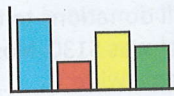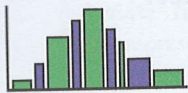# 35 Graphs and diagrams

A Types of diagrams

Diagrams are visual ways of **presenting data** concisely. They are often also called **figures**. In an academic article they are usually **labelled** Fig. (Figure) 1, Fig. 2, etc.

A **pie chart** is a circle divided into **segments** from the middle (like slices of a cake) to show how the total is divided up. A **key** or **legend** shows what each segment represents.

A **bar chart** is a diagram in which different amounts are represented by thin vertical or horizontal bars which have the same width but **vary** in height or length.

A **histogram** is a kind of bar chart but the bar width also varies to indicate different values.
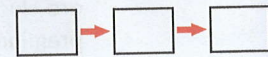
Number	Amount
1	10
2	5
3	20

A **table** is a grid with **columns** and **rows** of numbers.

A **cross-section** is something, or a model of something, cut across the middle so that you can see the inside. A cross-section of the earth's crust, for example, shows the different **layers** that make it up. A **label** gives the name of each part of the cross-section. Cross-section can also be used to mean a small group that is representative of all the different types within the total group (e.g. *the survey looked at a cross-section of society*).

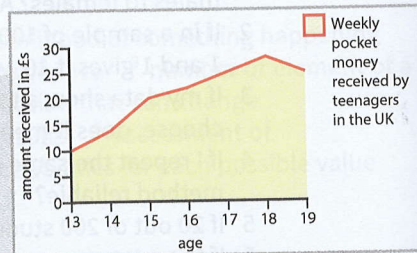A **flowchart** is a diagram which indicates the **stages** of a process.

Common Mistake

Don't use the definite article (*the*) when referring to a specific diagram. *See Table 4 below.* (NOT ~~See the table 4 ...~~)

B A graph

The **graph presents** data relating to teenagers and pocket money. A **random sample** of 1,000 teenagers were surveyed and the average pocket money received at each age has been plotted on the graph. The **x axis** or **horizontal axis indicates** age and the **y axis** or **vertical axis shows** the amount of money received per week. The **graph shows** that 15-year-olds receive twice as much pocket money as 13-year-olds. **From the** graph **we can see** that the amount received **reaches a peak** at the age of 18 and then starts to decline. This **decline** can perhaps **be explained by the fact that** many teenagers start earning and stop receiving pocket money at the age of 18.

Weekly pocket money received by teenagers in the UK

Graphs are drawn by **plotting** points on them and then drawing a line to join **adjacent** points. If there are two separate lines on a graph, the lines can **cross** or **intersect** at various points. Lines that **run parallel** to one another never intersect.

Graphs show how numbers **increase** or **decrease**. Numbers can also be said to **rise** or **grow** and **fall**, **drop** or **decline**. Other verbs used about growth include **double**[1], **soar**[2], **multiply**[3], **appreciate**[4] and **exceed**[5] [another number].

[1] increase to twice the number or amount; opposite = **halve**   [2] increase very quickly and by a large amount; opposite = **plummet**   [3] increase to a very large number   [4] increase in value; opposite = **depreciate**   [5] increase to greater than a particular number or amount; opposite = **fall below**
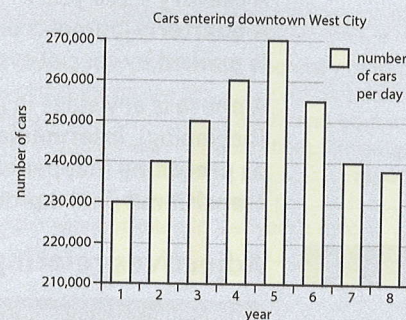
Language help

The verbs *increase* and *decrease* are followed by *by* (e.g. *The population of the city has increased by 10%.*). The nouns *increase, rise, growth, fall, drop* and *decline, decrease,* are followed by *in* (to explain what is rising) or *of* (to explain the size of the change), e.g. *a rise / an increase of 15% in the number of cars.*

Exercises

35.1 Look at the chart and complete the text with the missing words.

Cars entering downtown West City

The chart [1]................ the number of cars entering the downtown area of West City each day over an eight-year period (years 1-8). The totals are listed on the [2]................ axis (give two answers), while the years are listed on the [3]................ axis (give two answers). To the top right of the graph we see the [4]................ . The number of cars [5]v................ over the period. The total rose in the first few years and [6]r................ a [7]p................ in year 5, after which the numbers started to [8]................ . This decline can be [9]................ by the [10]................ that a new mass transit railway was opened in year 6, which is a clear illustration of how good public transport can dramatically affect car use.

Cars entering downtown West City

35.2 Answer the questions.

1 Draw examples of a pie chart and a bar chart.
2 What is the best type of diagram to present the different layers of rock in the Grand Canyon?
3 In a table, what is the difference between columns and rows?
4 What would be the best type of diagram to present the different stages in a research project you did?
5 How many segments are there in the pie chart in A opposite?
6 If you look at two adjacent columns in a table, are they next to each other or separated?
7 What is another name for a legend in a diagram?
8 What type of data collection are you doing if you survey the first 50 people you come across?
9 What do two lines on a graph do if (a) they intersect and (b) they run parallel to each other?
10 Choose the correct sentence: (a) There was an increase in 12% of smart phone sales last year. (b) There was an increase of 12% in smart phone sales last year.

35.3 Replace the underlined words with more precise, academic words.

1 The different bits of the pie chart show the numbers of people in each age group.
2 She kept a record by marking the midday temperature on a graph for a month.
3 People's salaries usually reach their highest point when they are in their late 40s.
4 This flowchart shows the different bits of our project over the next five years.
5 The two lines on the graph cross each other at point A.
6 Draw a line connecting the points that are next to each other.
7 The government's popularity in the opinion polls is beginning to go down.
8 If you look along the third line of the table you can see the figures for the 1950s.

35.4 Rewrite the underlined words and phrases using words from B opposite. There is also a deliberate mistake in one of the sentences. Can you find it and correct it?

1 Populations of some bird species in South Asia have crashed by 97% in recent years. The number of cases of death by poisoning has increased sharply.
2 In 2007 the child mortality rate fell to lower than 60 deaths per 1,000.
3 The average family car in the UK goes down in value by 20% per year. This means its value has fallen by more than half after just three years.
4 A typical piece of land on the edge of the city will go up in value by 15% per year, and house prices have gone up rapidly by a large amount in the last six months.
5 Business courses have increased greatly in number while science programmes have gone down.
6 The temperature rose higher than 45°C in some parts of the country. See the figure 3.
7 Between 1983 and 2006, the number of this species of eagle went up from 22 pairs to 58. Other bird populations have gone up to twice the number in the same period.
8 The numbers of old soldiers attending regimental reunions are becoming smaller each year.