

Lesson Two: What relationship is there between air quality and development?

Starter Activities:

Teachers should ask students where they see links between the idea of 'air quality' and 'development'. Depending on previous teaching and learning activities, a clear definition of what we mean by development may have to be explored first. Stronger sets can do this in peer pairs by linking ideas together from other course areas or from current news items they may have read. Weaker sets may need the help of Presentation: Air Quality and Development: the images should act as possible catalysts for linkages and teachers can encourage students to look at particular images as clues towards the thought process. Linkages can be fed back to the class verbally and possibly noted via an IWB for the whole class to see.

A key point which all students should recognise is that the relationship between air quality and development is a two way process – air quality is dependent on a nation's level of development as well as being a cause of development level for example in geopolitical spheres.

A further point for discussion would be how the linkages they have found might change in the future. This may involve a more teacher led discussion about the direction development is taking in BRIC nations and developing countries.

Main Teaching:

Discuss with students how they think a country's wealth will affect its pollution level. Using Presentation: Plot Hypothesis, students can use the IWB to show what they think the relationship may be between the data sets. Teachers should seek justification from the students for their ideas and create alternative scenarios such as those below in order to provoke discussion:

- Wealthy nations drive more cars but cars tend to be newer and less polluting
- Poorer nations may invest heavily in 'dirty' industries in order to stay competitive in manufacturing, regardless of the environmental consequences
- Wealthy nations may have higher energy usage but they also have the ability to invest more in technology that reduces harmful emissions

Using Handout: GDP v Air Quality (also in Presentation: GDP v Air Quality for IWB use) students should plot the countries' GDP per capita data against their annual mean $PM_{10}\mu g/m^3$. Students can do this using graph paper and by hand or by using a package such as Microsoft Excel and Data: GDP v Air Quality. Once plotted teachers should encourage students to draw a line of best fit (curved or straight) to show the relationship between the two. Students should be able to explain the relationship they see as well as identify any anomalies. These anomalies can form the focus of a further discussion:

- Are some countries producing significantly more or less PM_{10} than countries of similar wealth?
- Are some countries under or over developed for the amount of PM_{10} they are releasing?

Students could then be introduced to the idea of a Kuznets Curve via Presentation: Kuznets Curve. A brief explanation of how a Kuznets Curve can be interpreted environmentally should follow and then students should be posed the following questions which they can explore with a partner:

- Does the real life data follow the theory of environmental Kuznets Curves and if not, how does it differ?
- Give at least one reason for any differences you notice between the Kuznets Curve and your data.
- It is a case of the world not having yet reached the Kuznets Curve idea or have we surpassed it?
- Why might critics challenge the Kuznets Curve as a model for development?

Plenary Activities:

Teachers can explain the main sources of indoor air pollution in developing countries to students. Students can think of reasons why people in developing countries sometimes have little choice but to cook off an open flame.

Teachers can split the class in two. Group A needs to think about reasons why a 'technical fix' stemming from a developed nation is the best way forward for reducing the levels of indoor air pollution and the other, Group B, needs to think about why a 'technical fix' stemming from a developing nation is the better option.

If possible, group the tables together in the centre of the room to represent the basket of a hot air balloon. The teacher should set the scene once all the students are sat on the tables:

The students are floating above Los Angeles on a particularly smog filled day. They can barely see the city below as it is covered in a thick blanket of air borne particulates. In the basket there is only one oxygen tank and to ensure their survival the students will need to argue for why their solution to indoor air pollution is the better. If they lose the debate, they get 'thrown overboard' and into the smog.

In turn students will go 'head to head' against each other, giving one reason only why their 'solution' is better for those suffering from indoor air pollution. The teacher decides which of the two students gives the stronger argument and which of the two students is thrown out of the basket. Once an imbalance is made between the two teams, members of the same team may have to debate between themselves and pit different ideas against each other.

At the end of the debate, the main points of the discussion can be reviewed and students should be able to see that both short and long term technical solutions from a variety of sources are key to managing indoor air pollution.

Extension / Homework Activities:

Students should watch the Sarah Collins video clip on the 21st Century Challenges website. Following this, students should make a list of all the ways Wonderbags can help a family in a developing country, aside from improving their indoor air quality. With research on the Wonderbag website, students can explore how the Wonderbag business model incorporates elements of both 'top-down' and 'bottom-up' development.
