

## Big question: How is our planet changing?

Lesson	Essential Knowledge
1: Where am I?	<p>The <b>United Kingdom</b>, made up of England, Scotland, Wales and Northern Ireland, is an island nation in north-western Europe. England is home to the capital, London, a globally influential centre of <b>finance</b> and <b>culture</b>. A <b>continent</b>: is any of the world's main continuous expanses of land (Europe, Asia, Africa, North and South America, Australia, Antarctica). The UK is part of Europe. After WW2 European countries started to cooperate economically and <b>trade</b>, the <b>European Union</b> was established. The Union currently counts 27 EU countries. Some of the EU goals are to promote peace, promote scientific progress and offer freedom and security. The United Kingdom withdrew from the European Union on 31 January 2020.</p> <p><b>Scale</b> represents size or distance on a map. About 4.6 billion people live in <b>Asia</b>. The Asian continent has the most <b>populous</b> cities. Historically, cities have been located on <b>coastlines</b> because there are many transport, food and <b>ecological benefits</b>. Products - and therefore money - traditionally flows into countries through their <b>ports</b>. This has set a preference for people to <b>migrate</b> towards <b>coastal</b> areas. Eight of the top ten largest cities in the world are located by the coast. Any circle drawn around the Earth divides it into two equal halves called <b>hemispheres</b>. The <b>Equator</b>, or line of 0°C latitude, divides the Earth into the <b>Northern and Southern hemispheres</b>.</p> <p><b>Geology</b> is the study of rocks and the processes by which they change over time. <b>Scotland</b> has the harshest weather in the UK and large parts of it are <b>mountainous</b> to the degree where it is hard to farm. The soil is (not so much in the <b>lowlands</b>) poor and relatively <b>infertile</b>. This means that it has historically had a lower population than the rest of the UK. Leicester is North west of London. Leicester is to the east of Birmingham.</p>
2: Mapping Connections	<p>A <b>plan</b> is a map of an area – for example a room, or a house, or your school. You can show scale in three ways; in words 1cm to 30 cm; as a ratio: 1:30 or as a line divided into centimetres (cm) or kilometres (km) or miles on larger plans or maps. The scale is always marked on a plan or map so that people can tell the size in real life. A <b>mental map</b> is a map of an area that you have in your head. A <b>human feature</b> is man-made e.g. a settlements or transport links. Whereas, a <b>physical feature</b> is natural e.g. mountain, river or forest. <b>Aerial photography</b> is the taking of photographs from an aircraft or other flying object. Platforms for aerial photography include fixed-wing aircraft, helicopters, drones and even birds. All good maps have a title, <b>compass direction</b>, a scale and a key. The <b>Ordnance Survey National Grid</b> reference system is a system of geographic grid references used in Great Britain. <b>Grid lines</b> help users to locate places using <b>coordinates</b>. <b>4-figure grid references</b> give the number along the bottom (<b>eastings</b>) first and then the numbers up the side (<b>northings</b>). <b>Six-figure grid references</b> divide the sides of the square into 10 parts. A six-figure grid reference is more precise. <b>Ordnance survey</b> maps or <b>OS maps</b> are maps of places which show lots of detail. They use <b>symbols</b> to show what is located in an area or how the land is used.</p>
3: Exploring maps – ICT	<p>The world population is projected to reach <b>9.9 billion</b> by 2050, an increase of more than 25% from the current 2020 population of <b>7.8 billion</b>. <b>Google Earth</b> provides search capabilities and the ability to pan, zoom, rotate, and tilt the view of the <b>Earth</b>. You can also see characteristics of places such as rivers, land use and <b>topography</b>. <b>Topography</b> - the arrangement of the natural and artificial physical features of an area. The <b>Giant's Causeway</b> lies at the foot of the <b>basalt cliffs</b> along the sea coast on the edge of the Antrim plateau in Northern Ireland. It is made up of some 40,000 massive black basalt columns sticking out of the sea.</p>
4: Your Island Home	<p>The United Kingdom has <b>sovereignty</b> over; there are three Crown dependencies and fourteen British Overseas Territories. The 14 British Overseas Territories some of which include the <b>British Antarctic Territory</b>; the British Indian Ocean Territory; the British Virgin Islands; the Cayman Islands; the Falkland Islands; Gibraltar; Montserrat; South Georgia and the South Sandwich Islands; and Sovereign Base Areas on Cyprus. Most of these are parts of the <b>British Empire</b> which chose not to become independent though some are part of negotiated treaties with another country. Most of the countries of the British Empire became independent countries after the end of second world war. Many became <b>republics</b>, some chose to keep the British Monarch (currently Queen Elizabeth 2<sup>nd</sup>) as Head of State and some chose to retain a <b>monarchy</b> but with a different monarch.</p>

	<p>Many of these countries joined <b>The Commonwealth of Nations</b> which today has 53-member states, most were part of the British Empire or have a strong connection to an existing member that was. As well as cultural activities such as the <b>Commonwealth Games</b>, member states try to work together to further the <b>economic development</b> of each member and <b>promote values</b> such as <b>democracy</b>, and <b>freedom</b>. <b>Interpretations</b> of the British Empire have changed and developed over time. In the 19th and early 20th century, some historians argued that the empire was the deserved result of Britain's technical and moral superiority. Many modern historians argue that it is unacceptable to say that colonised peoples did not have or would not have developed their own entirely valid forms of government, laws, and <b>infrastructures</b> without the influence of the British Empire. Furthermore, many historians argue that you cannot examine the British Empire without examining the more shameful aspects of Britain's past. Britain was heavily involved with the <b>Transatlantic slave trade</b> in the 17th, 18th, and 19th centuries. The British Empire also stripped many colonies and <b>indigenous peoples</b> of their land and vibrant <b>cultures</b>, for example, the Aboriginal in Australia and the indigenous peoples of the United States. Today's <b>British values</b> include - Democracy, the rule of law, individual liberty and mutual respect and tolerance of those with different faiths and beliefs, and for those without faith. <b>Colonialisation</b> also caused many deaths due to famine, disease and violence. For instance, in India in 1953 and Kenya in the 1950s. The British Empire was dismantled and replaced by a voluntary organisation of former colonies called the <b>Commonwealth</b>. In 1926, the British government agreed the Balfour Declaration – that Canada, Australia, New Zealand and South Africa were completely <b>independent countries</b>. In 1947, India and Pakistan were given independence. In 1960, British Prime Minister, Harold Macmillan admitted there was a "wind of change" in Africa. Most of Britain's African and Caribbean <b>colonies</b> achieved independence in the 1960s. In 1973, Britain joined the European Economic Community and became part of a trading <b>community</b> based on <b>free trade</b> between the countries of Europe. In 1997, Britain formally handed Hong Kong back to China. As of 2019, the <b>population density</b> for the United Kingdom was 275 people per square kilometer. England is by far the most <b>densely</b> populated at 432 people per square kilometer. Scotland, by contrast, is the most <b>sparsely</b> populated country in the United Kingdom, with only 70 people per square kilometer. Due to <b>competition</b> from abroad, most of Leicester's and the UK's <b>manufacturing industry</b> has now gone. This has led to <b>urban decline</b> as manufacturing buildings were left empty and became <b>derelict</b>. As population increases, new homes are having to be built in the <b>countryside</b>. Increased <b>atmospheric pollution</b> is caused by 80% of the UK's population living in towns and cities. Areas in the UK have experienced significant change and face many <b>opportunities</b> and <b>challenges</b>, including <b>regeneration</b> and <b>urban sustainability</b>. There are 15 <b>National Parks</b> in the UK which cover over 8% of the land area.</p>
<p><b>5: Our Restless Earth</b></p>	<p>The surface of planet Earth sits on <b>plates</b> that move. Every so often we get a glimpse of what lies under these plates as gaps between them reveal pools of <b>lava</b> (magma which has reached Earth's surface). The heat given off by this <b>magma</b> under the surface is what causes the movement of plates. These movements are known as <b>convection currents</b>. As a consequence, the Earth is alive with <b>earthquakes</b>, <b>volcanoes</b> and <b>geothermal energy</b>. A <b>hazard</b> is a dangerous situation or event that carries a threat to humans. A <b>disaster</b> is an event that actually harms humans and disrupts the operations of society. <b>Hazards</b> will be considered <b>disasters</b> once they affect humans, but if they occur in an unpopulated area, they will remain <b>hazards</b>. The Earth is almost a sphere. These are its main layers, starting with the outermost: <b>crust</b> - relatively thin and rocky, up to 35km thick; <b>mantle</b> - has the properties of a solid, but can flow very slowly, about 2900 km thick. The upper mantle is hard. But below is soft, <b>molten</b> rock; <b>core</b> - made from nickel and iron- The <b>inner core</b> is solid and is approximately 6000°C; the <b>outer core</b> is liquid. The Earth's crust, its <b>atmosphere</b> and <b>oceans</b> are the only <b>sources</b> of the <b>resources</b> that humans need. <b>LOW</b></p>

**PRESSURE** weather system where warm, moist air is rising. **Climate change:** In the last 150 years, our climate has begun to warm rapidly due to human activities. The global average surface **temperature** rose 0.6 to 0.9 degrees Celsius (1.1 to 1.6° F) between 1906 and 2005, and the rate of **temperature** increase has nearly doubled in the last 50 years. **Temperatures** are certain to go up further. Despite ups and downs from year to year, global average surface **temperature** is rising. Fault lines are located in many parts of the world and are closely related to the structure of the Earth. It's important to understand the causes, impacts and responses to this tectonic activity. Large earthquakes are usually connected with plate boundaries. **Seismometers** record earth movements. An earthquake is a sudden **shockwave** caused by rocks being under stress from the movements of plates at plate boundaries. Eventually the stress in the rock builds up enough to deform and reach breaking point. At that point, the stored-up energy is released in the form of shockwaves. A **tsunami** is a series of extremely long waves caused by a large and sudden displacement of the ocean, usually the result of an earthquake below or near the ocean floor. This force creates waves that radiate outward in all directions away from their source, sometimes crossing entire ocean basins. **Social** = Impacts on people e.g. people are injured, **environmental** = Impacts on the landscape e.g. land flooded, **economic** = Impacts on businesses e.g. shops destroyed. **Climate** has varied due to **natural processes**. However, in the last 150 years, our climate has begun to warm rapidly due to **human activities**. A warming climate can cause more **low pressure** leading to the formation of **tropical storms**. Hurricanes often form over the tropical seas. The **Coriolis force** sends them spinning towards the **poles**. A tropical storm is a hazard that brings **heavy rainfall, strong winds** and other related **hazards** such as **mudslides** and **floods**. The strongest tropical cyclone recorded worldwide was Typhoon Tip. Winds reached 300km/h. U.S. Air Force aircraft flew 60 weather reconnaissance missions into the typhoon.

**Case Study – Hurricane Sandy**

- Total fatalities:** 285
- Highest wind speed:** 185 km/h
- Lowest pressure:** 940 mb
- Date:** 22 October 2012 – 2 November 2012
- Category:** Category 3 Hurricane (SSHWS)
- Affected areas:** Puerto Rico, Cuba, Jamaica, Eastern United States, MORE

**6: Earning a Living**

**Employment** is when people are in work, receive a regular wage and pay taxes to the government. **Unemployment** is when people are not in work. Approximately 31 million people are working for pay in the UK. They provide the **goods** and **services** we need. Most pay the government part of what they earn, as **income tax**. This money then pays for the National Health Service, funds schools, hospitals, transport links, the police and other public services. There are 4 **economic sectors** which these jobs fall into. The **primary** sector is where people take resources from the land and sea e.g. farming, fishing, mining and forestry. **Secondary** sector workers use resources collected in the primary sector to manufacture (make) products e.g. factory workers (making clothes and cars) and construction workers. In the **tertiary** sector, people provide services e.g. a teacher, dentist, lawyer, optician, waitress, taxi driver and many more. Finally, the **quaternary** sector is where people use their expertise and high-level skills to develop new technology e.g. scientific research, medical research, often these people work in laboratories and conduct experiments. The **employment structure** of a place is often shown using a pie chart. People earn money for **producing** and **supplying** goods and services. Other people buy and **consume** (use) these goods and services. The **economy** is the whole network of people producing, supplying and consuming these goods and services. When lots of goods and services are being produced and consumed we say the economy is **growing**. If the opposite is true, we say the economy is **shrinking**. The UK's economy has changed over time. In the 1600's most people were employed in the primary sector. Moving into 1850

	<p>and farming has become more <b>mechanised</b> with fewer people needed and the <b>industrial revolution</b> has started. Many people moved to the cities to work in factories, we see the growth of the secondary sector. During the 1970's factories in the UK started to close (<b>de-industrialisation</b>) as they couldn't compete with <b>competition</b> from abroad which were making things more cheaply, coal mines are closing to, the primary sector has shrunk but more people are now employed in the tertiary sector. Computers, the internet and technology have caused huge changes to how people work and supported the growth of the quaternary sector. The <b>Clarke Fisher Model</b> is a graph which shows these changes. Changes are still occurring. Look at how the recent Covid-19 pandemic changed how people worked! Change in economic activity is not the same in all countries and can happen at different speeds. <b>Leicester City Action Plan</b> focuses on providing opportunities for people in the city through <b>investing</b> in places, connectivity, work, <b>enterprise</b> and sport and culture. China has the biggest number of people working in the secondary sector and in Ethiopia 78% of people work in the primary sector. Development and <b>industrialisation</b> can change a countries economic structure over time.</p>
<p><b>7: Great Migrations</b></p>	<p><b>Green sea turtles</b> stay in shallow waters until the breeding season. Every time the females breed, they make a long <b>migration</b> back to their natal beach, or the beach where they were born. They will travel long distances, even across oceans, to return to their preferred breeding site. Marine turtles need to get to the surface to breathe, and if they get caught up in fishing gear, they can drown. Marine turtles need to get to the surface to breathe, and if they get caught up in fishing gear, they can drown. <b>Indigenous:</b> originating or occurring naturally in a particular place; native. <b>Nomad:</b> a member of a community without fixed habitation which regularly moves to and from the same areas. Such groups include hunter-gatherers, <b>pastoral nomads</b> (owning livestock), and tinkers or trader nomads. Butterflies and moths are a vital part of our wildlife heritage and are valuable as sensitive <b>indicators</b> of the health of our environment. One of the <b>Butterfly Conservations</b> aims is to Inspire people to understand and deliver species conservation; raising <b>awareness</b> about why butterflies and moths are important; <b>educating</b> people of all ages; raising funds to undertake conservation work and promoting the importance of connecting with nature for our mental and physical well-being. Each year, almost two million <b>wildebeest</b> and 20 000 plains game <b>migrate</b> from Tanzania's <b>Serengeti</b> to the south of Kenya's <b>Masai Mara</b> in search of lush grazing grounds and life-giving water. <b>Leviathan</b>, in Jewish mythology, a primordial sea serpent. <b>Humpback whales</b> make extensive seasonal migrations between <b>high latitude</b> summer feeding grounds and <b>low latitude</b> wintering grounds. Winters are spent mating and calving in warm <b>sub-tropical waters</b>, with an annual migration back to colder waters to feed. <b>Caribou</b> display the longest terrestrial migrations anywhere on the planet. During the summer, they spread across the <b>tundra</b> in smaller groups to feed. In fall, they group together again into larger herds for breeding. They stay in these larger groups throughout their winter migration to the "<b>taiga</b>" regions which are the areas just south of the tundra. The taiga has very similar plants and animals to the tundra, but isn't as <b>barren</b> or as cold.</p>