

Student tasks



Read the news item below:

Record pollution chokes Singapore

Air pollution in Singapore reached a record high for a third day running yesterday and the Prime Minister of Singapore has warned that the hazardous haze could remain in place for weeks.

The haze is from illegal slash and burn fires and crop burning in Sumatra, western Indonesia. The haze in Singapore is brought over by the prevailing southwesterly winds. It is rapidly becoming an annual occurrence in both Singapore and Malaysia but this year has seen Singapore experience its worst ever hazes.

The haze is causing many problems. A Singapore resident, Lee Wu summed it up when she said, 'This is crazy. I cannot even see what is happening outside my house due to the smog! I have to wear a mask to go out shopping and they have closed my son's nursery'.

Flights into Singapore have also experienced delays due to the poor visibility and schools have been closed. People with heart or lung disease have been advised to stay at home and everyone has been told to avoid all physical activity outdoors.

The Indonesian Government have sent more than 100 firefighters to Sumatra in an attempt to extinguish the fires. On 21 June 2013, Indonesia dispatched helicopters to create artificial rain in a desperate bid to fight the raging fires. Two more helicopters, which will conduct 'water-bombing' operations, will also be in use shortly according to the National Disaster Management Agency in Indonesia.

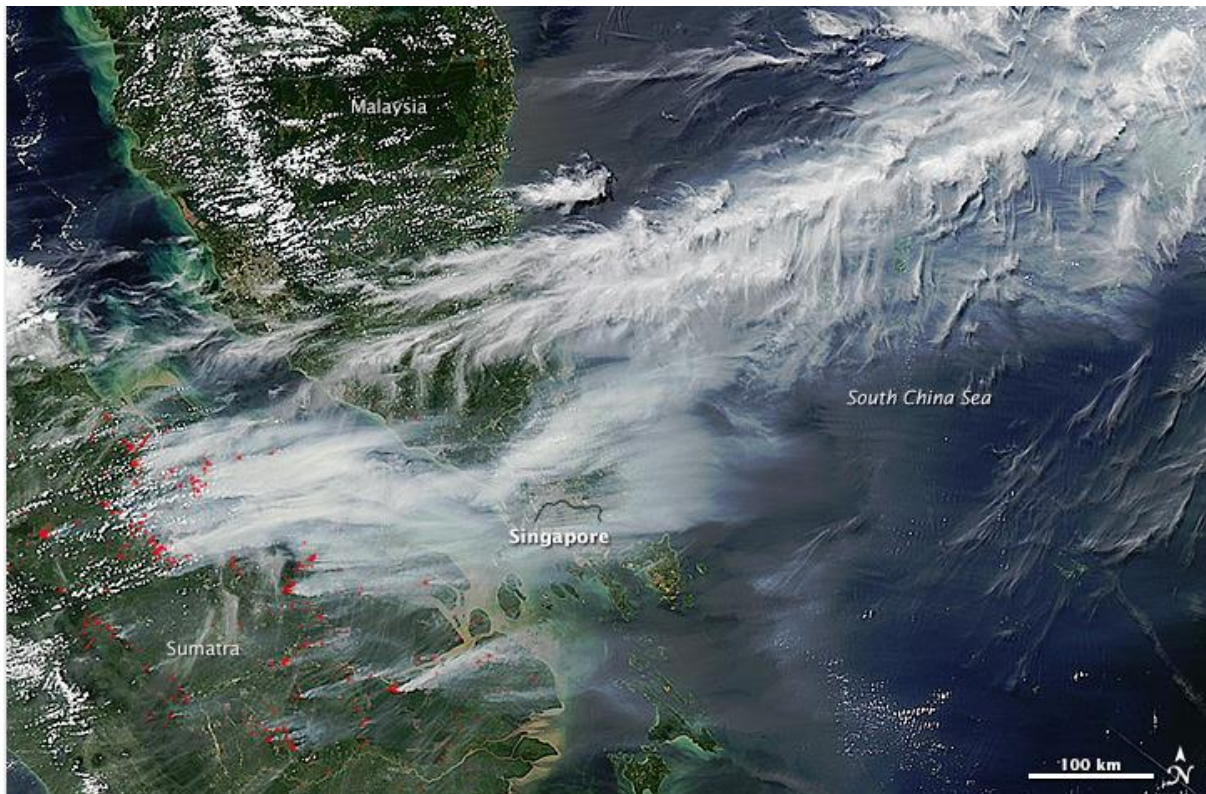


Early evening haze in Singapore, June 2013
© 2013 Charles Collier <http://www.flickr.com/photos/eyespix/9090124732>

1. Identify the main **cause** of the hazardous haze in Singapore.
2. Identify at least four **effects** of the haze in Singapore.
3. Identify three **responses** to the haze in Singapore.

Extension tasks

4. Study the satellite image below:



Smoke from Sumatra, Indonesia on the afternoon of June 19th
MODIS image courtesy of NASA 2013
<http://earthobservatory.nasa.gov/IOTD/view.php?id=81431>

- a. How many countries are affected by the smoke pollution?
 - b. What distance is the smoke travelling?
 - c. In what direction is the smoke blowing?
 - d. What distance is it from the fires to Singapore?
5. The Singapore Ministry of Health has issued the following advice:
- Stay indoors if possible.
 - Reduce outdoor activities and physical exertion to minimise exposure to the pollution.
 - Reduce strenuous work if you need to be outside
 - Use an approved N95 mask where appropriate. This depends on how healthy you are, the level of pollution and the amount of time you need to spend outside.

Design a poster to illustrate these suggestions.

Teaching notes

This resource asks students to identify causes, effects and responses which is a vital KS4 examination skill.

Questions asking students to distinguish between cause, effect and response are common in KS4 examinations. The feedback from senior examiners in the annual report on the examinations frequently states that candidates are unable to make these distinctions e.g.

'Effects invited students to describe impacts such as deaths, injuries, buildings and roads collapsing ... Yet the vast majority of students answered a different question, covering either the responses rather than the effects or giving reasons why the effects were more severe in a poorer area'.

Extension tasks could include the following questions and activities:

1. Separate the **effects** into immediate and long-term effects.
2. Separate the **responses** into short and long-term responses.
3. Write a sentence to link one **cause** and one **effect**.
4. Write a sentence to link one **effect** and one **response**.
5. Tweet a description (140 characters maximum) of the photograph of the street scene in Singapore.
6. Students could be asked to devise an air pollution index of their own. Singapore recognises five levels of air pollution. Their Pollutant Standards Index, or PSI, provides a uniform system of measuring pollution levels for the major air pollutants and is based on a scale devised by the United States Environmental Protection Agency.

Singapore Pollution Standards Index		
PSI reading	Description	Effects on health
0-50	Good	None
51-100	Moderate	Few or none for the general population
101-200	Unhealthy	Mild aggravation among susceptible persons and some symptoms in some of the healthy population
201-300	Very unhealthy	Moderate aggravation of symptoms and decreased tolerance in persons with heart or lung disease
>300	Hazardous	Early onset of certain diseases in addition to significant aggravation of symptoms in susceptible persons and decreased exercise tolerance in healthy persons

The current PSI record (21 June 2013) for Singapore was 401. The records are available at http://en.wikipedia.org/wiki/Pollutant_Standards_Index.

The Singapore Government website <http://app2.nea.gov.sg/anti-pollution-radiation-protection/air-pollution/psi/psi-and-pm2-5-readings> could also be shown to the class.