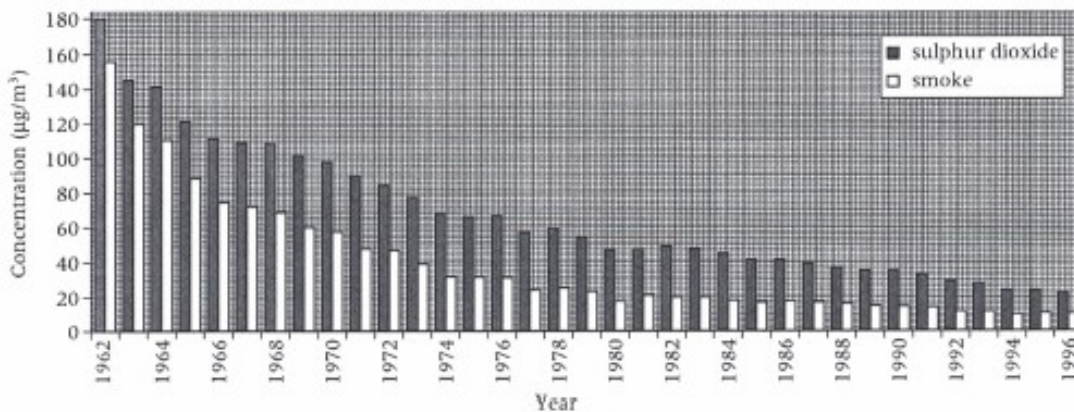


Evidence of pollution 1

Name _____ Class _____

Our understanding of air pollution has improved since we set up a network of automatic monitoring stations. There are about 1500 stations at different sites around Britain. Their main job is to take samples of air and measure and record the levels of pollution.

Black smoke and sulphur dioxide are the two pollutants which have been measured for the longest period of time. The graph below shows how the levels of these two pollutants have changed over a 35-year period.



Trends in pollution: mean levels of pollution of black smoke and sulphur dioxide (1962–1996).

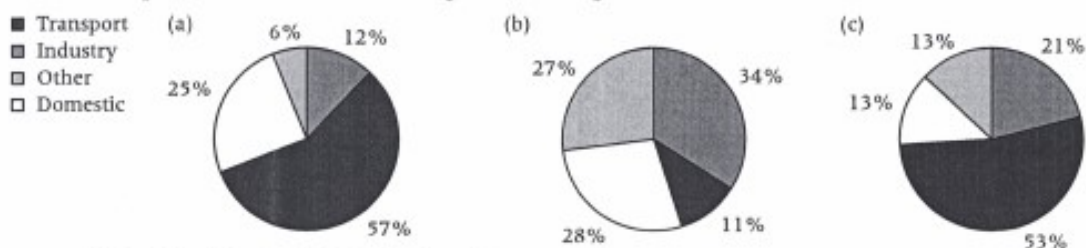
- Which forms of pollution have been monitored for the longest time?
Black smoke and sulphur dioxide.
- What were the trends in the levels of black smoke and sulphur dioxide between 1962 and 1996?
They both decrease in concentration.
- By how much did the black smoke levels drop between 1962 and 1996?
 $156 - 12 = 144 \mu\text{g}/\text{m}^3$ (+/- 2)
- By how much did the sulphur dioxide levels drop between 1962 and 1996?
 $180 - 22 = 158 \mu\text{g}/\text{m}^3$ (+/- 2)
- During which year was the drop in black smoke levels greatest? 1962-1963
- During which year was the drop in sulphur dioxide levels greatest? 1962-1963
- Suggest a possible reason for the drop in pollution levels.
People may have changed the fuels they were using.
New technology might have been developed.

S knowledge, numeracy

Evidence of pollution 2

Name _____ Class _____

The main sources of air pollution are industry, domestic (people's homes) and transport (cars, trains and aeroplanes). The charts below show the percentage of smoke, sulphur dioxide and nitrogen oxides produced from the different sources.



Sources of pollution from (a) smoke, (b) sulphur dioxide and (c) nitrogen oxides.

1 What is the largest source of each of the following pollutants?

- a smoke Transport
- b sulphur dioxide Industry
- c nitrogen oxides Transport

2 Complete the table below using information from the pie charts.

Pollutant	% from transport	% from industry	% from domestic	% from other sources
smoke	57	12	25	6
sulphur dioxide	11	34	28	27
nitrogen oxides	53	21	13	13

3 Describe ways in which we could reduce the amount of energy we use, and so reduce pollution:

- a in our homes
Switch off lights and electric appliances when not using them.
- b in our use of transport
walk!
- c in industry
Use more efficient processes and make use of bi-products so that secondary processes aren't needed.

S knowledge, literacy

Name _____ Class _____

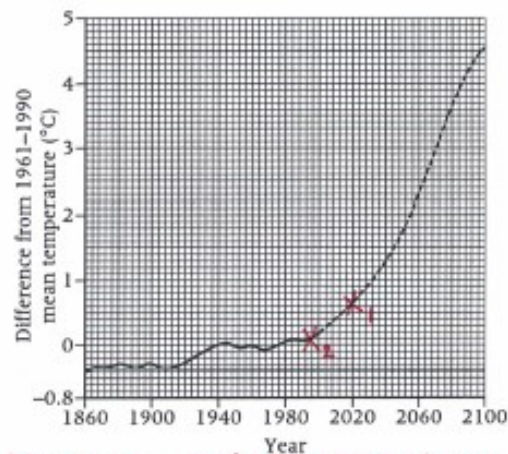


1 Complete the following sentences, using words from the box.

Mean world temperatures have increased by about 0.6°C in the last 100 years and scientists have predicted a greater rise of between 2 and 5 °C during the next century. This rise in temperature has been called global warming and if it happens it would have a great affect on all life on Earth.

life 0.6 °C greater global warming temperatures

A mean temperature for the period 1961–1990 has been calculated. This is shown by 0 on the graph. The line on the graph shows how each year's mean temperature compares with the 30-year mean.



2 Label the graph to indicate where the following statements apply:

- a the mean temperature this year X_1
 b mean temperatures start to rise. X_2

3 What has been the general trend in mean world temperatures over the last 100 years?

They have remained roughly the same, but there has been a big rise in the last 30 years.

4 What does the graph predict will happen to mean temperatures over the next 100 years?

They will increase very rapidly.

5 Using only the information on the graph, do you think that this prediction is correct?

The general trend is that it will increase and this has already started by 2020, so it is likely the prediction is correct.



knowledge, considering

1. Scientist think that CO_2 levels cause the rise in global warming.
2. The greenhouse effect is caused by rising CO_2 levels.
 - CO_2 (carbon dioxide) traps the Sun's heat inside the atmosphere and heats up the planet.
3. The main causes of rising CO_2 levels are:
 - combustion of fossil fuels
 - this includes petrol and diesel engines in vehicles
 - burning coal, oil and gas to produce electricity in power stations.
4. a) c. 1800
 - b) c. 1990 (remember this "mean temperature," above 0.
 - c) The current trend is a rapid increase.
 - d) The graph predicts that

4. a) c. 1800
 - b) c. 1990 (remember the "mean temperature" is above 0 .
 - c) The general trend is that there has been very little change. (Perhaps a very slight increase).
 - d) The graph predicts that mean temperatures will increase very rapidly .
 - e) The graphs suggest that mean temperature changes occur about 200 years after a rapid increase in CO_2 .
 - f) You could answer this both ways .
- (+g). - YES - There is a clear and rapid increase in CO_2 , followed by a rapid increase in temperature.
 - NO - The increase in temperature occurs 200 years after the CO_2 increase. This does not clearly show they are related.
 - Perhaps something else is causing temperature rises.

Climate history

1. Graph 1 shows a very rapid drop, followed by a steady increase until 140000 years followed by another rapid drop in temperature.
2. Graph 2 shows exactly the same pattern as graph 1.
 - a sharp decrease
 - a steady increase for 120000 years
 - a sharp drop.
3. There is a clear correlation (link) between temperature change and CO₂ levels.
4. It is very difficult to be sure.
 - although there are obvious similarities in the general trend, there is no delay between one and the other.
 - It is a "chicken and egg" situation.
5. It might be difficult to be sure because it is unclear whether temperature change is caused by CO₂ increase, or whether CO₂ increases because of temperature change.

9Gc/4

Air quality monitoring

1. The two studies are:
 - a health study
 - a buildings study.
2. The city might want to do something to reduce the nitrogen dioxide levels.
 - They might try to reduce traffic between 12 and 9 to keep nitrogen dioxide levels to "very good." (LSO).
3. The air quality is "very good" between 00-12 and 21-00.
4. a) Between 1600 and 1700.
b) There are many more cars on the roads
 - picking up students from school.
 - coming home from work.
5. No - they are always below 104.6 ppb.
6. The highest level is c. 80 ppb
 - This is in the "very good," band.

9Gc/3

Sources of information

1. The government wanted to cut emissions by 20%
2. The revised prediction is 6.4%.
3. Electricity prices have fallen because of:
 - increased competition
 - new electricity trading arrangements.
4. Cheaper electricity will most likely mean that more electricity will be used (demand), resulting in more fossil fuels being burned to produce the electricity.
5. Power stations are using more coal because gas prices have risen.
6. The government could use the tax system by
 - a) increasing tax on electricity use.
 - b) increasing tax on coal or by reducing tax on cleaner fuels