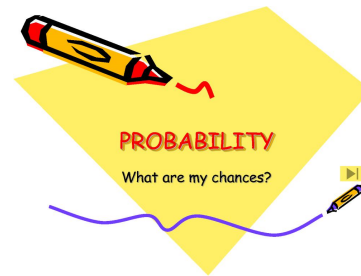


(Gr. 8)

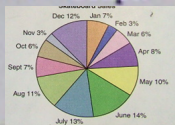
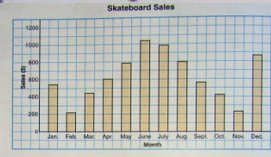
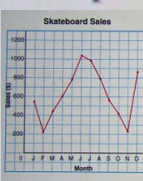
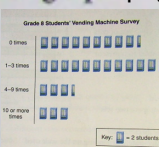
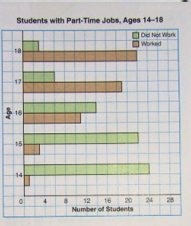
## Unit 7: Data Analysis & Probability

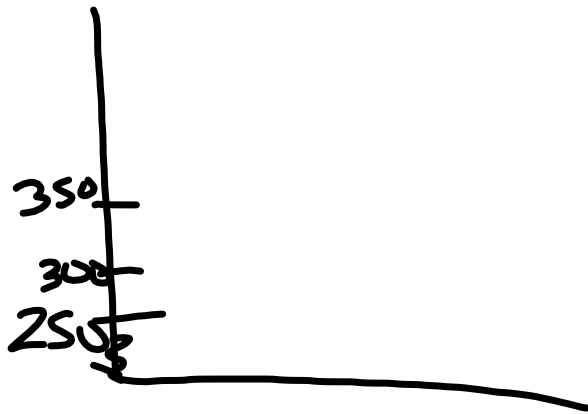


# Choosing an Appropriate Graph

Also see page for more examples

S  
D  
S  
+  
S

| Type of Graph   | Strengths  | Limitations  |
|---|--|--|
| <b>Circle Graph</b><br>          | <ul style="list-style-type: none"> <li>Shows parts of a whole</li> <li>Shows <u>percents of the total</u></li> <li>Sizes of sectors compare parts of the whole</li> </ul>  | <ul style="list-style-type: none"> <li>Does not show data values and the total</li> <li>Difficult to draw accurately</li> <li><b>Does Not Show # of people</b></li> </ul>  |
| <b>Bar Graph</b><br>             | <ul style="list-style-type: none"> <li>Lengths of bars compare data values</li> <li>Scale can be used to find the total</li> <li>Easy to draw</li> </ul>   | <ul style="list-style-type: none"> <li>May be difficult to read depending on scale used</li> <li>Does not show percents of the total for comparison</li> </ul>   |
| <b>Line Graph</b><br>          | <ul style="list-style-type: none"> <li>Easy to draw and to read</li> <li>Shows <u>data changes over time</u></li> <li>Can be used to estimate values between or beyond data points</li> </ul>                                | <ul style="list-style-type: none"> <li>Does not show parts of a whole <b>(No %)</b></li> <li>Zig-zag pattern can be difficult to interpret</li> </ul>  |
| <b>Pictograph</b> page 384<br> | <ul style="list-style-type: none"> <li>Lengths of rows of symbols compare data values</li> <li>Graph is visually appealing</li> <li>Key can be used to find the total</li> </ul>   | <ul style="list-style-type: none"> <li>Large number of symbols make it difficult to read</li> <li>Does not show parts of a whole <b>(No %)</b></li> <li>Difficult to draw</li> </ul>   |
| <b>Double Bar Graph</b><br>    | <ul style="list-style-type: none"> <li><u>Directly compares two sets of data</u></li> <li>Lengths of bars compare data values</li> <li>Scale can be used to find the total of each data set</li> <li>Easy to draw</li> </ul> | <ul style="list-style-type: none"> <li>Can only be used to show discrete data <b>(Can't have half object)</b></li> <li>May be difficult to read depending on scale used</li> <li>Two sets of data in one graph can be confusing</li> </ul> |



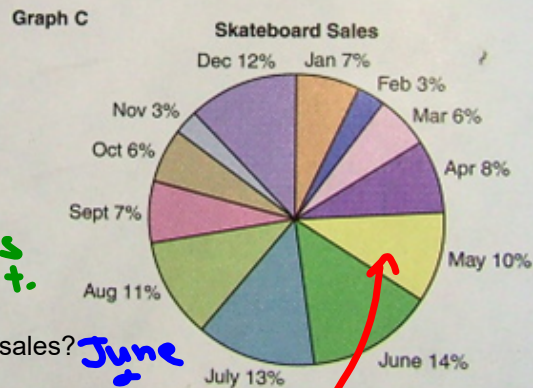
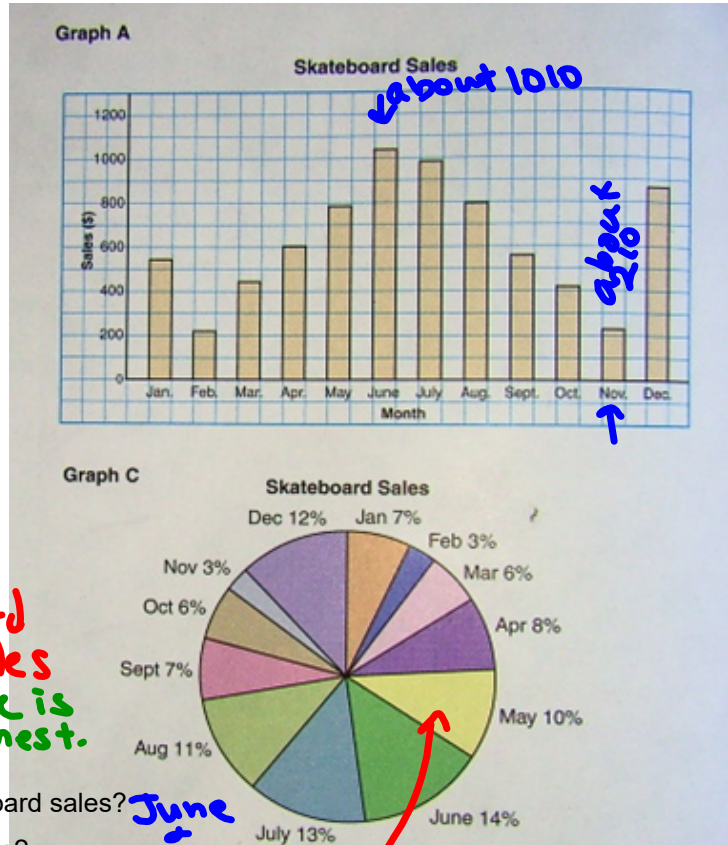
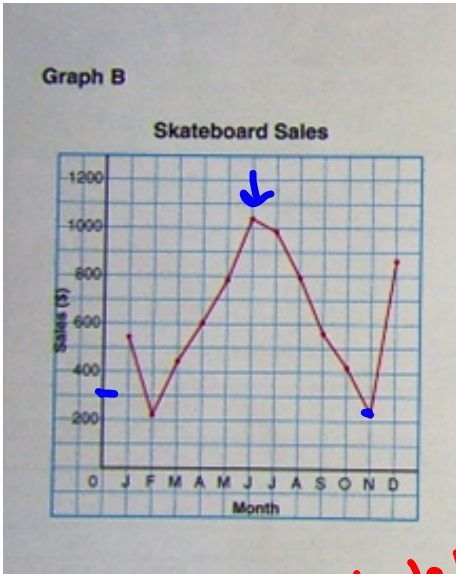


broken graph

→ zoomed in

→ does not represent data accurately.

→ not wrong



Skateboard  
→ scales  
June is  
highest.

What do you know from each graph?

Which graph is the MOST helpful in

- Which 2 months had the greater skateboard sales?
- What is the range in the skateboard sales?
- What percent of skateboard sale occurred in May?

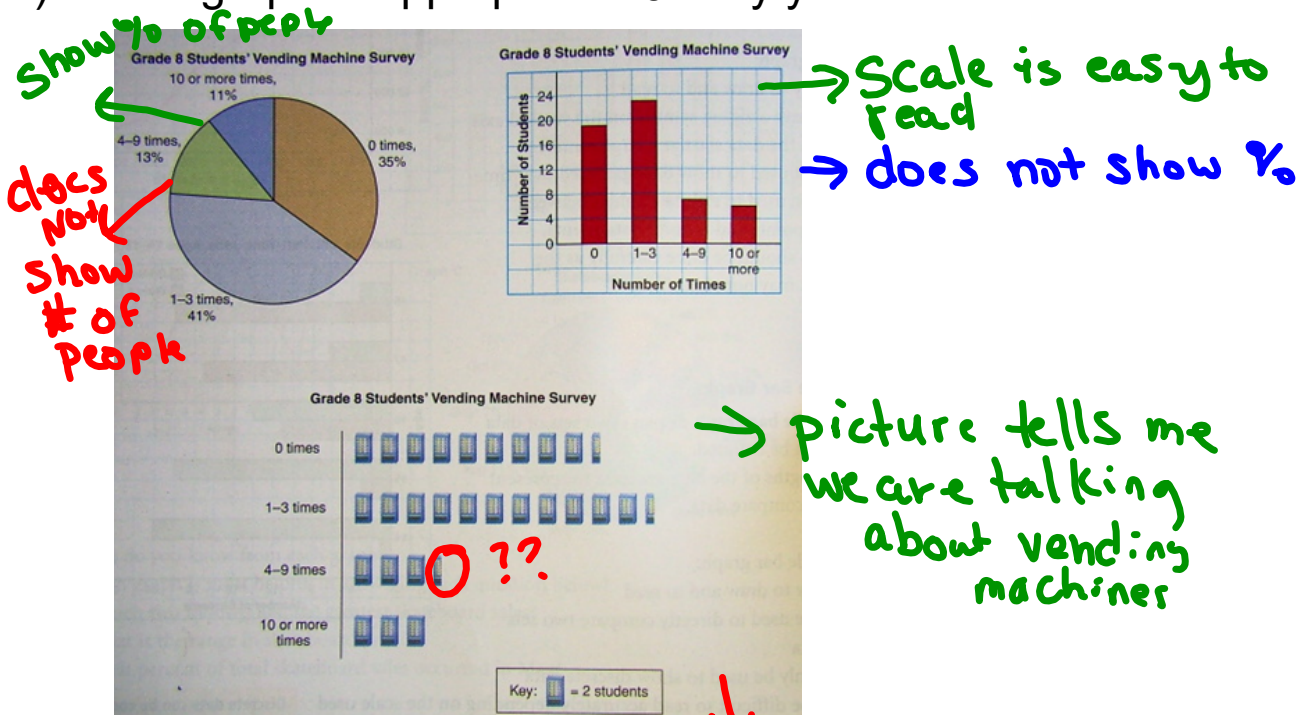
June  
July  
10%

$$\begin{aligned} \text{Range} &\Rightarrow \text{largest \#} - \text{Smallest \#} \\ &\approx 1010 - 210 \\ &\approx 800 \end{aligned}$$

Three students surveyed Grade 8 students in their school. They asked: "How many times did you use a vending machine last week: 0 times, 1-3 times, 4-9 times, or 10 or more times?" Amrit displayed the results on a circle graph.

Fred used a bar graph. Stella used a pictograph.

- What are the strengths and limitations of each graph?
- Which graph is appropriate? Justify your answer.



down fall  
is you have to  
use key to determine  
what part of  
vending represents:



This table shows the favourite types of video games of the Grade 8 students at L'ecole Orleans.

a) Graph these data.  
Justify your choice of graph.

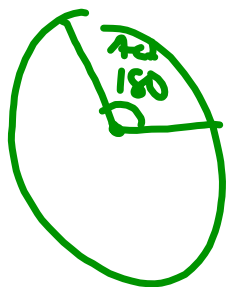
b) What are the advantages and disadvantages of the graph you drew?

| Type         | Number of Students |
|--------------|--------------------|
| Action       | 15                 |
| Role Playing | 10                 |
| Arcade       | 4                  |
| Strategy     | 7                  |
| Simulation   | 11                 |
| Other        | 3                  |

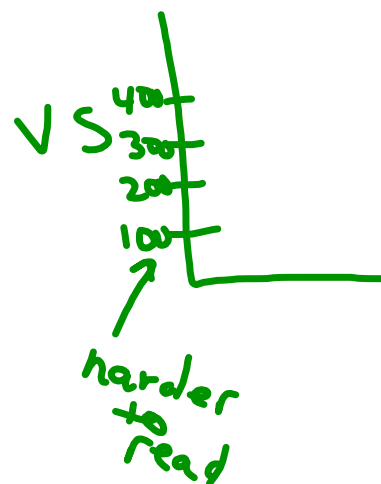
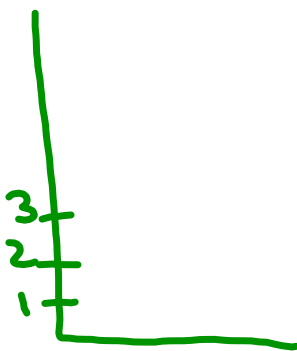
Action  $\frac{15}{50} = 0.3 = 30\%$

$\downarrow$   
 $0.3 \times 360^\circ$   
 $108^\circ$

Total 50



The smaller your scale, the better (more precise) the bar graph.





This table shows the favourite types of video games of the Grade 8 students at L'ecole Orleans.

a) Graph these data.  
Justify your choice of graph.

b) What are the advantages and disadvantages of the graph you drew?

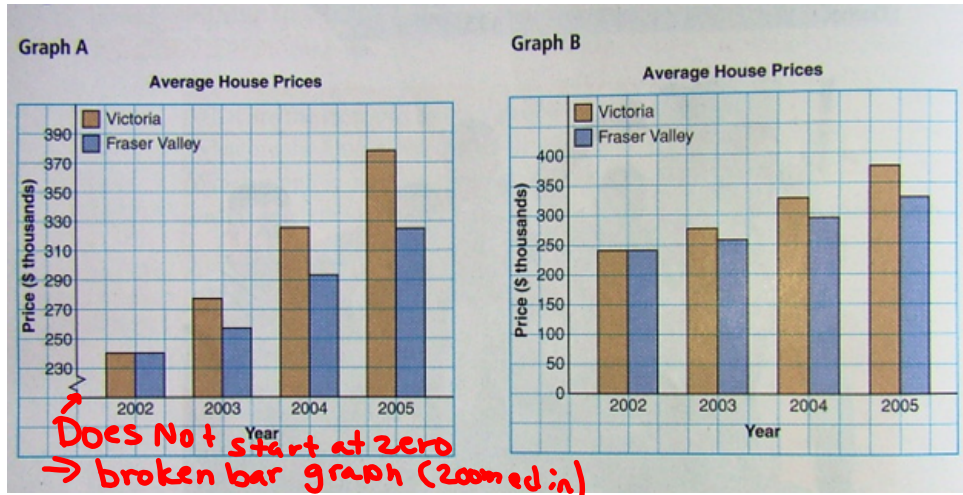
| Type         | Number of Students |
|--------------|--------------------|
| Action       | 15                 |
| Role Playing | 10                 |
| Arcade       | 4                  |
| Strategy     | 7                  |
| Simulation   | 11                 |
| Other        | 3                  |

Total : 50

Action  $\frac{15}{50} = \frac{30}{100} = 30\%$

$30\%$  of  $360$   
 $0.30 \times 360 = 108^\circ$

# Misrepresenting Data



What does each graph represent?

→ data is the same.  
It shows comparison of prices of house in Victoria and Fraser Valley.

At first glance which graph appears to show the greater difference in house prices? Why?

The graph on the left. There is a greater difference in height for each pair of bars in this graph. (Victoria house price is <sup>slightly</sup> greater than Fraser valley)

Do the graphs display the same data? **yes**

What is the scale of each graph?

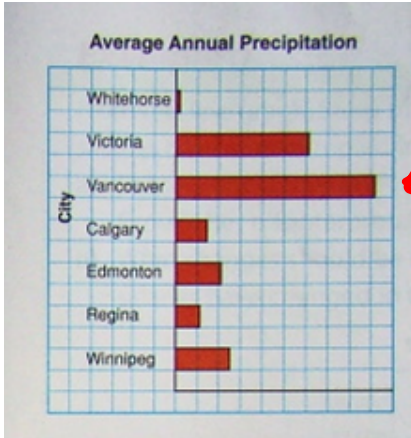
Graph A → broken starts at 230 and counts by 20  
Graph B → starts at zero, counts by 50

Does the scale on each graph start at zero? **No**

Is the graph on the left incorrect? Do you think someone who uses this graph to show the difference in houses prices is lying?

No. Both graphs represent the data. However, the graph on the left emphasizes the difference in the average price of a house in Victoria and a house in Fraser Valley.

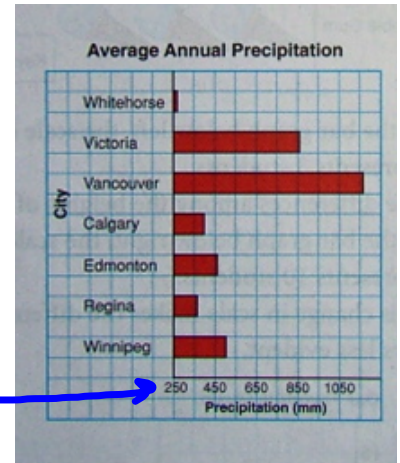
→ zoomed in



← Vancouver has a lot more precipitation than Whitehorse (45 times more)

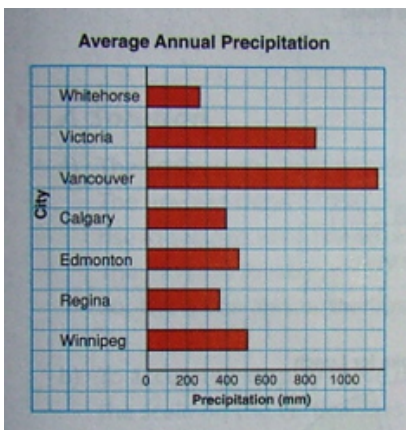
→ no # on horizontal axis

Vancouver has a lot more precipitation than Whitehorse



does not start at zero

(zoomed in) 1 block = 100



→ starts @ zero ✓

→ Scale counts 1 block = 100

There are many ways in which graphs can be drawn to **misrepresent data**. Graphs like these may be found in the media to create false impressions.

## Study

How could a circle graph be misleading?

- Sectors may be treated differently to draw attention to it

How could a pictograph be misleading?

- Different sized symbols
- No Key given

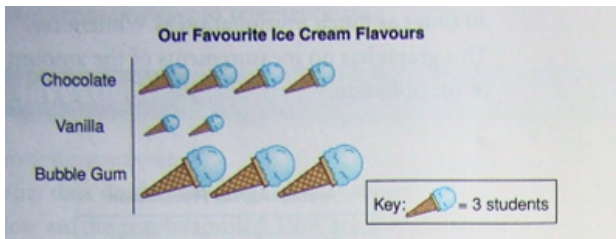
How could a bar graph be misleading?

- Different widths of bars
- No Scale given
- Scale may be too large or too small

How could a line graph be misleading?

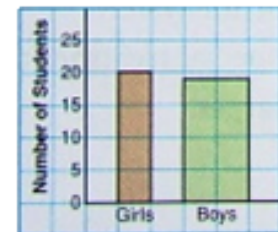
- Distance between points may not be proportional to the length of time between the recorded times.
- No Scale given
- Scale may be too large or too small

In this pictograph, the symbols have different sizes.  
 The three large ice-cream cone symbols give the impression that bubble gum is the favorite flavour.  
 When the key is used, chocolate is the favourite flavour.



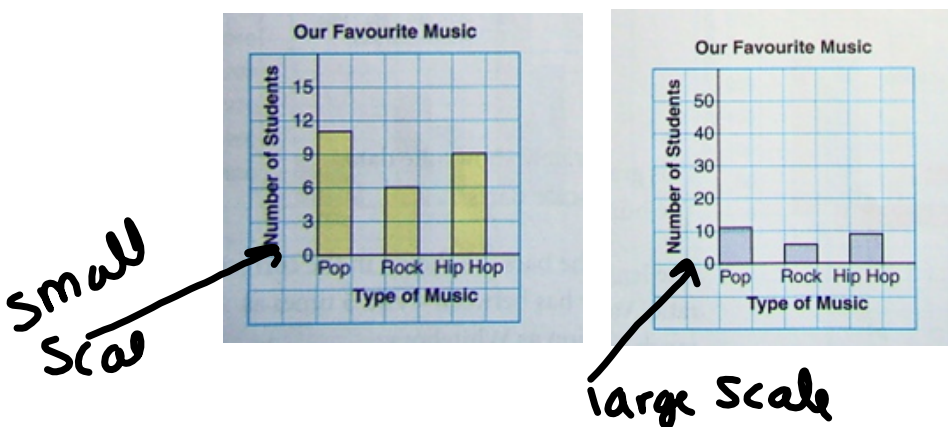
Grade 8 Students Who Scored Higher than 80% on a Math Test

In this bar graph, the wider bar creates the impression that many more boys than girls scored higher than 80%. In fact, the number of girls who scored higher than 80% is greater than the number of boys.

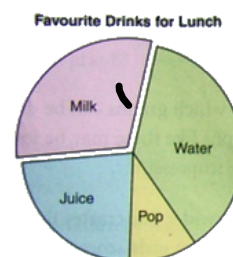


In the bar graph below left, the scale on the vertical axis is 1 square represents 3 students. The difference among the heights of the bars are easily seen.

In the graph below right, the scale on the vertical axis is 1 square represents 10 students. This change in scale makes the difference among the heights of the bars less evident.



A part of a graph may be treated differently to draw attention to it.  
 A milk company uses this circle graph to draw attention to the milk sector.  
 The sector for milk is not as large as the sector for water, but the special treatment makes it seem larger.



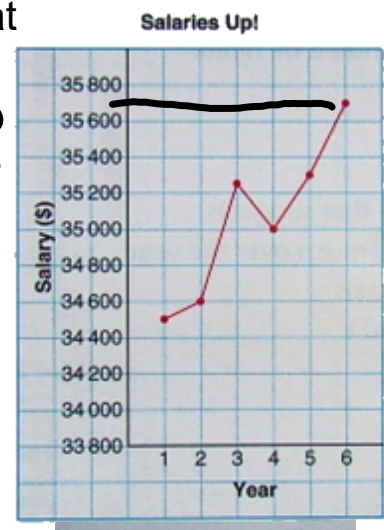
From this line graph, Shiva made the conclusion that salaries have almost tripled in 6 years.

- a) Shiva's conclusion is not consistent with the data. Explain her misinterpretation. RANGE???

$$35700 - 34500$$

- b) What changes should be made to the graph to accurately show how salaries have changed in 6 years?

→ Start at zero



→ Triple  
30000  
x 3  
90000