THE GLOBE PROGRAM

AQC5 Topography and Air Pollution

Activity: Examine the topography (terrain) around your school

Purpose: Determine if topography potentially influences air pollution levels at your school

Educational Outcomes: Encourages observational skills, map reading, and critical thinking

Tools required: Access to the internet to use Google Maps or local topographic maps

Supporting documents: Air Pollution factsheet, Air Pollution and Weather factsheet

Background Information – Topography and Air Pollution

Pollution levels can be greater in valleys than for areas of higher ground due to the interaction between air flow (winds) and the Earth's surface.

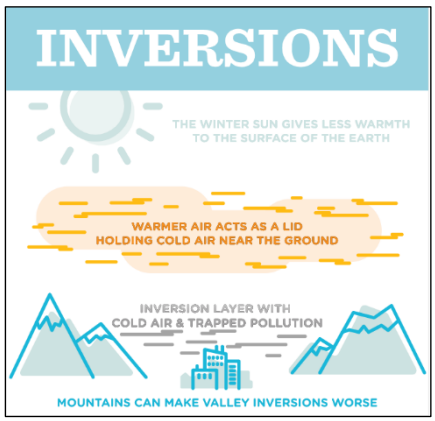
On hill tops and exposed areas, moderate wind will typically cause the pollutant to be dispersed (blown and spread out) but in low-lying areas like valleys, it is harder for the wind to penetrate, causing air pollutants to become trapped and levels of air pollution to rise.

A good example is the heavily populated Mexico City that sits in a low-lying area surrounded by hills.

The geographical setting makes it difficult to disperse pollutants from the city.

This same phenomenon can also happen on flat or rolling terrain when the weather is still (no wind). On these days there is no wind to disperse pollutants and the sun can cause secondary pollutants to form such as ozone (O_3) which linger over the city.

In the winter, urban areas surrounded by mountains can also experience a temperature inversion (upside down), where cold air is trapped in a valley below a warmer layer of air.



As you remember, we normally see air cooling with distance (altitude) from the Earth's surface. Traffic-related pollutants can become trapped in the cool layer of surface area for days causing harmful levels of air pollution. Salt Lake City in Utah, USA experiences five to six multi-day inversions during the winter months due to a combination of topography and weather.

Source: inversion image and information: https://deq.utah.gov/air-quality/inversions

Now it is time to examine the topography around your school

Terrain Analysis Guide – by hand

1. Find OSI Topographic map for your area
2. Identify your school on the map
3. Examine the landscape around your school, are you situated in a relatively flat area, or are you positioned on top of a hill, or in a valley?
4. If you identify a valley or nearby mountains - what is the difference between the elevation (height above sea level) at your school compared to the elevation of the top of the nearby hills?
5. What landforms can you identify, for example, mountains, valleys or flat lying land

Terrain Analysis Guide - computer

1. Search for your school on Google Maps
2. Once you have found your school, click on the menu in the top left and select 'terrain'
3. Examine the landscape around your school, are you situated in a relatively flat area, or are you positioned on top of a hill, or in a valley?
4. If you identify a valley or nearby mountains - what is the difference between the elevation (height above sea level) at your school compared to the elevation of the top of the nearby hills?
5. What landforms can you identify, for example, mountains, valleys or flat lying land

Questions:

Do you think the local topography influences air pollution levels at your school?

If yes, describe how the topography influences air pollution.