

### Air Pollution

#### Explanatory Notes for Teachers

Level: S3

Topic: Air Pollution

Supporting Teaching Materials: worksheet

#### Students' Prior Knowledge

Before completing this ELA unit, students have gained related life experience about air pollution problems in Hong Kong and some understanding of the world's environmental issues caused by air pollution. They may also have learnt some of the English terms used in this unit in their Chinese-medium lessons on the topic.

#### Aims and Objectives

##### I. Content Objectives

After the ELA activities, students should be able to use English to:

1. describe how human activities cause air pollution,
2. name the global environmental issues caused by air pollution,
3. explain how air pollution problems affect our health and living, and
4. suggest ways to improve air quality

##### II. Language Objectives

After the ELA activities, students should be able to

1. pronounce familiar English terms related to air pollution (air pollution, air quality, environmental problems, human activities, power plants, motor vehicles, fuel, coal, natural gas and deforestation) and recognize new English terms (global warming, greenhouse effect, greenhouse gases (GHG), emission, pollutants, exhaust gases, fossil fuel, Air Pollution Index (API), ozone depletion, acid rain, high sulphur fuel, smog, and the Kyoto Protocol) taught in the lesson;
2. show their understanding of the key terms (ozone depletion, acid rain, global warming, greenhouse gases, smog and fossil fuel) to complete a crossword puzzle;

read and understand English texts on various aspects of air pollution and extract from the texts relevant information to complete a series of tasks on the discussion of the causes and effects of air pollution, such as completing a concept map, filling in blanks, and answering short questions);

3. Express their ideas about the causes and effects of air pollution by using the prepositional phrases “because of”, “due to”, “instead of” and “therefore”, for example,
  - *Because of low visibility resulting from the presence of smog, traffic flow, ferry navigation and flight movement are affected.*
  - *Due to the risk of getting pollution-related illnesses, foreign investors and tourists may move away or refuse to come.*
  - *Instead of using high sulphur fuel, factories should use environmentally-friendly techniques for production.*
  - *The government needs to solve pollution-related health problems, therefore, the expenditure on medical care and environmental conservation increases*

#### Procedure:

1. Before reading – The teacher should help students to familiarize themselves with the key terms to be learnt in this unit. Students look at the key terms (with Chinese equivalent meaning) and match the key terms with the appropriate meanings/definitions in English.
2. Activity 1 – Crossword Puzzle. This activity requires students to read descriptive sentences intensively. The puzzle clues describe the atmospheric phenomenon caused by air pollution. Students read the clues and work out the words for the specific phenomena in the descriptions.
3. Activity 2 – Word Splash. This activity helps students to see the semantic relationships between the new vocabulary items. Students use the words to complete a concept map about the key ideas of this topic
4. Activity 3 – This activity involves information search and application of information to daily life cases. Students make judgement with the use of their own knowledge and available information.
5. Activity 4 – This activity involves reading comprehension and using data. Students read about international collaboration in fighting air pollution and what has been achieved in Hong Kong. They will then review the actions taken by the government.
6. Activity 5 – This activity involves editing skills with the use of knowledge learned from previous activities. Students will be guided with cued questions and have to provide appropriate information accordingly.
7. Language Practices 1-3  
These language practices focus on constructing logical statements using the connectors ‘because of’, ‘due to’, ‘instead of’ and ‘therefore’.



## Introduction

Before reading your textbook, let's get to know the words about air pollution. Can you match the words with the closest meanings / explanations?

Key Words		Meanings
1. air quality 空氣質素		(a) harmful and toxic materials in the air
2. air pollutants 空氣污染物		(b) how good or poor the air is
3. deforestation 砍伐森林		(c) a feeling of not being comfortable
4. discomfort 不適		(d) heart-related health problems
5. exhaust gases 廢氣		(e) when you can only see a short distance because of weather conditions
6. air traffic 航空交通		(f) movement of vehicles and pedestrians
7. fossil fuel 化石燃料		(g) travel between places by boat
8. global warming 全球暖化		(h) planes taking off, landing and flying
9. heart disease 心臟病		(i) reduction of the amount of ozone
10. low visibility 能見度低		(j) a greater warmth due to the greenhouse effect
11. ferry navigation 渡輪航行		(k) clearing of forests and trees
12. ozone depletion 臭氧層損耗		(l) waste gas from machines or engines
13. traffic flow 交通流量		(m) places which supply water
14. water sources 水源		(n) gases in the atmosphere that absorb and emit radiation, causing the greenhouse effect
15. greenhouse gases 溫室氣體		(o) a source of energy mainly from the decay of dead plants and animals

## Reading 1 (For students of higher English language ability)

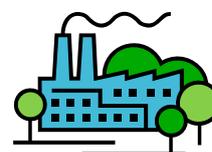
### How clean is our air?

Air pollution has become the major urban problem faced by both the less developed and more developed countries. In Hong Kong, we also suffer from the impact of air pollution

Air pollution occurs when a large amount of gases and solid particles in the air causes harm to our health and comfort. Carbon dioxide, sulphur dioxide and dust are common air pollutants. The Environmental Protection Department has set up air quality stations in different districts in Hong Kong. Every day, these stations tell the public about air pollution through 2 types of Air Pollution Index: general API and roadside API. The highest and lowest API levels are 500 and 0 respectively and they tell how good or poor the air quality is.

### Why is the air quality getting poorer?

Rapid population growth and industrial development increase the energy consumption from the burning of fossil fuel and create a large amount of air pollutants. Exhaust gas from power plants and factories is one of the main sources of air pollutants. Motor vehicles also produce air pollutants and worsen the air pollution problem.



### Impacts of air pollution

Air pollution problems seriously affect our health. Air pollutants cause discomfort to people, particularly people with heart disease and breathing problems.

Air pollution problems have wider impacts on our society and our environment. Smog affects road traffic, ferry navigation and air traffic. Government may have to increase spending on improving air quality and on curing pollution-related health problems.

Air pollution has led to global environmental problems such as ozone depletion, global warming and acid rain. Ozone depletion is making the ozone layer thinner and allowing excess ultraviolet radiation to cause cancer in people and animals. Global warming refers to the rise in the world's average temperature due to the increase of carbon dioxide in the atmosphere. Many islands and coastal areas are threatened by rising sea levels. Acid rain pollutes water sources and land, and damages farmland and buildings.



### How to improve the quality of our air



The government should reduce the amount of air pollutants which factories produce. It has been suggested that industries should use environmentally-friendly production techniques instead of using high sulphur fuel.

The government should reduce air pollutants from power plants. It has been suggested that power plants should replace the burning of coal with the use of natural gas for energy generation.

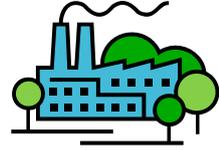


The government should reduce air pollutants from motor vehicles. It has been suggested that diesel should be replaced by liquefied petroleum gas (LPG) and electricity for powering vehicles.

**Reading 2** (For students with average English language ability)

# How clean is our air

How does air become dirty? Cars, factories and power plants produce emissions and exhaust gases that go into the air. Dusts and chemicals such as carbon dioxide and sulphur dioxide in emissions and exhaust gas are common air pollutants.



Air pollution is a city problem in Hong Kong. The Environmental Protection Department has set up air quality stations in different districts in Hong Kong. The Air Pollution Index (API) can tell us how good or poor the air quality is.

Poor air quality can make people sick. It has also been linked to some health problems such as heart disease and breathing problems. Also, air pollution has led to global environmental problems such as ozone depletion, global warming and acid rain.



Get a breath of fresh air

How can we fight air pollution? Actions have been taken to cut down emissions and exhaust gas and to remove pollutants from emissions. Also new technology can improve air quality. Factories cut down pollutants from high sulphur fuel and use environmentally-friendly production techniques. Power plants stop burning coal and use natural gas to make electricity. Government encourages people to replace their diesel-driven vehicles with liquefied petroleum gas (LPG) and electric powered vehicles.



## Optional reading

### What is acid rain?

#### Formation of acid rain

Human activities and industrial production release large amounts of **acidic gases**. These gases **dissolve** in rain and turn into acid rain.

How does acid rain affect humans and the environment?	
1. Acid rain damages the ecological system. It makes the soil acidic and poor.	
2. Acid rain pollutes land and rivers. Wildlife would be affected because of loss of <b><u>habitat</u></b> and food.	
3. Acid rain affects farming, fishing and forestry. It damages <b><u>crops</u></b> , kills fishes, causes poor <b><u>harvests</u></b> and affects <b><u>timber production</u></b> .	
4. Acid rain threatens human health. Acid rain pollutes our <b><u>water sources</u></b> and as a result, vegetable may contain <b><u>heavy metal</u></b> . Acid rain also makes our drinking water acidic and is harmful to our health.	
5. Acid rain corrodes buildings. It <b><u>wears away</u></b> the buildings and statues. It costs a lot of money to <b><u>repair</u></b> and maintain them.	

## Optional reading

### What can the government do to clean the air?

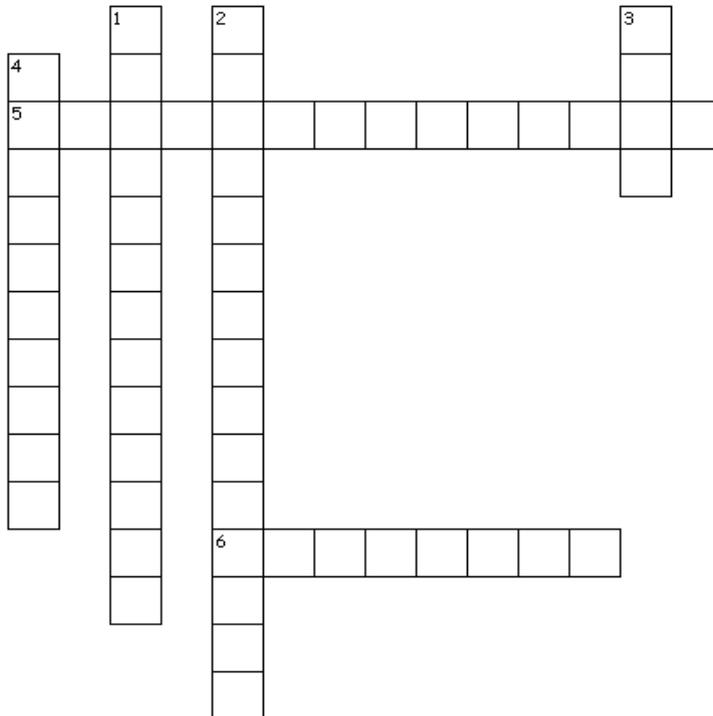


The government should reduce air pollutants from factories, power plants and motor vehicles.

 Factory production	<input type="checkbox"/>  high sulphur fuel
	<input checked="" type="checkbox"/>  environmentally-friendly production techniques
 Energy generation	<input type="checkbox"/>  burning coal
	<input checked="" type="checkbox"/>  natural gas
 diesel for vehicles	<input type="checkbox"/>  diesel vehicles
	<input checked="" type="checkbox"/>  liquefied petroleum gas (LPG) and electric powered vehicles

## Activity 1 – Crossword Puzzle

### How clean is our air?



#### Down

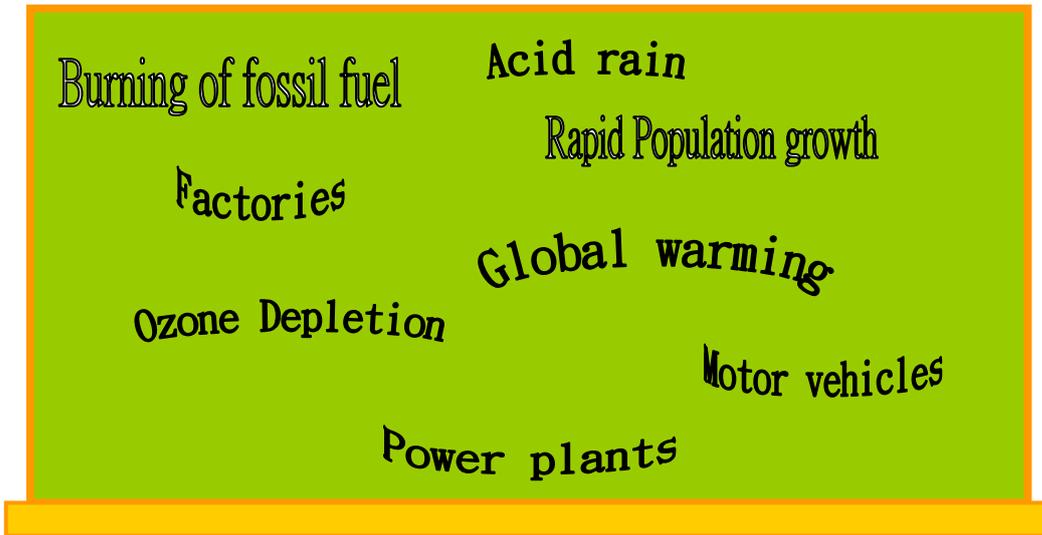
1. \_\_\_\_\_ refers to the rise in the world's average temperature due to air pollution.
2. \_\_\_\_\_ are gases in the atmosphere that absorb and emit radiation, causing the greenhouse effect.
3. \_\_\_\_\_ is a mixture of smoke and fog in the atmosphere
4. \_\_\_\_\_ is a non-renewable source of energy from the remains of dead plants and animals

#### Across

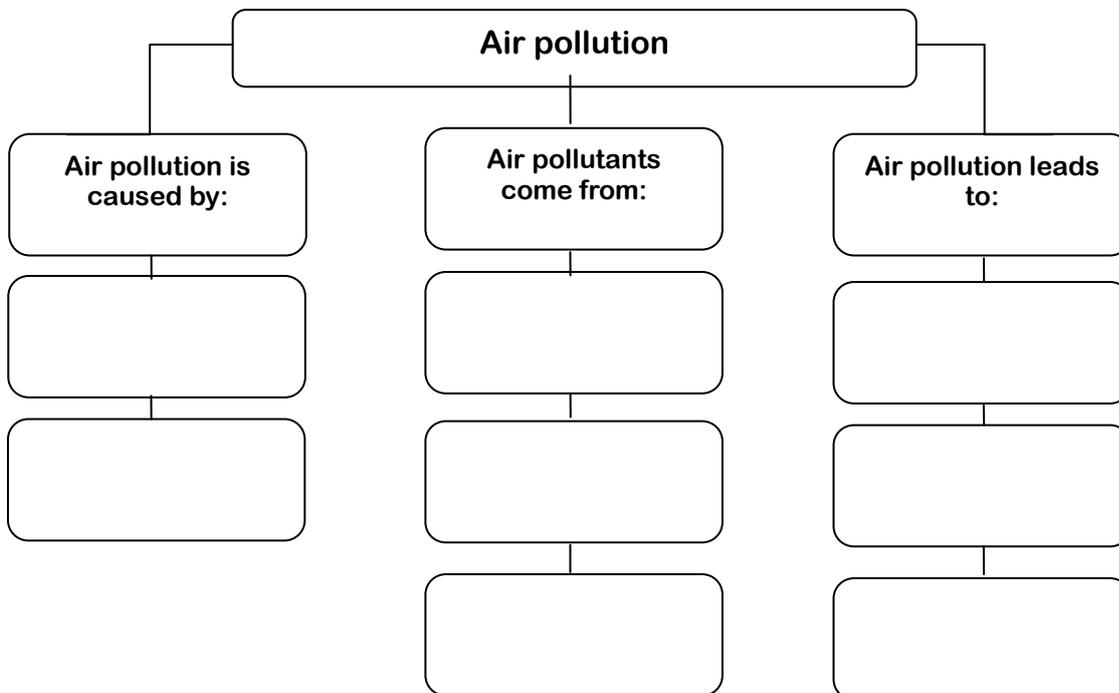
5. \_\_\_\_\_ is the reduction of the amount of ozone
6. The water sources and the land are polluted by \_\_\_\_\_ when exhaust gases dissolve in the rain.

**Activity 2 - Word splash**

The following are the key words we learn about air pollution.



Can you use the words to complete the diagram below?



### Activity 3 API and Us

#### What is API?

The Air Pollution Index (API) tells us the air pollution level. The Environmental Protection Department has set up air quality stations in different districts in Hong Kong. They tell the public about the air quality every day, through 2 types of API: general API and roadside API. The highest and lowest APIs are 500 and 0 respectively and they tell us how good or poor the air quality is. People who have respiratory illness should take precautionary measures when the API is high.

Visit the official website of the Environmental Protection Department and find out today's general API and roadside API.

FORECAST – TODAY'S HIGHEST	General Station	
	Roadside Station	

API	Air Pollution Level
201-500	Severe
101-200	Very High
51-100	High
26-50	Medium
0-25	Low



The API forecast for today is \_\_\_\_\_ (API) .  
 It is reported from the API stations that the General API is \_\_\_\_\_ (Air pollution level) and  
 Roadside API is \_\_\_\_\_ (Air pollution level).

API and daily activities - How does the API level affect our daily activities?

Discuss with your classmates, are the activities below suitable on the days when API is very high (API=101-200)?

Activity 1 Tai Chi



Is it a suitable activity when air pollution level is high?

Activity 2 Yum Cha



Is it a suitable activity when air pollution level is high?

Activity 3 Watching TV



Is it a suitable activity when air pollution level is high?



**Useful link:**

Air Pollution Index, The Environmental Protection Department, HKSAR  
<http://www.gov.hk/en/residents/environment/air/api.htm>

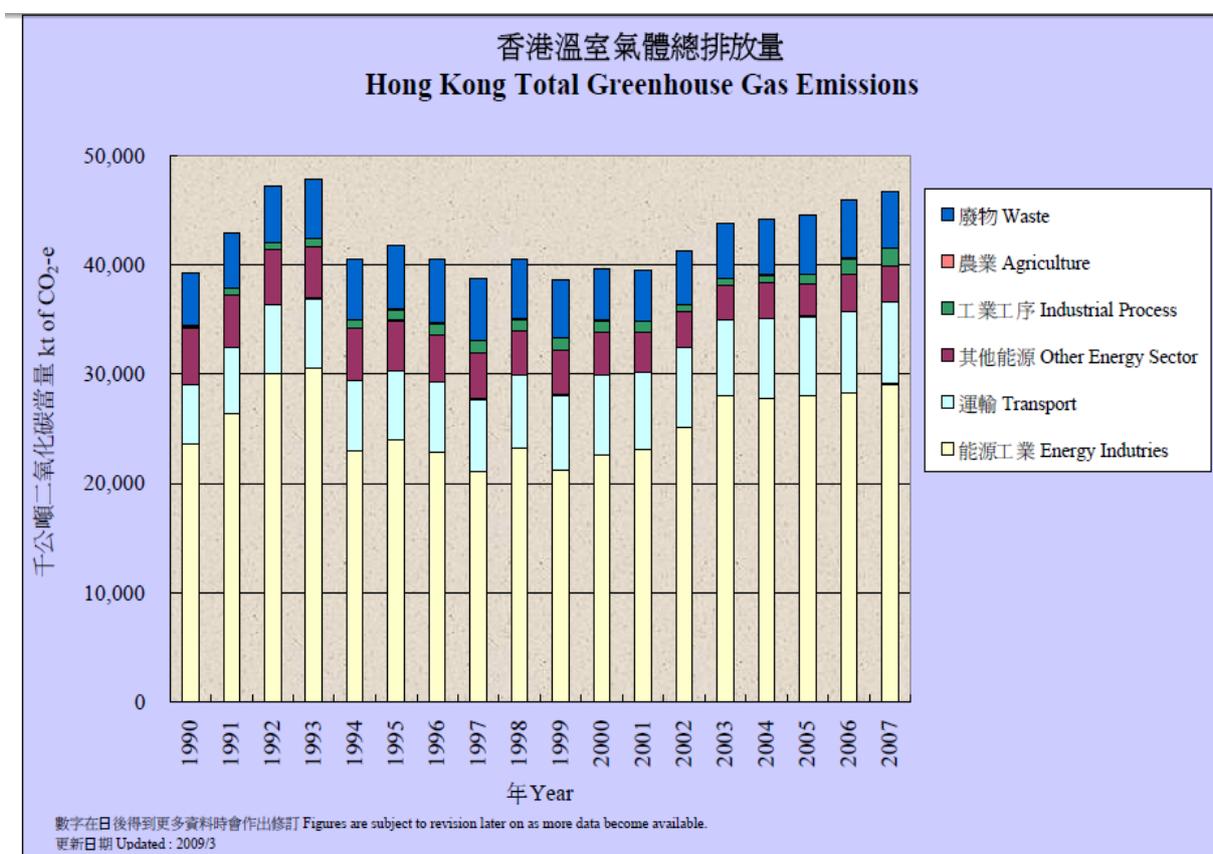
API: current API, The Environmental Protection Department, HKSAR  
<http://www.epd-asg.gov.hk/eindex.html>

## Activity 4 The Kyoto Protocol

The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. (UNFCCC). The protocol sets targets for the signatories to cut down their greenhouse gas (GHG) emissions.

Each country that has signed the protocol sets their own targets for reduction of (greenhouse gas) GHG emissions and has agreed to cut these to 5% below 1990 levels by 2008-2012.

As of 2009, 183 states have signed and ratified the protocol. China was a signatory of the Kyoto Protocol in 2002 and the protocol has been applied to Hong Kong since May 2003.



[http://www.epd.gov.hk/epd/english/climate\\_change/files/GHG\\_Emission\\_Trend\\_1990\\_2007.pdf](http://www.epd.gov.hk/epd/english/climate_change/files/GHG_Emission_Trend_1990_2007.pdf)

i. Compare the data in 1990 and 2007, what is the trend of total GHG emissions in Hong Kong?

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ii. Which industry is the main source of GHG emissions?

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iii. What can the government do to meet the target on the reduction of GHG emissions?

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<p style="text-align: center;"><b>Actions to reduce greenhouse gas emissions taken by the Hong Kong Government</b></p>	<p style="text-align: center;"><b>Which of the sources of GHG emissions can be reduced?</b></p> <p style="text-align: center;"><i>(you may select more than one option)</i></p>
<p><b>Energy Efficiency Labelling Scheme (EELS)</b></p> <p><i>The Energy Efficiency Labelling Scheme aims to provide customers with information about the level of energy consumption and efficiency rating of different products. We can find the energy efficiency labelling on household appliances and office equipment.</i></p>	<ul style="list-style-type: none"> <li><input type="radio"/> Power plants</li> <li><input type="radio"/> Factories</li> <li><input type="radio"/> Vehicles</li> <li><input type="radio"/> Households</li> </ul>
<p><b>LPG Vehicle Scheme 1999</b></p> <p><i>The LPG Vehicle Scheme is an incentive scheme that provides subsidies for the replacement of diesel taxis and light buses by liquefied petroleum gas (LPG) driven vehicles. This is to help reduce emissions from public transport.</i></p>	<ul style="list-style-type: none"> <li><input type="radio"/> Power plants</li> <li><input type="radio"/> Factories</li> <li><input type="radio"/> Vehicles</li> <li><input type="radio"/> Households</li> </ul>
<p><b>Tax Incentives Scheme for Environmentally-friendly Petrol Private Cars</b></p> <p><i>This tax incentive scheme provides first registration tax allowance to vehicle owners who buy cars qualified with the “Environmentally-friendly Private Car Certificate”. This is to encourage car users to use greener transportation that reduces emissions and improves roadside air quality.</i></p>	<ul style="list-style-type: none"> <li><input type="radio"/> Power plants</li> <li><input type="radio"/> Factories</li> <li><input type="radio"/> Vehicles</li> <li><input type="radio"/> Households</li> </ul>
<p><b>Lamma Winds Power Station</b></p> <p><i>Hong Kong Electric has set up wind turbines on Lamma Island to generate power from one of our natural resources – the wind. This is to explore alternatives to the burning of fossil fuels in future power generation.</i></p>	<ul style="list-style-type: none"> <li><input type="radio"/> Power plants</li> <li><input type="radio"/> Factories</li> <li><input type="radio"/> Vehicles</li> <li><input type="radio"/> Households</li> </ul>
<p><b>25.5 °C initiative</b></p> <p><i>The 25.5°C initiative by Action Blue Sky provides energy-saving tips for air conditioning. We can reduce our energy consumption by 9% by simply adjusting the room temperature from 22.5°C to 25.5°C.</i></p>	<ul style="list-style-type: none"> <li><input type="radio"/> Power plants</li> <li><input type="radio"/> Factories</li> <li><input type="radio"/> Vehicles</li> <li><input type="radio"/> Households</li> </ul>
<p><b>Ban idling vehicles engines</b></p> <p><i>The ban aims to deal with vehicular pollution by changing car-user behaviour with respect to engine idling. This is to penalize drivers who do not switch off their car engines when the car is idle.</i></p>	<ul style="list-style-type: none"> <li><input type="radio"/> Power plants</li> <li><input type="radio"/> Factories</li> <li><input type="radio"/> Vehicles</li> <li><input type="radio"/> Households</li> </ul>



Games for Grown-ups, Fun Zone in Energy Land. EMSD [http://www.energyland.emsd.gov.hk/en/funzone/grown\\_ups.html](http://www.energyland.emsd.gov.hk/en/funzone/grown_ups.html)

Kengeo - the interactive world map <http://interactive-worldmap.com/worldmap>

The Kyoto Protocol Video <http://www.youtube.com/watch?v=aXdmgXG3ITU>

Global Warming 101 <http://www.youtube.com/watch?v=oJAbATJCugs&feature=fvw>

Global Warming and The Kyoto Protocol <http://www.youtube.com/watch?v=Jh02eZFRlh4>

**Activity 5 Cloze Passage**



This is an article about Air Pollution in Hong Kong. Please use the given information and complete the paragraphs in the article.

○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

People in Hong Kong are affected by poor air quality. [How do the people know the air quality?] .....tells us the level of air quality every day. Severe air pollution affects our health and daily activities.

Air pollutants cause discomfort to people. Poor air quality may cause [What are the health problems related to air pollution?] ..... and..... People with these diseases need to reduce outdoor activities when air pollution is serious.

Air pollutants mainly come from human and industrial activities [what are the main sources of air pollutants?].....Also, natural causes such as volcanic eruptions and forest fires produce ashes and gases in the atmosphere. These air pollutants make our air quality poor.

Air pollution problems have wider effects on our health and the environment. These problems also bring inconvenience and harm to the Earth. [What are the global environmental problems we are facing?] .....  
.....

Therefore, it is important for us to work together to help the government to improve the quality of our air.



# Language Practice 1

## Causes and Results

Which is the cause? Which is the result? Tick the appropriate boxes and use the given information to complete a logical statement for each of the following:

A. How does smog lead to traffic disruption?		cause	result
(1) traffic flow, ferry navigation and air traffic		<input type="checkbox"/>	<input type="checkbox"/>
(2) low visibility resulting from the presence of smog		<input type="checkbox"/>	<input type="checkbox"/>
	Because of ....., .....are affected.		

B. How do the air pollutants lead to economic loss for a region?		cause	result
(1) risk of getting pollution-related illnesses		<input type="checkbox"/>	<input type="checkbox"/>
(2) foreign investors and tourists may move away or refuse to come		<input type="checkbox"/>	<input type="checkbox"/>
	Due to the....., .....		

C. How do air pollution problems increase government expenditure?		cause	result
(1) the expenditure on medical care and environmental conservation increases		<input type="checkbox"/>	<input type="checkbox"/>
(2) pollution-related health problems		<input type="checkbox"/>	<input type="checkbox"/>
	The government needs to help people to solve ..... ..... Therefore, ..... .....		



### Language point

To tell the causes / reasons, you may use the following sentence structure:

Because of ..... (causes) ....., ..... (result) .....

Due to ..... (causes) ....., ..... (result) .....

To tell the cause and effect, you may use the following sentence structure:

..... (causes) ....., therefore ..... (result) .....



## Language Practice 2

Can you also try the following?

Use the given information and complete a logical statement for each of the following:

<b>1. Can you explain why there is global warming?</b>	
	<p>(1) human activities such as fossil fuel burning and deforestation</p> <p>(2) increasing concentrations of greenhouse gases in the atmosphere</p>
Global warming is caused by..... partly resulting from.....	

<b>2. Why is ozone depletion a problem to humans?</b>	
	<p>(1) the ozone layer prevents most harmful ultraviolet radiation from passing through the atmosphere</p> <p>(2) an increase in skin cancer (皮膚癌) and cataracts (白內障)</p>
Because of....., ozone depletion will cause .....	

<b>3. Why is acid rain a problem caused by humans?</b>	
	<p>(1) human activities and industrial production release large amounts of acidic gases</p> <p>(2) the acidic gases dissolve in the rain</p>
Acid rain is a problem caused by humans because ..... when ..... , the rain then turns into acid rain.	



### Language Practice 3

#### What can the government do to clean the air?

For part a, tick the correct answer.

For part b, use “instead of” to connect the two parts of the sentence in your answer.

1a. Which of the following produces pollutants in the air?

- high sulphur fuel
- renewable energy



1b. What is the suggestion for reducing air pollution?

Instead of using ....., factories should use ..... for production.

2a. Which of the following is a more effective way to reduce air pollution?

- allowing uncontrolled emission of air pollutants from power plants
- regulating the total amount of air pollutants emitted from power plants



2b. What is the suggestion for reducing air pollution?

Instead of ....., the government should regulate.....

3a. Which of the following is a way to reduce air pollution in the street?

- switch off idling vehicles to reduce emission of exhaust gases into the street
- having idling vehicles with running engines



3b. What is the suggestion for improving the air quality in Hong Kong?

Instead of ....., drivers should .....

#### Other useful references:

- AIRNow – Air Quality Index  
<http://www.airnow.gov/index.cfm?action=aqikids.index>
- Minnesota Pollution Control Agency Kids  
<http://www.pca.state.mn.us/kids/kidsQuizAir.cfm>
- Clean Air Kids – Games and Puzzles  
<http://www.clean-air-kids.org.uk/Games/index.html>
- Clean Air Kids – Word Scramble  
<http://www.clean-air-kids.org.uk/Games/Scramble/scramble.html>
- Hamilton County Environmental Services - Clean Air Kids Activity Book  
<http://www.hcdoes.org/airquality/pdf/Clean%20Air%20Activity%20Booklet%20-%202006.pdf>
- Hamilton County Environmental Services – Kids’ Stuff  
<http://www.hcdoes.org/airquality/Kids/Home.htm>
- Environmental Education – Environmental education packages “Air – Our Source of Life”  
[http://www.epd.gov.hk/epd/english/envir\\_education/envir\\_explorer/explorer\\_1\\_01.html](http://www.epd.gov.hk/epd/english/envir_education/envir_explorer/explorer_1_01.html)

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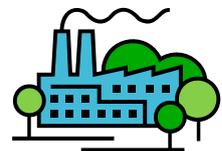
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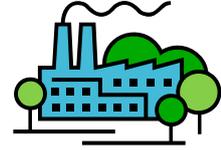


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Poor air quality can make people sick. It has also been linked to some health problems such as heart disease and breathing problems. Also, air pollution has led to global environmental problems such as ozone depletion, global warming and acid rain.



Get a breath of fresh air

How can we fight air pollution? Actions have been taken to cut down emissions and exhaust gas and to remove pollutants from emissions. Also new technology can improve air quality. Factories cut down pollutants from high sulphur fuel and use environmentally-friendly production techniques. Power plants stop burning coal and use natural gas to make electricity. Government encourages people to replace their diesel-driven vehicles with liquefied petroleum gas (LPG) and electric powered vehicles.



Optional reading

What is acid rain?

Formation of acid rain

Human activities and industrial production release large amounts of **acidic gases**. These gases **dissolve** in rain and turn into acid rain.

How does acid rain affect humans and the environment?	
1. Acid rain damages the ecological system. It makes the soil acidic and poor.	
2. Acid rain pollutes land and rivers. Wildlife would be affected because of loss of <b>habitat</b> and food.	
3. Acid rain affects farming, fishing and forestry. It damages <b>crops</b> , kills fishes, causes poor <b>harvests</b> and affects <b>timber production</b> .	
4. Acid rain threatens human health. Acid rain pollutes our <b>water sources</b> and as a result, vegetable may contain <b>heavy metal</b> . Acid rain also makes our drinking water acidic and is harmful to our health.	
5. Acid rain corrodes buildings. It <b>wears away</b> the buildings and statues. It costs a lot of money to <b>repair</b> and maintain them.	

Optional reading

What can the government do to clean the air?

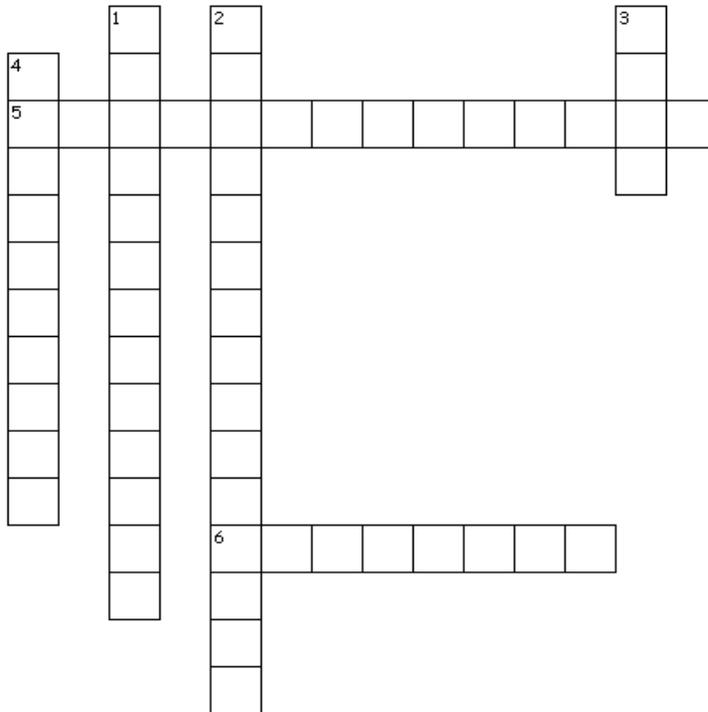


The government should reduce air pollutants from factories, power plants and motor vehicles.

 Factory production	<input checked="" type="checkbox"/>  high sulphur fuel
	<input checked="" type="checkbox"/>  environmentally-friendly production techniques
 Energy generation	<input checked="" type="checkbox"/>  burning coal
	<input checked="" type="checkbox"/>  natural gas
 diesel for vehicles	<input checked="" type="checkbox"/>  diesel vehicles
	<input checked="" type="checkbox"/>  liquefied petroleum gas (LPG) and electric powered vehicles

Activity 1 – Crossword Puzzle

How clean is our air?



Down

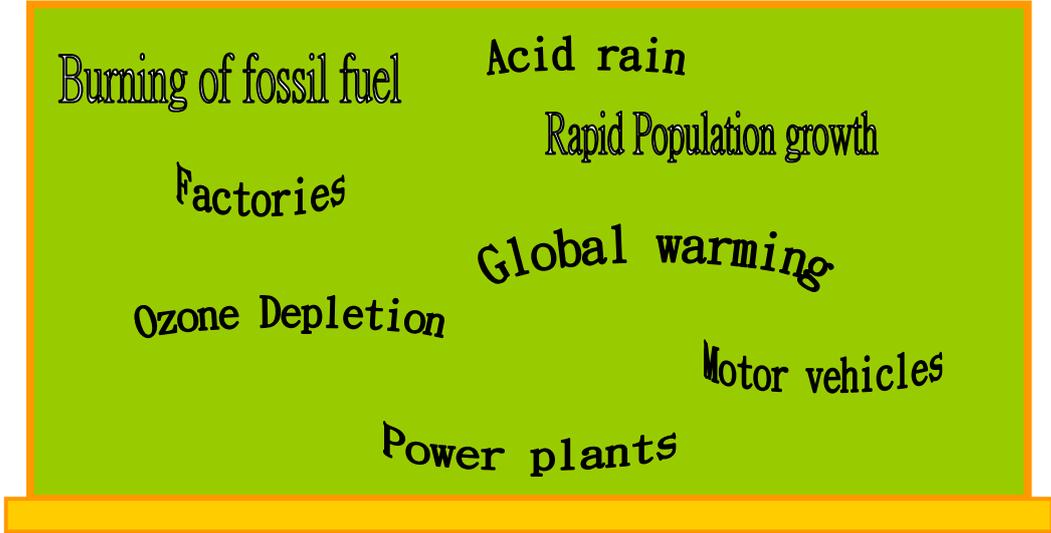
1. **Global warming** refers to the rise in the world's average temperature due to air pollution.
2. **Greenhouse gases** are gases in the atmosphere that absorb and emit radiation, causing the greenhouse effect.
3. **Smog** is a mixture of smoke and fog in the atmosphere
4. **Fossil fuel** is a non-renewable source of energy from the remains of dead plants and animals

Across

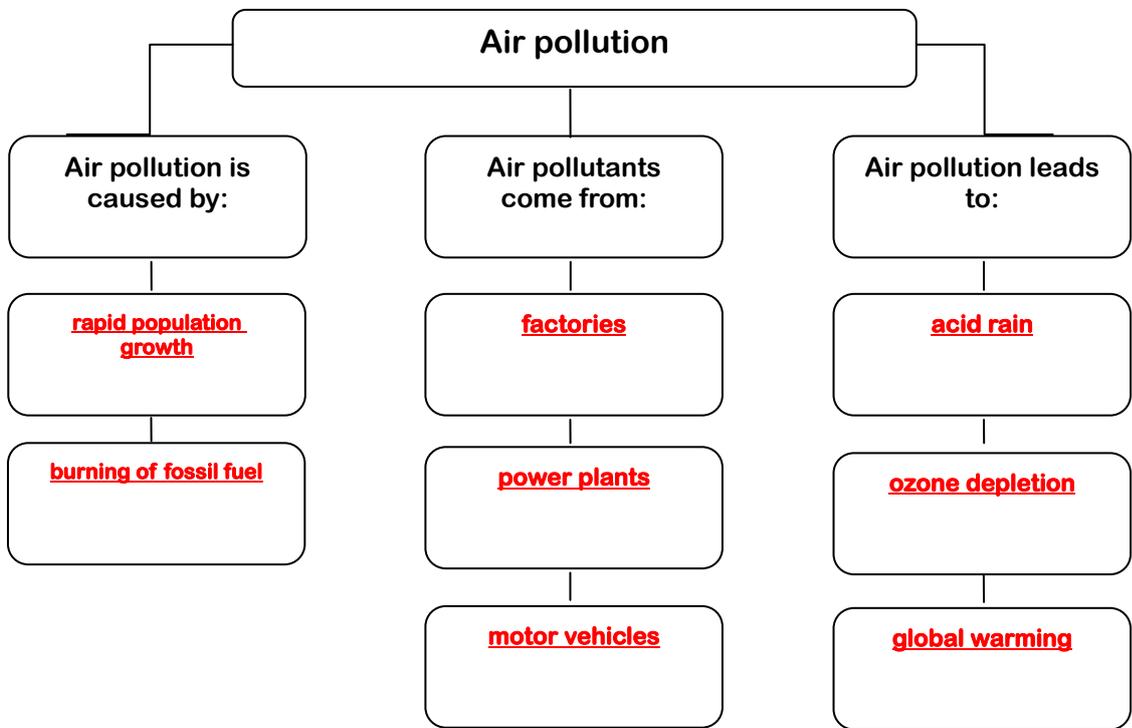
5. **Ozone depletion** is the reduction of the amount of ozone
6. The water sources and the land are polluted by **acid rain** when exhaust gases dissolve in the rain.

Activity 2 - Word splash

The following are the key words we learn about air pollution.



Can you use the words to complete the diagram below?



### Activity 3      API and Us

#### What is API?

The Air Pollution Index (API) tells us the air pollution level. The Environmental Protection Department has set up air quality stations in different districts in Hong Kong. They tell the public about the air quality every day, through 2 types of API: general API and roadside API. The highest and lowest APIs are 500 and 0 respectively and they tell us how good or poor the air quality is. People who have respiratory illness should take precautionary measures when the API is high.

Visit the official website of the Environmental Protection Department and find out today's general API and roadside API.

FORECAST – TODAY'S HIGHEST	General Station	Student's free responses
	Roadside Station	Student's free responses

	API	Air Pollution Level
	201-500	Severe
	101-200	Very High
	51-100	High
	26-50	Medium
	0-25	Low



The API forecast for today is \_\_\_\_\_ (API) .  
 It is reported from the API stations that the General API is \_\_\_\_\_ (Air pollution level) and  
 Roadside API is \_\_\_\_\_ (Air pollution level).

API and daily activities - How does the API level affect our daily activities?

Discuss with your classmates, are the activities below suitable on the days when API is very high (API=101-200)?

Activity 1 Tai Chi



Is it a suitable activity when air pollution level is high?

Activity 2 Yum Cha



Is it a suitable activity when air pollution level is high?

Activity 3 Watching TV



Is it a suitable activity when air pollution level is high?



**Useful link:**

Air Pollution Index, The Environmental Protection Department, HKSAR  
<http://www.gov.hk/en/residents/environment/air/api.htm>

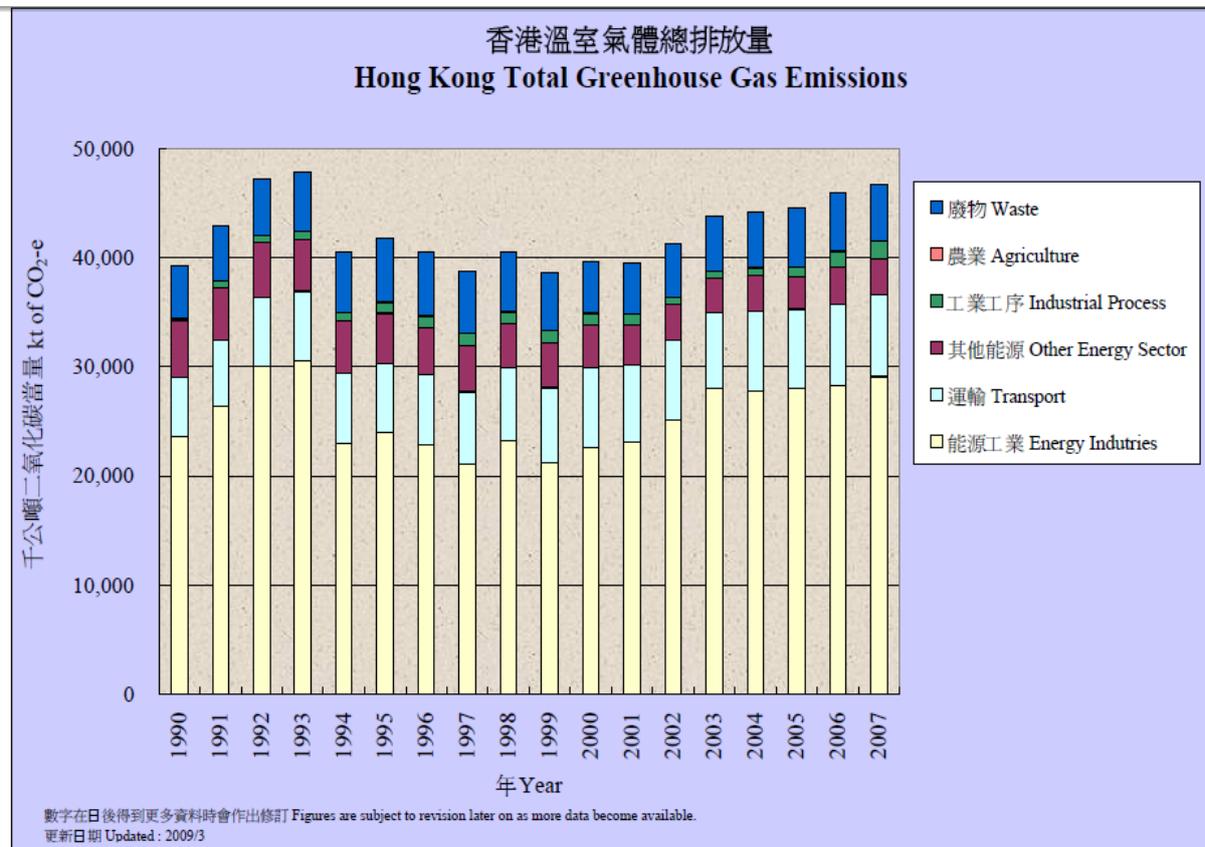
API: current API, The Environmental Protection Department, HKSAR  
<http://www.epd-asg.gov.hk/eindex.html>

### Activity 4 The Kyoto Protocol

The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. (UNFCCC). The protocol sets targets for the signatories to cut down their greenhouse gas (GHG) emissions.

Each country that has signed the protocol sets their own targets for reduction of (greenhouse gas) GHG emissions and has agreed to cut these to 5% below 1990 levels by 2008-2012.

As of 2009, 183 states have signed and ratified the protocol. China was a signatory of the Kyoto Protocol in 2002 and the protocol has been applied to Hong Kong since May 2003.



[http://www.epd.gov.hk/epd/english/climate\\_change/files/GHG\\_Emission\\_Trend\\_1990\\_2007.pdf](http://www.epd.gov.hk/epd/english/climate_change/files/GHG_Emission_Trend_1990_2007.pdf)

i. Compare the data in 1990 and 2007, what is the trend of total GHG emissions in Hong Kong?

In 1990 and 2007, the total GHG emissions in Hong Kong increased.

ii. Which industry is the main source of GHG emissions?

Energy Industries are the main source of GHG emissions.

iii. What can the government do to meet the target on the reduction of GHG emissions?

The government should reduce the amount of air pollutants factories, power plants and motor vehicles produce.

<b>Actions to reduce greenhouse gas emissions taken by the Hong Kong Government</b>	<b>Which of the sources of GHG emissions can be reduced?</b> <i>(you may select more than one option)</i>
<p><b>Energy Efficiency Labelling Scheme (EELS)</b></p> <p><i>The Energy Efficiency Labelling Scheme aims to provide customers with information about the level of energy consumption and efficiency rating of different products. We can find the energy efficiency labelling on household appliances and office equipment.</i></p>	<ul style="list-style-type: none"> <li><input type="radio"/> Power plants</li> <li>✓ <u>Factories</u></li> <li><input type="radio"/> Vehicles</li> <li>✓ <u>Households</u></li> </ul>
<p><b>LPG Vehicle Scheme 1999</b></p> <p><i>The LPG Vehicle Scheme is an incentive scheme that provides subsidies for the replacement of diesel taxis and light buses by liquefied petroleum gas (LPG) driven vehicles. This is to help reduce emissions from public transport.</i></p>	<ul style="list-style-type: none"> <li><input type="radio"/> Power plants</li> <li><input type="radio"/> Factories</li> <li>✓ <u>Vehicles</u></li> <li><input type="radio"/> Households</li> </ul>
<p><b>Tax Incentives Scheme for Environmentally-friendly Petrol Private Cars</b></p> <p><i>This tax incentive scheme provides first registration tax allowance to vehicle owners who buy cars qualified with the “Environmentally-friendly Private Car Certificate”. This is to encourage car users to use greener transportation that reduces emissions and improves roadside air quality.</i></p>	<ul style="list-style-type: none"> <li><input type="radio"/> Power plants</li> <li><input type="radio"/> Factories</li> <li>✓ <u>Vehicles</u></li> <li><input type="radio"/> Households</li> </ul>
<p><b>Lamma Winds Power Station</b></p> <p><i>Hong Kong Electric has set up wind turbines on Lamma Island to generate power from one of our natural resources – the wind. This is to explore alternatives to the burning of fossil fuels in future power generation.</i></p>	<ul style="list-style-type: none"> <li>✓ <u>Power plants</u></li> <li><input type="radio"/> Factories</li> <li><input type="radio"/> Vehicles</li> <li><input type="radio"/> Households</li> </ul>
<p><b>25.5 °C initiative</b></p> <p><i>The 25.5°C initiative by Action Blue Sky provides energy-saving tips for air conditioning. We can reduce our energy consumption by 9% by simply adjusting the room temperature from 22.5°C to 25.5°C.</i></p>	<ul style="list-style-type: none"> <li><input type="radio"/> Power plants</li> <li><input type="radio"/> Factories</li> <li><input type="radio"/> Vehicles</li> <li>✓ <u>Households</u></li> </ul>
<p><b>Ban idling vehicles engines</b></p> <p><i>The ban aims to deal with vehicular pollution by changing car-user behaviour with respect to engine idling. This is to penalize drivers who do not switch off their car engines when the car is idle.</i></p>	<ul style="list-style-type: none"> <li><input type="radio"/> Power plants</li> <li><input type="radio"/> Factories</li> <li>✓ <u>Vehicles</u></li> <li><input type="radio"/> Households</li> </ul>



Games for Grown-ups, Fun Zone in Energy Land. EMSD [http://www.energyland.emsd.gov.hk/en/funzone/grown\\_ups.html](http://www.energyland.emsd.gov.hk/en/funzone/grown_ups.html)

Kengeo - the interactive world map <http://interactive-worldmap.com/worldmap>

The Kyoto Protocol Video <http://www.youtube.com/watch?v=aXdmgXG3ITU>

Global Warming 101 <http://www.youtube.com/watch?v=oJAbATJCugs&feature=fvw>

Global Warming and The Kyoto Protocol <http://www.youtube.com/watch?v=Jh02eZFRlh4>





Language Practice 1

**Causes and Results**

Which is the cause? Which is the result? Tick the appropriate boxes and use the given information to complete a logical statement for each of the following:

A. How does smog lead to traffic disruption?		cause	result
(1) traffic flow, ferry navigation and air traffic		<input checked="" type="checkbox"/>	<input type="checkbox"/>
(2) low visibility resulting from the presence of smog		<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Because of <u>(2) low visibility resulting from the presence of smog</u> , <u>(1) traffic flow, ferry navigation and air traffic</u> are affected.		

B. How do the air pollutants lead to economic loss for a region?		cause	result
(1) risk of getting pollution-related illnesses		<input checked="" type="checkbox"/>	<input type="checkbox"/>
(2) foreign investors and tourists may move away or refuse to come		<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Due to the <u>(1) risk of getting pollution-related illnesses</u> , <u>(2) foreign investors and tourists may move away or refuse to come</u>		

C. How do air pollution problems increase government expenditure?		cause	result
(1) the expenditure on medical care and environmental conservation increases		<input type="checkbox"/>	<input checked="" type="checkbox"/>
(2) pollution-related health problems		<input checked="" type="checkbox"/>	<input type="checkbox"/>
	The government needs to help people to solve <u>(2) pollution-related health problems</u> . Therefore, <u>(1) the expenditure on medical care and environmental conservation increases</u> .		



**Language point**

To tell the causes / reasons, you may use the following sentence structure:

Because of \_\_\_\_\_ (causes) \_\_\_\_\_, \_\_\_\_\_ (result) \_\_\_\_\_

Due to \_\_\_\_\_ (causes) \_\_\_\_\_, \_\_\_\_\_ (result) \_\_\_\_\_

To tell the cause and effect, you may use the following sentence structure:

\_\_\_\_\_ (causes) \_\_\_\_\_, therefore \_\_\_\_\_ (result) \_\_\_\_\_



**Language Practice 2**

Can you also try the following?

Use the given information and complete a logical statement for each of the following:

<b>1. Can you explain why there is global warming?</b>	
	<p>(1) human activities such as fossil fuel burning and deforestation</p> <p>(2) increasing concentrations of greenhouse gases in the atmosphere</p>
<p>Global warming is caused by <u>(2) increasing concentrations of greenhouse gases in the atmosphere</u> partly resulting from <u>(1) human activities such as fossil fuel burning and deforestation</u>.</p>	

<b>2. Why is ozone depletion a problem to humans?</b>	
	<p>(1) the ozone layer prevents most harmful ultraviolet radiation from passing through the atmosphere</p> <p>(2) an increase in skin cancer (皮膚癌) and cataracts (白內障)</p>
<p>Because of <u>(1) the ozone layer prevents most harmful ultraviolet radiation from passing through the atmosphere</u>, ozone depletion will cause <u>(2) an increase in skin cancer and cataracts</u>.</p>	

<b>3. Why is acid rain a problem caused by humans?</b>	
	<p>(1) human activities and industrial production release large amounts of acidic gases</p> <p>(2) the acidic gases dissolve in the rain</p>
<p>Acid rain is a problem caused by humans because <u>(1) human activities and industrial production release large amounts of acidic gases</u>, when <u>(2) the acidic gases dissolve in the rain</u>, the rain then turns into acid rain.</p>	



Language Practice 3

What can the government do to clean the air?

For part a, tick the correct answer.

For part b, use “instead of” to connect the two parts of the sentence in your answer.

1a. Which of the following produces pollutants in the air?

- high sulphur fuel
- renewable energy



1b. What is the suggestion for reducing air pollution?

Instead of using .....high sulphur fuel....., factories should use ... environmentally- friendly production techniques..... for production

2a. Which of the following is a more effective way to reduce air pollution?

- allowing uncontrolled emission of air pollutants from power plants
- regulating the total amount of air pollutants emitted from power plants



2b. What is the suggestion for reducing air pollution?

Instead of allowing uncontrolled emission of air pollutants from power plants, the government should regulate...the total amount of air pollutants emitted from power plants ...

3a. Which of the following is a way to reduce air pollution in the street?

- switch off idling vehicles to reduce emission of exhaust gases into the street
- having idling vehicles with running engines



3b. What is the suggestion for improving the air quality in Hong Kong?

Instead of having idling vehicles with running engines, drivers should switch off idling vehicles to reduce the emission of exhaust gases into the street.

Other useful references:

- AIRNow – Air Quality Index  
<http://www.airnow.gov/index.cfm?action=aqikids.index>
- Minnesota Pollution Control Agency Kids  
<http://www.pca.state.mn.us/kids/kidsQuizAir.cfm>
- Clean Air Kids – Games and Puzzles  
<http://www.clean-air-kids.org.uk/Games/index.html>
- Clean Air Kids – Word Scramble  
<http://www.clean-air-kids.org.uk/Games/Scramble/scramble.html>
- Hamilton County Environmental Services - Clean Air Kids Activity Book  
<http://www.hcdoes.org/airquality/pdf/Clean%20Air%20Activity%20Booklet%20-%202006.pdf>
- Hamilton County Environmental Services – Kids’ Stuff  
<http://www.hcdoes.org/airquality/Kids/Home.htm>
- Environmental Education – Environmental education packages “Air – Our Source of Life”  
[http://www.epd.gov.hk/epd/english/envir\\_education/envir\\_explorer/explorer\\_1\\_01.html](http://www.epd.gov.hk/epd/english/envir_education/envir_explorer/explorer_1_01.html)