

The background of the slide features a close-up, slightly blurred image of a wooden pencil and a metal ruler resting on a sheet of graph paper. The pencil is positioned diagonally from the bottom left towards the center. The ruler is placed horizontally across the middle of the frame. The graph paper has a grid pattern, and some faint numbers are visible on the ruler.

# STRATEGY TO ENHANCE STUDENT LEARNING IN DATA INTERPRETING & INFERRING

2018 SAT Debriefing Seminar

# Providing opportunities for students to explore

- 1.2 Practice of science
  - Recognise that scientific knowledge is derived from systematic observation, experimentation and analysis

□ Making use of the database of Hong Kong Observatory in teaching

The screenshot shows the Hong Kong Observatory's Climate Data Service website. The main content area displays climate data for June 2018 and July 2018. The data is presented in a table format with columns for 2018年6月, 2018年7月, and 今年累積 (截至7月2日). The data includes average high/low temperatures, precipitation, and cumulative rainfall. The website also features a navigation menu on the left and a 'Climate Data Library' section at the bottom.

2018年6月	2018年7月 (截至7月2日)	今年累積 (截至7月2日)
平均最高氣溫 31.3°C ↑ 1.1°C	平均最高氣溫 31.8°C	絕對最高氣溫 35.4°C (5月30日)
平均氣溫 28.6°C ↑ 0.7°C	平均氣溫 29.9°C	絕對最低氣溫 6.8°C (2月1日)
平均最低氣溫 26.8°C ↑ 0.6°C	平均最低氣溫 26.8°C	最高日雨量 109.3毫米 (6月13日)
月雨量 458.8毫米 ↑ 2.7毫米	月雨量 6.2毫米	累積雨量 640.0毫米 ↓ 475.5毫米

每日數據摘錄 - 2018年6月  
每月天氣回顧 - 2018年6月

每日數據摘錄 - 2018年7月  
每年天氣概況 - 2017

高於 低於 等於  
平均值 平均值 平均值

下一個特別日子的氣候  
節慶日 中秋節  
二十四節氣 小暑

氣候資料庫

香港氣象觀測摘錄 | 個別氣象站

摘錄 | 平均值

每年數據摘錄 | 1981-2010 | 1971-2000 | 1961-1990

每月數據摘錄 | 月/年平均值

每日數據摘錄 | 日平均值

個別要素的每月數據

氣候監察

厄爾尼諾與拉尼娜最新情況更新  
每月天氣摘要  
氣候變化  
每年天氣概況  
廣東省及鄰近地區雨量資料 [更多](#)

天氣現象統計資料

警告及信號資料庫  
特殊天氣現象統計資料  
風暴潮記錄 [更多](#)

氣候預報

季度預報

# Data table & Graph

表 4. 1981-2010 年天文台錄得日最高、平均及最低氣溫的月平均值

月份	平均日最高 (攝氏度)	平均 (攝氏度)	平均日最低 (攝氏度)
一月	18.6	16.3	14.5
二月	18.9	16.8	15.0
三月	21.4	19.1	17.2
四月	25.0	22.6	20.8
五月	28.4	25.9	24.1
六月	30.2	27.9	26.2
七月	31.4	28.8	26.8
八月	31.1	28.6	26.6
九月	30.1	27.7	25.8
十月	27.8	25.5	23.7
十一月	24.1	21.8	19.8
十二月	20.2	17.9	15.9
年值	25.6	23.3	21.4

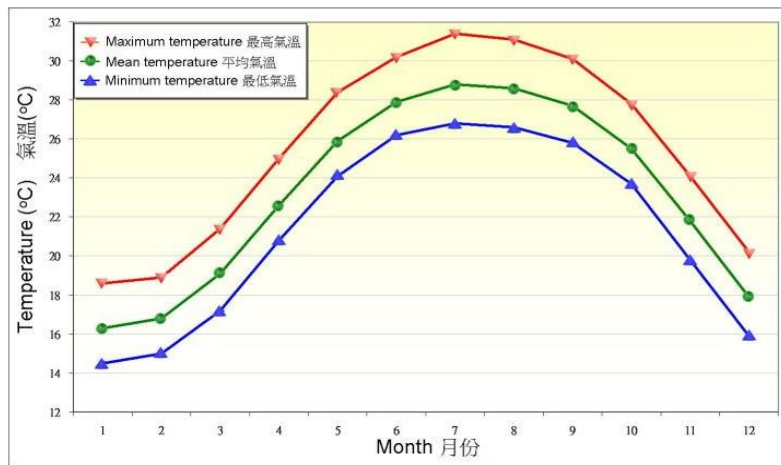


圖 4. 1981-2010 年天文台錄得日最高、平均及最低氣溫的月平均值

- Helping students to get the idea of data & how they are presented in an organised form

- Helping students to find meaning in the data by looking for patterns or trends

# Activity on constructing data table

Data tables are useful tools for both recording and communicating scientific data. You can use a data table to organize and record the measurements and observations that you make. Some examples of information that might be recorded in data tables are frequencies, times, and amounts.

## Some important data table tips:

- Always give numbers and titles for data tables.
- Decide how you will organize the table into columns and rows. Generally, you will place the *independent variable* in the left column and the *dependent variable* in the *right column*.
- Always put units in the column headings, leaving them out of the individual cells.



## 2.2 Dissolving

- Solubility — recognise that the solubility of a substance in water changes with temperatures

➤ could arrange activities on interpreting data

### **TIPS FOR INTERPRETING DATA**

- During investigations, use a data table to collect and organize your data.
- Whenever possible, make a graph using the data.
- Identify trends, or patterns, in the data.
- Use the data to make inferences. Do your inferences make sense compared with what you already know about a topic? If not, review your work.

**Task:** The data table shows how much mass of a compound dissolves in 100 mL of water as the temperature of the water is increased. Use the data to construct and interpret a graph.

Temperature ( $^{\circ}\text{C}$ )	Mass of Compound Dissolved (g)
0	37
10	47
20	56
30	66
40	75

1. **Graphing** – Label each axis of your graph with the appropriate variable, units, and range of values. Then plot the data in a line graph.
2. **Interpreting Data** – What does the graph show about the effect of temperature on the amount of the compound that will dissolve in water?  

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3. **Predicting** – Assume the amount of the compound dissolved continues to increase as the water is heated. Predict how many grams will dissolve at  $50^{\circ}\text{C}$ .  

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# 2.5 Water conservation and pollution

## Making use of the database of Environmental Protection Department

The screenshot displays the website of the Environmental Protection Department (EPD) of the Government of the Hong Kong Special Administrative Region. The page is titled "Data & Statistics" under the "Water" category. The "Water Quality in Typhoon Shelters" link is highlighted with a red circle. The website features a navigation menu on the left, a search bar at the top, and a main content area with various links and a "Table of Contents" button at the bottom.

**Environmental Protection Department**  
The Government of the Hong Kong Special Administrative Region

GOVHK 香港政府一站通 | 繁體版 | 简体版

Mobile / Accessible Version | Search | Enter search keyword | SITE MAP

Home

WATER

Beach Water Quality

Marine Water

River Water Quality

Regional Collaboration

Problems & Solutions

Data & Statistics

Study Reports

Guidelines & References

Advanced Search

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Home > Water >

### Data & Statistics

- Beach Water Quality Trendlines
- Annual Rankings of Bathing Beaches
- Achievement of Water Quality Objectives in Water Control Zones
- Marine Sediment Quality
- Water Quality in Typhoon Shelters**

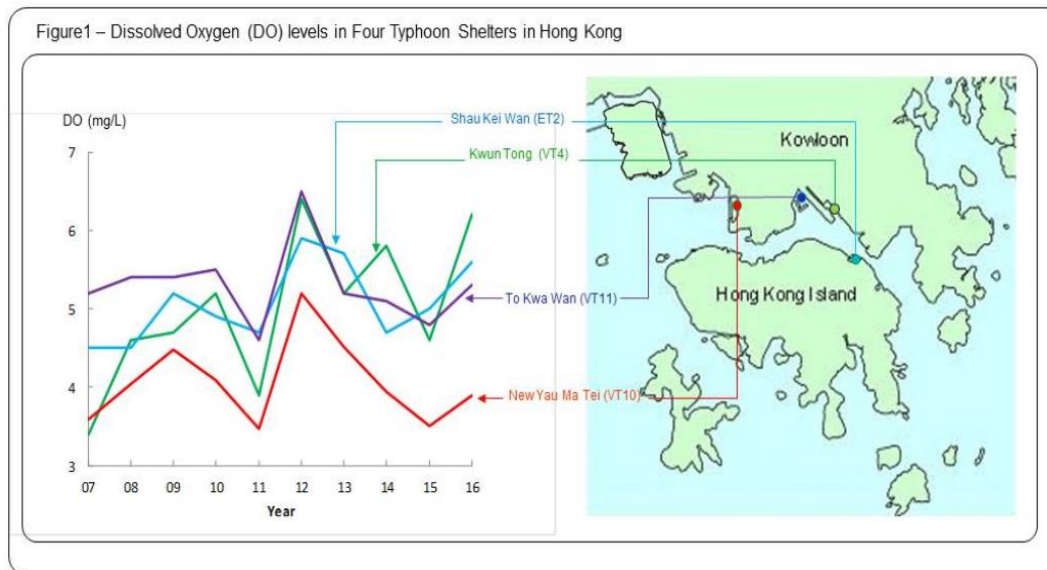
Back to top | Table of Contents



## Data & Statistics

### Water Quality in Typhoon Shelters

Pollution in typhoon shelters is reflected in the water quality parameters regularly measured by the Environmental Protection Department (EPD). Figure 1 shows the Dissolved Oxygen levels in four typhoon shelters in Hong Kong. The Ammonia Nitrogen levels in the typhoon shelters are shown in Figure 2. Further information on the water quality of typhoon shelters is available in the annual report [Marine Water Quality in Hong Kong](#).



- Could arrange activities on the interpretation of graphs

#### Questions:

- Which typhoon shelter has a lowest DO level?
- Suggest reason(s).

## 6.5 Gas pressure

### ➤ change in gas pressure at different temperatures

- could arrange activities on plotting graph

Line graphs are useful for showing trends, or patterns, in data.

#### **Tips for making a line graph**

- Draw a horizontal and a vertical axis on graph paper. The horizontal axis is called the x-axis, and the vertical axis is called the y-axis.
- Place the independent variable on the horizontal axis, or x-axis.
- Place the dependent variable on the vertical axis, or y-axis.
- Create a scale on each axis. Be sure that the scales you choose will allow you to show the least and the greatest measurements in your data.
- Draw and label each axis. Be sure to include units in the labels.
- Plot each value as a data point on the graph.
- Connect the data points with straight lines.
- Give your graph a number and a title.

**Task:** Read the following description of an experiment, and complete the questions that follow.

In an experiment to study the gas behaviour, the temperature of a gas at a constant volume was varied. Gas pressure was measured after each  $5^{\circ}\text{C}$  change. The results is shown in the following table.

<i>Temperature (<math>^{\circ}\text{C}</math>)</i>	<i>Pressure (kPa)</i>
0	8
5	11
10	14
15	17
20	20
25	23

1. Use the data in the table to construct a graph. Show temperature on the x-axis and pressure on the y-axis.



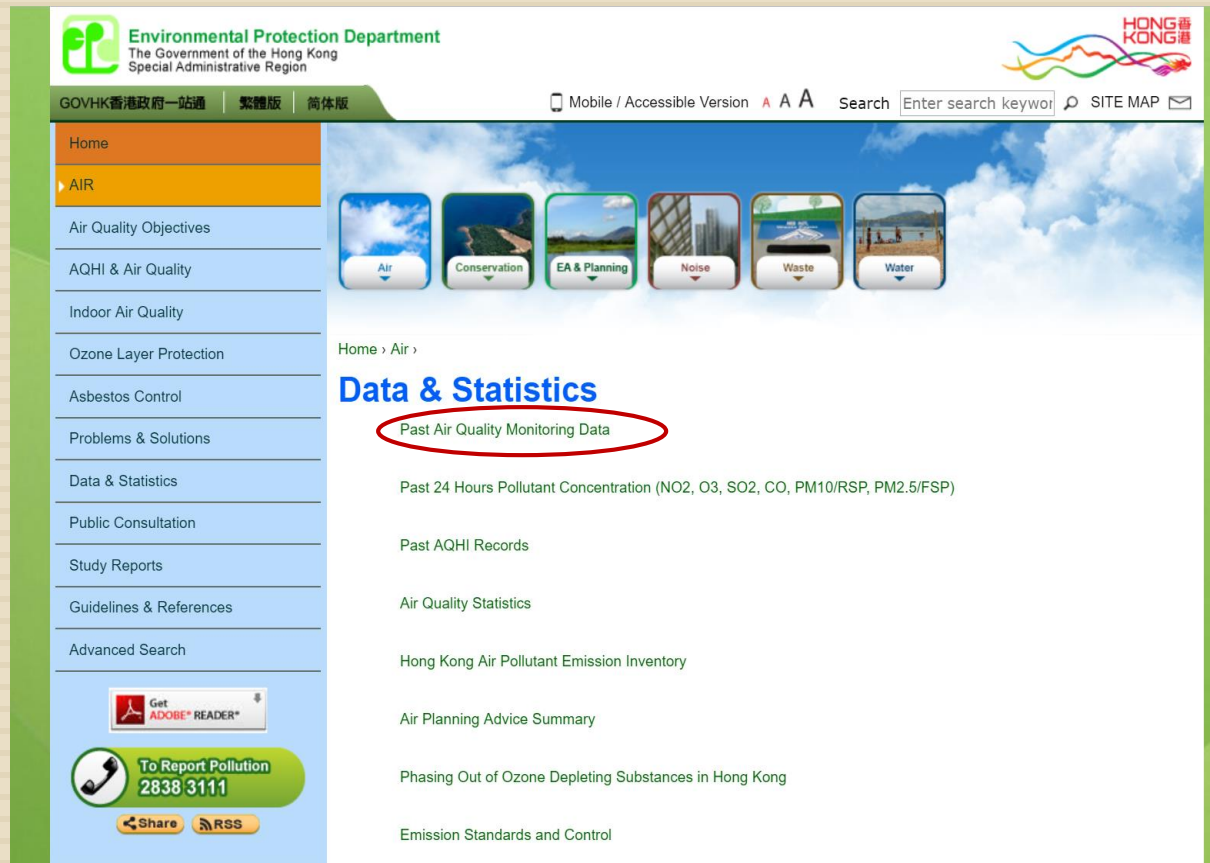
2. **Think It Over** – What happens to the pressure of a gas when the temperature is increased at constant volume?

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# 7.6 Air quality

## ◆ examples of common air pollutants



The screenshot displays the website of the Environmental Protection Department of the Government of the Hong Kong Special Administrative Region. The page is titled "Data & Statistics" and features a navigation menu on the left with options like "Home", "AIR", "Air Quality Objectives", "AQHI & Air Quality", "Indoor Air Quality", "Ozone Layer Protection", "Asbestos Control", "Problems & Solutions", "Data & Statistics", "Public Consultation", "Study Reports", "Guidelines & References", and "Advanced Search". The "Data & Statistics" section is highlighted, and the link "Past Air Quality Monitoring Data" is circled in red. Below this link, there are several other links: "Past 24 Hours Pollutant Concentration (NO2, O3, SO2, CO, PM10/RSP, PM2.5/FSP)", "Past AQHI Records", "Air Quality Statistics", "Hong Kong Air Pollutant Emission Inventory", "Air Planning Advice Summary", "Phasing Out of Ozone Depleting Substances in Hong Kong", and "Emission Standards and Control".

Environmental Protection Department  
The Government of the Hong Kong Special Administrative Region

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Mobile / Accessible Version A A Search Enter search keyword SITE MAP

Home

AIR

Air Quality Objectives

AQHI & Air Quality

Indoor Air Quality

Ozone Layer Protection

Asbestos Control

Problems & Solutions

Data & Statistics

Public Consultation

Study Reports

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Home > Air >

### Data & Statistics

**Past Air Quality Monitoring Data**

Past 24 Hours Pollutant Concentration (NO<sub>2</sub>, O<sub>3</sub>, SO<sub>2</sub>, CO, PM<sub>10</sub>/RSP, PM<sub>2.5</sub>/FSP)

Past AQHI Records

Air Quality Statistics

Hong Kong Air Pollutant Emission Inventory

Air Planning Advice Summary

Phasing Out of Ozone Depleting Substances in Hong Kong

Emission Standards and Control

GovHK 香港政府一站通 繁體版 简体版 A A A SEARCH SITE MAP

### Air Quality Data - Download by Station

You have selected the **SHATIN** station  
Data is available from **1991** to **2018**

**1. Please select parameters**

Carbon Monoxide     Fine Suspended Particulates     Nitrogen Dioxide  
 Nitrogen Oxides     Ozone     Respirable Suspended Particulates  
 Sulphur Dioxide

**2. Please select average time range**

Hourly     Daily Mean     Monthly Average     Yearly Average   

**3. Please select a time period not exceeding 60 months**

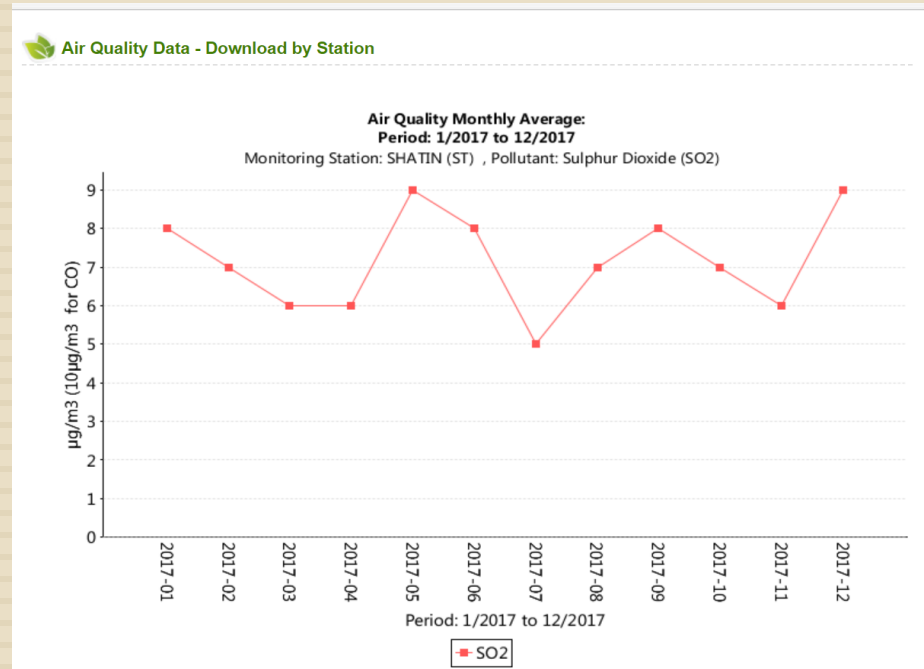
From: (YYYY/MM)    2017 / 1  
 To: (YYYY/MM)    2017 / 12

Environmental Protection Department of HKSAR

Microsoft Excel interface showing the downloaded data table:

YEAR	STATION	POLLUTAN	Month 01	Month 02	Month 03	Month 04	Month 05	Month 06	Month 07	Month 08	Month 09	Month 10	Month 11	Month 12
2017	SHATIN	Sulphur D	8	7	6	6	9	8	5	7	8	7	6	9



➤ Arrange activities on plotting graphs & interpretation of data to reinforce student learning in these areas.