Key Stage 4 AQA Geography: Geography A (Linear) 9030 & Geography B (Linear) 9035
GCSE

Lesson 1: "Impact of transport on urban space and air quality"
Divided into two parts
Part 1 consists of 4 Tasks, which may take 35 minutes to complete
Part 2 consists of an extension exercise, which may take 20 minutes

For Exams June 2014 onwards
Lesson Topic:
Geography A: Changing Urban Environments
Geography B: The Urban Environment
Link Geography A: http://filestore.aqa.org.uk/subjects/AQA-9030-W-SP-14.PDF *pages 17 and 18*
Link Geography B: http://filestore.aqa.org.uk/subjects/AQA-9035-W-SP-14.PDF *pages 10 and 11*

CURRICULUM

Geography A 3.2 Unit 2: Human Geography
Changing Urban Environments
- Urbanisation is a global phenomenon
- Urban areas have a variety of functions and land uses.
- Overview of the issues facing many urban areas: Traffic – impact of increased use of road transport on the environment and solutions aimed at reducing the impact.
- Effects and management of air and water pollution.
Opportunities to study ALTERNATIVE FUTURES (page 16) in this section include:
The effects of sustainable transport solutions, integrated systems, controls on air quality, improvements to public transport etc.
Study how one city could be made more sustainable and how it could be different in the future.

CURRICULUM

Geography B 3.1 Unit 1: Managing places in the 21st century
The Urban Environment
Key Question: How can urban growth create challenges?
The Urban Environment: Key Ideas
- The world is increasingly urban.
- Urban areas face increasing threats from environmental hazards (pollution).
- The increasing need to manage the movement of people and traffic in urban areas.
Specification Content:
- Investigate global patterns of urban population/ rates of urbanisation.
- Investigate one urban area to consider the environmental hazards (pollution) linked to urban/industrial concentrations and the challenges these present.
- Use an example(s) to describe and explain the different methods being used to manage people movement and traffic in urban areas.

LESSON PLAN

Students will look at the main ways Beijing and London are polluted by accessing the web links available and answering questions from task 1, 2, 3 and 4. The tasks can be handed out to each student at the start of the class.

Through these links and materials, students will be introduced to the way land is used, particular the transport links, both on ground and above ground. Each task will help students understand how the city has urbanised and sprawled, as well as some environmental effects of this. The focus will be on the creation and impact of outdoor air pollution and the current air quality in London, developed in task 4. In this task, students will use the London Air Quality Network data, as well as use AirSensa if applicable. How teachers can access this information will be discussed below.

In the extension exercise students will be asked to think about mitigation techniques, with the TEDxZurich link (15 minute video) helping their understandings. Students are asked to interpret the information and discuss their individual comments with the class. This exercise can also be used as homework, with the discussion taking place during the following lesson.

LEARNING OBJECTIVES

- Students will be able to define and describe the global patterns of urbanisation.
- Students will be able to describe an example city that illustrates many of the challenges facing urbanised populations.
- Students will understand the way that transport links urban areas, and the effects this has on the ambient air.

LESSON REQUIREMENTS:

- White board
- Access to weblinks online
- Paper & pens
- Handout of tasks and extension exercise

Name ....

Introduction:

As the world's population continues to increase and further populate urban areas, the impact of human activity on those concentrated areas continues to pose problems to human health.

Consider, just for example, the state of the air in Beijing. Please read the link and it will become clear that the visible impact of the smog leads to the death of thousands of people. Los Angeles is even 'famous' for its brown blur that hovers over the city's airspace.
(link: http://theweek.com/articles/456979/chinas-massive-pollution-problem)

With these resources you are going to be considering how residents in Beijing travel around the city. You will want to consider options beyond that which is provided here. You will need to think about human behaviour and what processes happen in urban areas.

TASK 1 : (42 second video clip + task question)
Familiarise yourself with the green spaces within London. You can see many of them in this video:
https://www.youtube.com/watch?v=WUAjUPc8M1w
but you may also look at other map sources. Hint, you might find it easiest to press pause when you get the view that you find best.

Task Question: What impact do green spaces have on levels of air pollution?

TASK 2: (2minutes 38seconds)
Look to the skies with this resource: http://www.telegraph.co.uk/travel/travelnews/11236552/Air-traffic-timelapse-untangling-the-traffic-in-Britains-skies.html

Task Question: Observe the density of air traffic over London and consider. What impact has this on the air that sits over the city?

TASK 3: (60 seconds)
Look to the roads with this short video:
http://vimeo.com/72638656
Bear in mind this is just data of a 24hr period of operation.

Task 3 Question: Imagine what all the road vehicles would look like. Can you tell from the road links where in London the most busy routes are?

TASK 4:
Conducting your own personal research:
1. Make a list of polluting forms of transport that you see on a day-to-day basis in London.

2. Come up with a way where one of the transport forms may be mitigated. Here, think of how it would affect the population in terms of health, cost and travel time, as well as how it would impact the rest of the transport links.

3. Using the various maps, data representations and resources available, have a guess at the most polluted region of London. Make note of where you think it is and why.

4.a) Please access the [London Air Quality Network](#). You can find live information about the state of the air quality by using their accessible data from the Air Quality Network's sensors that are located in various locations around London. You can get a live picture of the pollution levels by clicking on 'NOWCAST'.

4.b)

Toward the bottom of the page you will also find a TOOLS section. Use this to access the data for different pollutants to see whether your identified area is actually the most highly polluted region of London.

4.c) Does what you have found surprise you? Explain why, or why not.
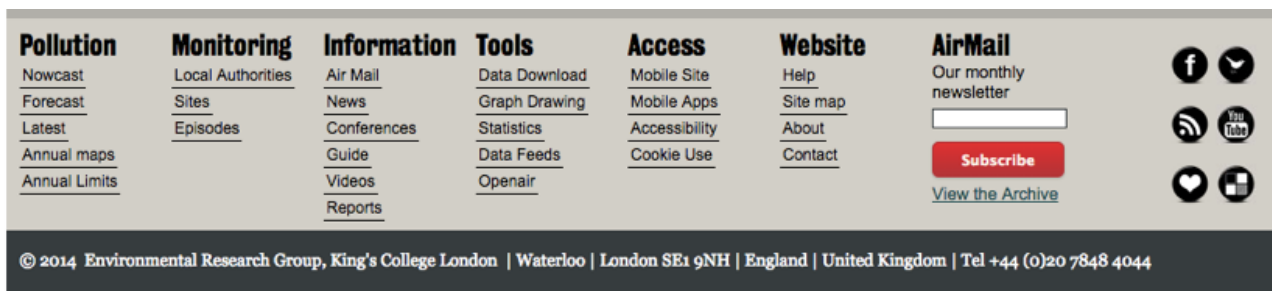
4.d) Now select 'Graph Drawing'.

4.e) Use the graph building options to compare one of the pollutants listed in the table. Compare this across two points in time, e.g. January 1st 2013 and January 1st 2014. You may wish to select the sensor location that is nearest to your school, home or favourite place.

4.f) What do you notice about the data over those two time points?
4.g) Do the graphs looks similar?
4.h) If they look similar, what reasons can you suggest for why this is the case?
4.i) If they look different, what reasons can you suggest for why this is the case?

4.j) Continue to interact with the data whilst thinking about how the following factors may cause differences in your findings:
- Location & its surrounds (use your local knowledge)
-Time of the year, the season and what that means for human behaviour
- Special events that took place at the time you have selected (e.g. London Olympics)
- World Events that may influence your readings (e.g. Saharan dust blowing over the UK)

4.k) Make five more analyses and record your findings.
- Offer as much insight as you can (you may need to do a little research!) about how human behaviour might be altered to help reduce the levels of pollution.
- You may wish to refer back to the table from earlier to refresh your memory of why it is important to reduce pollution levels.

Extension Exercise (and can be used as homework), 15 min video:

Some people have strong beliefs of how cities may be improved and pollution levels may be reduced. Of course, there are different opinions about what is considered improved and thus you may find a number of different, and sometimes-conflicting ideas.

As a final task, you are encouraged to watch and think about this presentation made in Zurich, Switzerland ([video link here](https://www.youtube.com/watch?v=pX8zZdLw7cs) / https://www.youtube.com/watch?v=pX8zZdLw7cs). It concerns road use and transportation.

Bring your thoughts from this video and be prepared to talk about them with your class.

For teachers:

Option exercise: The AirSensa Air Quality Data

The AirSensa provides air quality data from the school's own individual device as well as London Averages. Students can use the AirSensa London average and look at the data available, to compare their findings with the LAQN.

Accessing the AirSensa data

If a school has its own AirSensa, the individual AirSensa data can be accessed by adding in the school specific log-in code, that is shared with the head teacher or head of faculty. If you (the teacher) have not yet received access to the log-in code and data please contact the individual who is responsible for the AirSensa and it's data.

Once you have typed in the log-in code you will see a dashboard page which contains graphs of key air pollutants, with their level of pollution against a time gradient. Teachers can alter the time average by adding in the time-frame of pollutant measurements in the task bar at the top of the page. The data can also be downloadable as an Excel CVC file, allowing students to draw their own graph, if applicable.

If the school does not have its own individual AirSensa, Deliver Change will be able to supply a prepared data set for students to work with. In this case, please contact info@deliverchange.org to receive this information.