively, ask them to use photocopiable page 124 'Map projections' and to write a sentence or two about each projection.
- As the children work on the writing task, go around the class, asking them to identify major rivers, mountain ranges and cities on two different map projections such as Eckert IV and Peters.
- Ask the children to write a few sentences to describe the daily pattern of day and night and the significance of time zones. Children who might be held back by weak writing skills could be assessed verbally instead. Can the children identify some places in the world that fall in times zones earlier and later in the day than GMT?
- Hand out copies of modern-day and historical maps and ask the children to identify three more changes (in addition to the ones identified earlier in the lesson). Discuss the children's findings in the class and note which children were able to identify changes and give clear explanations about the changes that had taken place.

Further practice

- Track the progress of the ISS through time zones during a school day.
- Challenge the children to identify the region of the UK that they think has changed most in the last 100 years.

Map projections

■ Look at the different map projections and give reasons why they might be chosen.

<p>Mercator</p> 	<p>Peters</p> 
<p>Polar</p> 	<p>Goode</p> 

I can give reasons for choosing different map projections.

How did you do? 