

# The Geography of Science



## Lesson 1: Introducing Flashpoints

Key concepts	Range and content	Key questions and ideas	Teaching and learning activities	Resources
<p><b>Space</b> – understanding the interactions between places and the networks created by flows of people.</p> <p><b>Human processes</b> – understanding how sequences of events and activities in the human world lead to change in places and societies.</p> <p><b>Scale</b> – appreciating different scales and making links between them.</p> <p><b>Place</b> – geographical imaginations.</p>	<p>Consideration of the flows of information, people, disease and the interactions between these.</p> <p>Consideration of different places and how the actions of others can impact people in other areas.</p> <p>Variety of scales (local, international, global)</p>	<p><b>Pupils should learn:</b></p> <ol style="list-style-type: none"> <li>1. Geographical flashpoints are examples of different major world events that can impact many people/places.</li> <li>2. By looking at three different case studies, both geographers and scientists have an interest and an involvement in these flashpoints.</li> </ol> <p><b>Learning outcomes</b></p> <ul style="list-style-type: none"> <li>• Recognise that world flashpoints can be on different scales from the local to the global.</li> <li>• Learn that major world events can impact on people/environments in different ways and at different scales.</li> <li>• Recognise the different and complementary roles that scientists and geographers have in identifying problems, and finding solutions to major world events.</li> </ul>	<p><b>STARTER:</b> <i>What are geographical flashpoints?</i></p> <ul style="list-style-type: none"> <li>• Students brainstorm individually, in groups or as a class, examples of different major world events that can impact on many people/places.</li> <li>• Explain that these can be called “flashpoints.”</li> </ul> <p><b>MAIN ACTIVITY:</b> Investigating flashpoints</p> <ul style="list-style-type: none"> <li>• For the main activity, students read and examine three flashpoint fact files on Swine flu, the Sichuan Earthquake and climate change.</li> <li>• Students then fill in a table to see linkages between these disasters and how both geographers and scientists have a role/interest. Students can do this in groups and focus on one fact file only and then share with the class or do all three.</li> <li>• Students answer the PowerPoint quiz in teams or as a class.</li> </ul> <p><b>PLENARY:</b> This lesson ends with a discussion of the main findings from the table. Questions provided in the lesson plan can aid discussion.</p>	<p><b>Downloads:</b> Lesson plan 1 Swine Flu Fact File Climate Change Fact File Sichuan Quake Fact File Table: What are Flashpoints? Quiz (PPT)</p> <p><b>Useful links:</b> The <a href="#">NHS website</a> contains information about Swine Flu.</p> <p>The <a href="#">BBC website</a> has an animated map of swine flu cases country by country:</p> <p>The <a href="#">BBC website</a> has an animated graphic of how earthquakes happen</p> <p>The <a href="#">BBC website</a> has an Interactive map of the Sichuan region, information, videos, photos.</p> <p><a href="#">Intergovernmental Panel on Climate Change</a></p> <p><a href="#">The Royal Society</a> offers a simple guide to climate change controversies.</p>
<b>Key processes</b>	<b>Curriculum opportunities</b>			
<p><b>Geographical enquiry</b> – collect, record and display information, analyse and evaluate evidence to draw and justify conclusions.</p> <p><b>Geographical communication</b> – communicate knowledge and understanding using geographical vocabulary.</p>	<p>Make links between geography and work in other subjects and areas of the curriculum. Examine geographical issues in the news. Investigate important issues of relevance to the UK and globally.</p> <p><b>Science curriculum links:</b> 1.4 Sharing developments and common understanding across disciplines.</p>			<p><b>Notes</b></p> <p>Lesson approx. 40 minutes or 2x40 minutes if completed in more detail.</p>

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## Lesson 2: Swine Flu: an over-reaction?

Key concepts	Range and content	Key questions and ideas	Teaching and learning activities	Resources
<p><b>Space</b> – understanding the interactions between places and the networks created by flows of people.</p> <p><b>Interdependence</b> – exploring the social, economic, environmental and political connections between places.</p> <p><b>Human processes</b> – understanding how sequences of events and activities in the human world lead to change in places and societies.</p> <p><b>Scale</b> – appreciating different scales and making links between them.</p> <p><b>Place</b> – geographical imaginations.</p>	<p><i>Flows of people and interactions between people can impact on a place and its people.</i></p> <p><i>Study how the connections between different countries can have an impact on places worldwide.</i></p> <p><i>Study of the UK through a topical current issue. Media activities and flows can have an impact on people/places.</i></p> <p><i>Study of issues and problems at the global and national scale.</i></p>	<p><b>Pupils should learn:</b></p> <ol style="list-style-type: none"> <li>Swine Flu is a pandemic which has spread throughout the world.</li> <li>The distribution of the Swine Flu pandemic.</li> <li>Some media portrayals of the pandemic may have been exaggerated and biased.</li> </ol> <p><b>Learning outcomes:</b></p> <ul style="list-style-type: none"> <li>Appreciate that Swine Flu is a global pandemic that impacts people in many different countries.</li> <li>Recognise that although Swine Flu is of major international concern, it affects far fewer people than many other diseases or disasters.</li> <li>Recognise that some media reports were sensationalist and exaggerated.</li> <li>Develop a more balanced understanding of Swine Flu and its impact in the UK.</li> </ul>	<p><b>STARTER:</b> <i>What is the worldwide distribution of the Swine Flu pandemic?</i></p> <ul style="list-style-type: none"> <li>Using the “2009 H1N1 Flu Outbreak Map” found at <a href="#">Google Maps</a>, students describe the global distribution of the Swine Flu pandemic. For less able students, a set of four questions can be answered.</li> </ul> <p><b>MAIN ACTIVITY:</b> <i>Swine Flu: balanced reporting?</i> There are three tasks in this section:</p> <ul style="list-style-type: none"> <li>Students examine four news reports of the Swine Flu pandemic and decide if the reporting style is likely to have encouraged public panic. There are two newspaper reports and two video reports. Depending on time and the ability of the group, students can study one or all four of the reports and share their ideas.</li> <li>Students record their results in a downloadable table.</li> <li>Students gain a more balanced perspective of the pandemic using the downloadable resource sheet “Swine Flu in Perspective” and complete the news article using the downloadable “Swine Flu – it’s all in the balance” work sheet.</li> </ul> <p><b>PLENARY:</b> This lesson ends with considering two biased statements about Swine Flu. Students work in pairs to create a more balanced response.</p>	<p><b>Downloads:</b> Lesson Plan 2 Swine Flu through the media (worksheet) Swine Flu in perspective (worksheet) Swine Flu – it’s all in the balance (worksheet)</p> <p><b>Links:</b></p> <ul style="list-style-type: none"> <li><a href="#">Google Maps</a> and type “2009 H1N1 Flu Outbreak Map.”</li> </ul> <p>News reports for main activity:</p> <ul style="list-style-type: none"> <li><a href="#">The Independent</a> “Swine Flu could affect up to half the population”</li> <li><a href="#">The Daily Mail</a> “NHS helplines swamped swine flu panic rises”</li> <li><a href="#">YouTube</a> “UK update on Swine Flu – 27<sup>th</sup> April 2009”</li> <li><a href="#">YouTube</a> “Swine Flu: parents should not panic.”</li> </ul> <p><b>Other useful links to support the lesson:</b></p> <ul style="list-style-type: none"> <li><a href="#">BBC website</a> – swine flu</li> <li><a href="#">NHS website</a> – swine flu</li> <li><a href="#">The Guardian</a> – swine flu</li> </ul>
<b>Key processes</b>	<b>Curriculum opportunities</b>			
<p><b>Geographical enquiry</b> – analyse and evaluate evidence, presenting findings to draw and justify conclusions.</p>	<p><i>Interpret maps and draw conclusions. Investigate issues of UK and global relevance. Evaluate and interpret a variety of ICT and web-based resources.</i></p> <p><b>Science curriculum links:</b> 3.3c – study of diseases. 4c – real life examples to find out about science. 4d – study science in local, national, global contexts.</p>			<p><b>Notes</b></p> <p>Lesson approx. 2x 40 minutes if all activities are completed.</p> <p><b>Gifted and talented</b> geographers may like to take the main activity further by creating a short podcast or video using Moviemaker and their Swine Flu article. This could include pictures, maps, music, voice-overs and interviews if appropriate.</p>

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## Lesson 3: Sichuan Earthquake (2008): Lessons learnt?

Key concepts	Range and content	Key questions and ideas	Teaching and learning activities	Resources
<p><b>Scale</b> – appreciating different scales and making links between them.</p> <p><b>Physical processes</b> – understanding how sequences of events and activities in the physical and human worlds lead to change in places, landscapes and societies.</p> <p><b>Human processes</b> – understanding how sequences of events and activities in the human world lead to change in places and societies.</p> <p><b>Place</b> – geographical imaginations.</p>	<p><i>Study earthquakes at a local scale.</i></p> <p><i>Interactions between humans and the environment can affect the impact of natural hazards.</i></p> <p><i>Understanding how humans prepare and react to natural hazards which can lead to future change.</i></p>	<p><b>Pupils should learn:</b></p> <ol style="list-style-type: none"> <li>How earthquakes happen</li> <li>Earthquakes affect a huge number of people.</li> <li>Changes can be made to reduce the impact of earthquakes on people and places.</li> </ol> <p><b>Learning outcomes:</b></p> <ul style="list-style-type: none"> <li>Develop geographical knowledge of how earthquakes happen.</li> <li>Appreciate that there are a range of human processes which can accentuate the impacts of natural hazards.</li> <li>Develop geographical skills in sorting, categorizing and analyzing information.</li> <li>Identify similarities and differences between two large scale earthquakes.</li> <li>develop decision-making skills by creating recommendations to reduce the future impact of earthquakes in China and beyond.</li> </ul>	<p><b>STARTER:</b> <i>How do earthquakes happen?</i></p> <ul style="list-style-type: none"> <li>Talk through the interactive resource at the <a href="#">BBC website</a> to learn how earthquakes happen.</li> </ul> <p><b>MAIN ACTIVITY:</b> <i>Comparing Tangshan (1976) and Sichuan (2008) earthquakes in China.</i></p> <ul style="list-style-type: none"> <li>Students watch the downloadable “China Earthquakes: Learning from the past (PPT).”</li> <li>This can be supplemented by the teacher, using the additional links listed.</li> <li>Students complete a card sort activity using the downloadable “Learning from the past: Tangshan and Sichuan compared” work sheet.</li> <li>Working in groups, students then use the information from the card sort to produce a Venn diagram to compare how the two earthquakes were similar/different.</li> <li>Using all the resources from the lesson, students produce recommendations of how the Chinese Government could prepare better for an earthquake in the future. The downloadable worksheet “Learning from the past: Changing the future” outlines the activity.</li> </ul> <p><b>PLENARY:</b> Students discuss and share their ideas and recommendations to reduce the impact of earthquakes in the region.</p>	<p><b>Downloads:</b> Lesson Plan 3 China Earthquakes: Learning from the past (PPT). Sichuan Quake Fact File. Learning from the past: Tangshan and Sichuan compared (card sort) Learning from the past: changing the future (worksheet).</p> <p><b>Links:</b> <a href="#">BBC website</a> earthquakes: <a href="#">BBC Website</a> - aerial video of quake zone. Pictures of the Sichuan earthquake from the <a href="#">Guardian website</a></p> <p><a href="#">BBC Website</a> - interactive map of region, information, videos, photos: <a href="#">Guardian news article</a> – making Schools in earthquake zones safe:</p>
<b>Key processes</b>	<b>Curriculum opportunities</b>			
<p><b>Geographical enquiry</b> – analyse and evaluate evidence, presenting findings to draw and justify conclusions.</p> <p><b>Geographical communication</b> – communicate knowledge and understanding using geographical vocabulary.</p>	<p><i>Decision making, categorise, organize and analyze information. Make recommendations based on evidence.</i></p> <p><b>Science curriculum links:</b> 2.2a – analyse data from a range of sources 3.4c – human activity and natural processes can lead to changes in the environment. 4f – use creativity and innovation in science.</p>			<p><b>Notes</b></p> <p>Lesson approx. 40 minutes + homework if all activities are completed.</p> <p><b>Gifted and talented</b> geographers may also like to consider the implications of China’s large scale dam programme to the impacts of earthquakes in the region. As an extra activity, students can research and design their own earthquake resistant building.</p>

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## Lesson 4: Climate change: Global impacts

Key concepts	Range and content	Key questions and ideas	Teaching and learning activities	Resources
<p><b>Scale</b> – appreciating different scales and making links between them.</p> <p><b>Environmental interaction</b> – understanding that the physical and human dimensions of the environment are interrelated and together influence environmental change.</p> <p><b>Physical processes</b> – understanding how sequences of events and activities in the physical and human worlds lead to change in places, landscapes and societies.</p> <p><b>Place</b> – geographical imaginations.</p>	<p>Study on a global scale making links between places.</p> <p>The physical interactions of climate change can impact on people and places in a variety of ways.</p> <p>Study how physical changes may lead to human choices in the future which can change places and societies.</p>	<p><b>Pupils should learn:</b></p> <ol style="list-style-type: none"> <li>1. What is climate change?</li> <li>2. Climate change may impact on world population distribution in a variety of ways.</li> <li>3. Population changes and climate change impacts are unlikely to be evenly distributed.</li> <li>4. Geographers and scientists can work together to reduce the impact of climate change.</li> </ol> <p><b>Learning outcomes:</b></p> <ul style="list-style-type: none"> <li>• Develop geographical knowledge of global warming and the greenhouse effect.</li> <li>• Develop geographical and ICT literacy skills using a variety of web-based maps and ICT skills.</li> <li>• Develop skills to categorize and analyse map data and information.</li> <li>• Recognise that the world is interconnected and climate change will impact on everyone in different ways.</li> <li>• Identify ways that scientists and geographers can work together to minimise the impacts of climate change.</li> </ul>	<p><b>STARTER:</b> <i>What is climate change?</i> Using the interactive resources at the BBC website, go over the theories of climate change. It would be useful to have covered this previously.</p> <p><b>MAIN ACTIVITY:</b> <i>How might climate change impact on world population density?</i> For the main activities you will need the downloadable worksheets.</p> <ul style="list-style-type: none"> <li>• The first task is to annotate a world population density map using labels provided. This is designed to help students gain a global perspective of the impacts of climate change.</li> <li>• Secondly, students colour code the labels according to where they think people will move 'from' and 'to' due to climate change.</li> <li>• Students then answer six questions based on their map.</li> <li>• Lastly, students discuss the role of geographers and scientists in minimising the impacts of climate change on food, water and space resources.</li> </ul> <p><b>PLENARY:</b> The impacts of climate change are brought from the global back to the local. To lead into the next lesson, students discuss: What do you think the impacts of climate change would be for people in London? Do you think we are prepared in this country for flooding, movements of people or rapid changes in weather? Why/Why not?</p>	<p><b>Downloads:</b> Lesson Plan 4 How will climate change impact on world population density? (worksheet). Impacts of climate change (worksheet).</p> <p><b>Links:</b> <a href="#">BBC</a> interactive resources on climate change: <a href="#">Population density map:</a> Printable world map from <a href="#">Teacher Vision</a></p>
<b>Key processes</b>	<b>Curriculum opportunities</b>			
<p><b>Graphicacy and visual literacy</b> - construct maps and plans at a variety of scales, using graphical techniques to present evidence. Use atlases, globes, maps at a range of scales.</p>	<p>Construct and annotate a map using geographical techniques. Examine geographical issues in the news.</p> <p><b>Science curriculum links:</b> 2.3 – use scientific methods including ICT to communicate information. 3.4c – Human activity and natural processes can lead to changes in the environment.</p>			<p><b>Notes</b></p> <p>Lesson approx. 40 min</p> <p><b>Gifted and talented</b> geographers may like to create their own choropleth map showing the world population density if the climate was to increase by 4°C using their annotated map from the lesson.</p>

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## Lesson 5: Flood in London: A mission impossible?

Key concepts	Range and content	Key questions and ideas	Teaching and learning activities	Resources
<p><b>Scale</b> – <i>appreciating different scales and making links between them.</i></p> <p><b>Physical processes</b> – <i>understanding how sequences of events and activities in the physical and human worlds lead to change in places, landscapes and societies.</i></p> <p><b>Environmental interaction</b> – <i>understanding that the physical and human dimensions of the environment are interrelated and together influence environmental change.</i></p>	<p>Focusing on the local scale.</p> <p>Studying changes in climate and its impact on human processes which in turn leads to changes in places.</p> <p>A variety of human processes can lead to environmental change. Investigating people and environmental interaction in London.</p>	<p><b>Pupils should learn:</b></p> <ol style="list-style-type: none"> <li>1. Climate change poses potential threats for London</li> <li>2. London is not very well prepared for major floods</li> <li>3. Major floods could impact many people and places</li> <li>4. Relevant agencies need more plans in place for flooding in London.</li> </ol> <p><b>Learning outcomes:</b></p> <ul style="list-style-type: none"> <li>• Realise that major flooding is a potential risk in London due to climate change.</li> <li>• Study a focused case study of relevance.</li> <li>• Use geographical enquiry skills by asking questions and formulating solutions.</li> <li>• Use decision making skills and interpersonal skills to formulate decisions together.</li> <li>• Gain skills using a variety of maps and other evidence to decide on a plan of action.</li> <li>• Students put themselves in an imaginary situation to formulate ideas.</li> </ul>	<p><b>STARTER:</b> <i>What if London really flooded?</i> To set the scene of the lesson, watch the film trailer for the 2007 film “Flood.”</p> <p><b>MAIN ACTIVITY:</b> <i>Mission Impossible?</i></p> <ul style="list-style-type: none"> <li>• The lesson is based on the film Mission Impossible.</li> <li>• Students work in groups as teams of ‘agents’ to save London from a devastating storm surge.</li> <li>• The downloadable PPT “Mission Impossible” guides the lesson.</li> <li>• The background briefing sets the scene.</li> <li>• Students move onto a decision making slide where they discuss and brain storm ideas of how London would deal with a major flood.</li> <li>• During the action plan slide, students work in groups to come up with a more detailed plan of action. Students use population density maps and maps showing hospitals and schools to help them formulate their decisions. For less able students there is a downloadable sentence stem sheet to help them write their ideas.</li> </ul> <p><b>PLENARY:</b> The storm abatement slide is designed to encourage discussion, where students reflect on their ideas and whether their ideas would have worked or made the situation worse. Depending on time, students share their action plans with the class or finish for homework.</p>	<p><b>Downloads:</b> Lesson Plan 5 Mission Impossible (PPT) Action Plan sentence stems (worksheet)</p> <p><b>Links:</b> Film trailer 2007 film “<a href="#">Flood</a>” <a href="#">London flood map</a> <a href="#">London population density map</a> <a href="#">Picture of Thames Barrier</a> <a href="#">BBC website</a> – London Ill prepared for Flood: <a href="#">BBC video</a> “The Thames Barrier” Use <a href="#">Google Maps</a> to search for “London hospitals” and “London Schools”</p> <p><b>Notes:</b> Lesson approx. 40 mins</p> <p>Gifted and talented students can take this further by designing their own Thames Barrier. For ideas and help, students can use the links provided on the lesson plan.</p>
<p><b>Key processes</b></p> <p><b>Geographical enquiry</b> – <i>ask geographical questions, thinking critically, constructively and creatively.</i></p> <p><b>Geographical communication</b> – <i>use geographical vocabulary and conventions in both talk and writing.</i></p>	<p><b>Curriculum opportunities</b></p> <p><i>Students work together to think of their own geographical questions and formulate their own ideas. Investigate important issues of relevance.</i></p> <p><b>Science curriculum links:</b> 3.4c - <i>human activity and natural processes can lead to changes in the environment</i> 4c- <i>use real life examples to explore science</i> 4f- <i>use creativity and innovation in science</i></p>			

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## Lesson 6: Reducing the impact of flashpoints

Key concepts	Range and content	Key questions and ideas	Teaching and learning activities	Resources
<p><b>Scale</b> – <i>appreciating different scales and making links between them.</i></p> <p><b>Human processes</b> – <i>understanding how sequences of events and activities in the human world lead to change in places and societies.</i></p> <p><b>Environmental interaction</b> – <i>understanding that the physical and human dimensions of the environment are interrelated and together influence environmental change.</i></p>	<p>Variety of scales (local, national, global)</p> <p>Investigating how human processes can impact on places and societies.</p> <p>Investigate how human choices/decisions can impact on the physical and human dimensions of the environment.</p>	<p><b>Pupils should learn:</b></p> <ol style="list-style-type: none"> <li>There are impacts (problems) associated with geographical flashpoints</li> <li>Solutions can be found to reduce the impact of geographical flashpoints</li> <li>Geographers and scientists have roles/interests in these flashpoint solutions</li> </ol> <p><b>Learning outcomes:</b></p> <ul style="list-style-type: none"> <li>Reinforce learning from previous lessons regarding flashpoints and their impacts</li> <li>Strengthen interpersonal skills through group work</li> <li>Use decision making skills when identifying possible solutions to problems associated with flashpoints</li> <li>Use of ICT and research skills</li> </ul>	<p><b>STARTER:</b> <i>What are the impacts of the three flashpoints?</i> Students reflect back on the problems associated with the three flashpoints covered in this module and how they impact on people and the environment.</p> <p><b>MAIN ACTIVITY:</b></p> <ul style="list-style-type: none"> <li>In task 1, students work in groups to carry out the downloadable problems and solutions card activity. Students come up with three solutions for each of the three problems they are given. For less able students there is a card sort activity with the solutions already noted.</li> <li>Discuss/feedback solutions devised.</li> <li>For more able students, they can come up with some of their own problems associated with the flashpoints and possible solutions.</li> <li>In task 2, students produce a leaflet, poster or PPT presentation to show ways of reducing the impact of one of the flashpoints. Students use the information from the card activity and their own research. This activity can be done on paper or using ICT. The guidance for this activity can be found on the “Reduce the Impact of Flashpoints” worksheet.</li> </ul> <p><b>PLENARY:</b> A ‘Pictionary’ style game is played where students, in pairs, choose two problems discussed in the lesson and draw one for their partner to guess within one minute. Their partner also has to come up with a possible solution for that problem. Then swap over.</p>	<p><b>Downloads:</b> Lesson plan 6 Flashpoint Problems and Solutions Cards (word) Flashpoint Problems and Solutions Card Sort – for less able students (word) Reduce the Impact of Flashpoints (word)</p> <p><b>Links:</b> Links for research in task two of the main activity can be found on the “Reduce the Impact of Flashpoints” worksheet. Key links are listed below:</p> <ul style="list-style-type: none"> <li><a href="#">Government information</a> on Swine Flu:</li> <li><a href="#">The Central US Earthquake Consortium</a> - What are building codes?</li> <li>Global impacts of climate change available at <a href="#">Climate Change North</a></li> </ul>
<b>Key processes</b>	<b>Curriculum opportunities</b>			
<p><b>Geographical enquiry</b> – <i>solve problems and make decisions to develop analytical skills and creative thinking about geographical issues.</i></p>	<p><i>Examine geographical issues in the news. Investigate important issues of relevance.</i></p> <p><b>Science Curriculum links:</b> 4a – <i>research, experiment, discuss and develop arguments.</i> 4d – <i>study science in local, national and global contexts, appreciate connections.</i></p>			<p><b>Notes</b></p> <p>Lesson approx. 40 mins</p>

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