

# DISPLAYING DATA

## Learning Goals:

Making various graphs by hand

There are 3 types of data.

Handout

### Categorical Data

- Qualitative
- recorded as label
  - ex. male / female
  - eye colour

### Continuous Data

- Quantitative
- decimals are allowed
  - ex. measurements 14.7 cm

## Discrete Data

- Quantitative
  - decimals are NOT allowed
- ex. number of toppings on a pizza  
number of people attending

### Examples

1. Number of mugs of coffee drank in a day. *continuous*
2. Amount of coffee drank in a day (in mL). *discrete*
3. Type of pet at home. *categorical*
4. Number of pets at home. *discrete*

*Depending on the data type we use  
different graphs to show the data.*

### Step 1: Collect some information

(e.g. using a **frequency table**)

Category (e.g. Age)	Tally	Frequency
[ 0 - 2 )		
[ 2 - 4 )		
[ 4 - 6 )		

\*\*\*

[square bracket] = value is included

(round bracket) = value **not** included

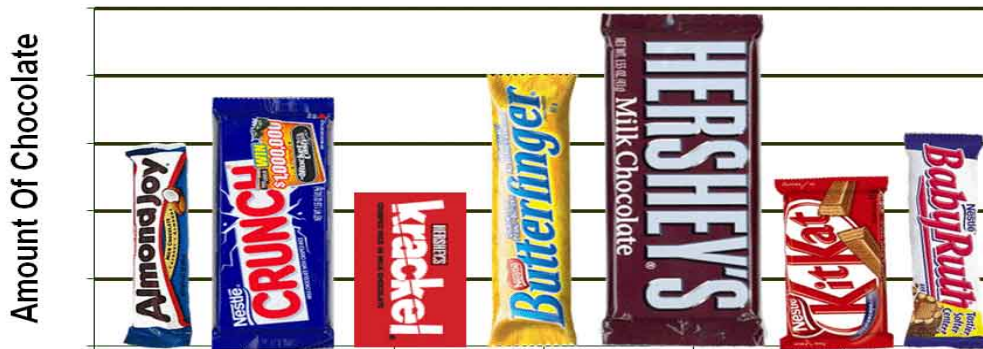
## Step 2: Graph the information

Types of graphs:

a) bar graph (spaces between bars)

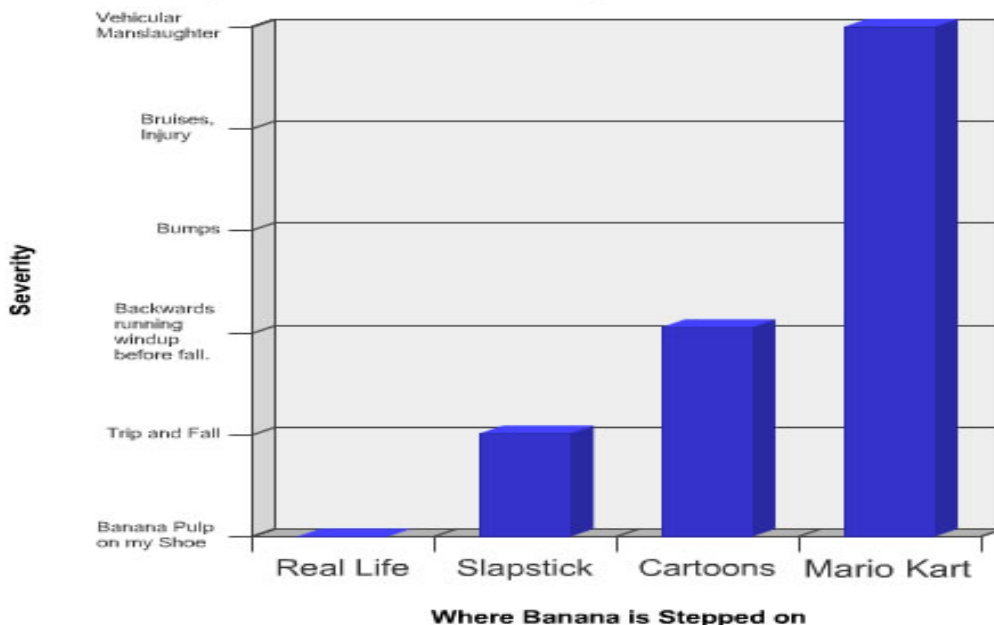
\*\*\* good for showing differences between categories

### Candy Bar Chart



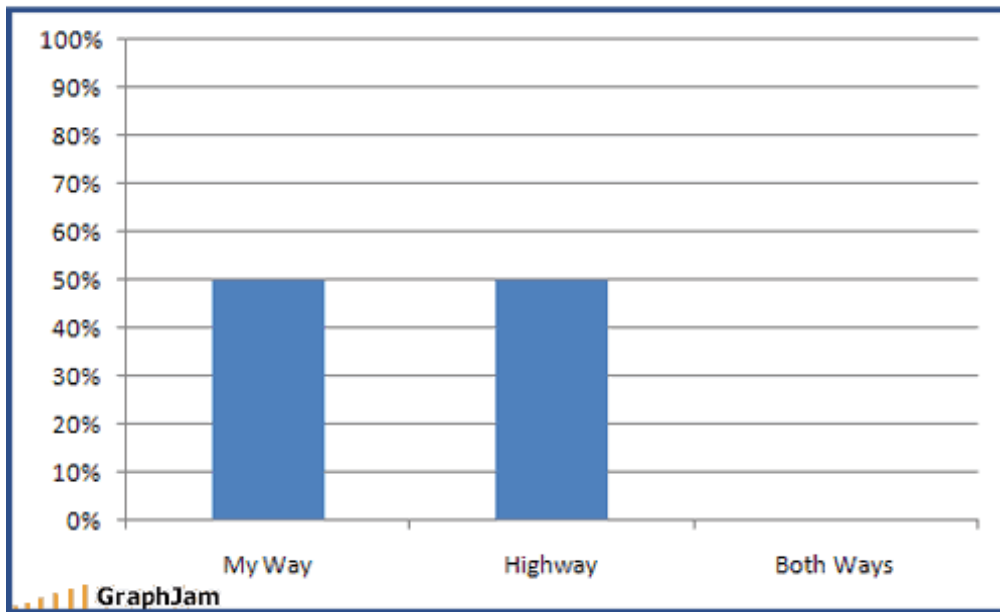
...more bar graphs...

### Danger of Stepping on Banana



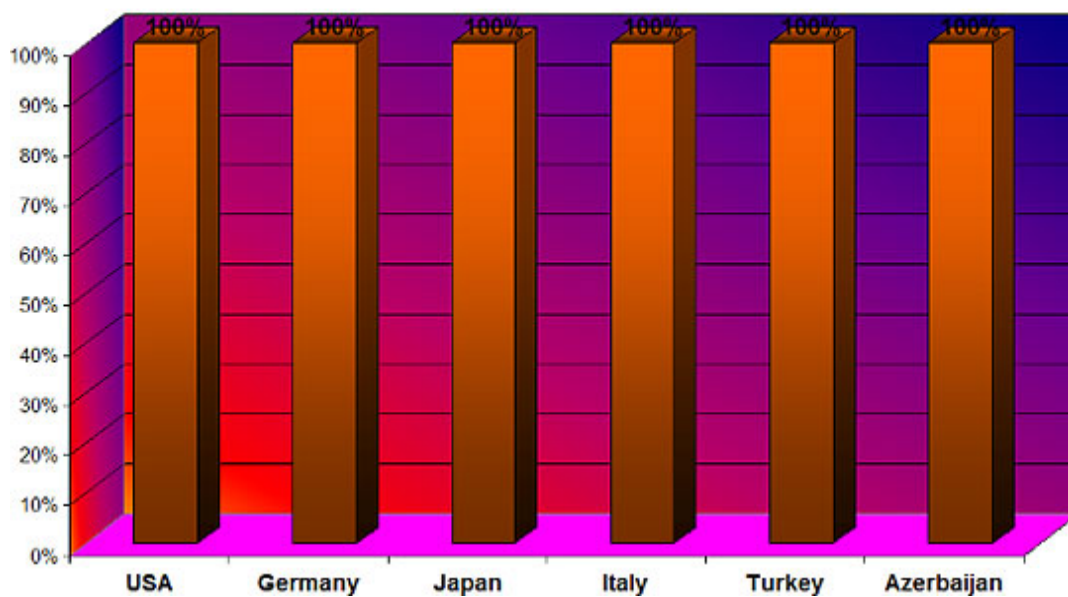
...more bar graphs...

### Ways You Can Have It



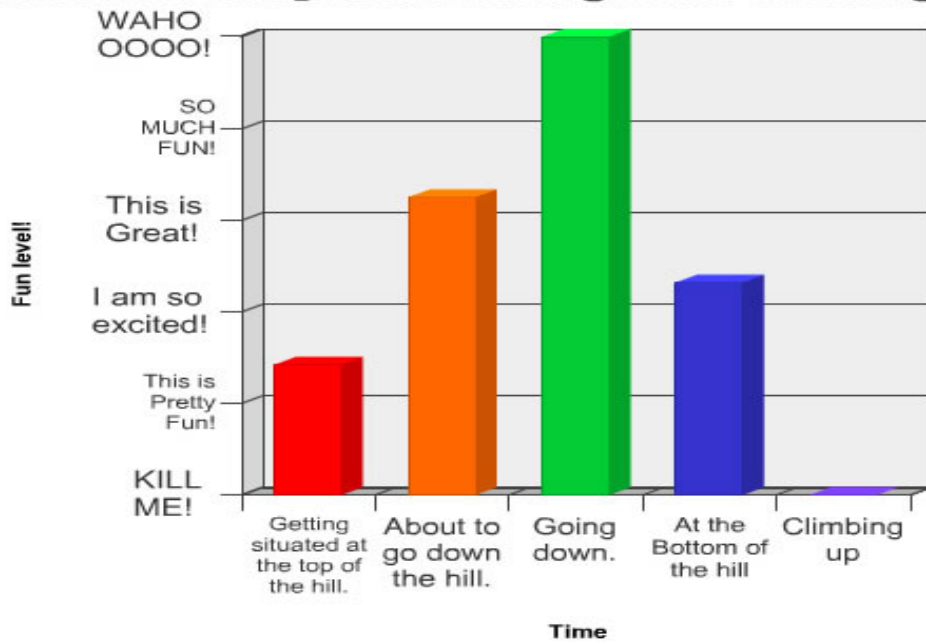
...more bar graphs...

### Probability of Death by Country



*...more bar graphs...*

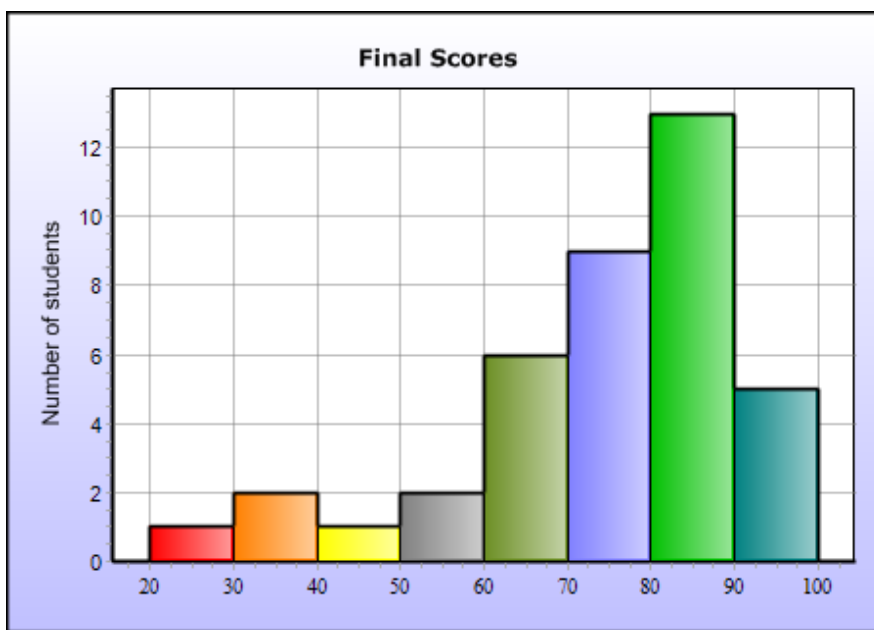
**Amount of fun you are having while Sledding.**



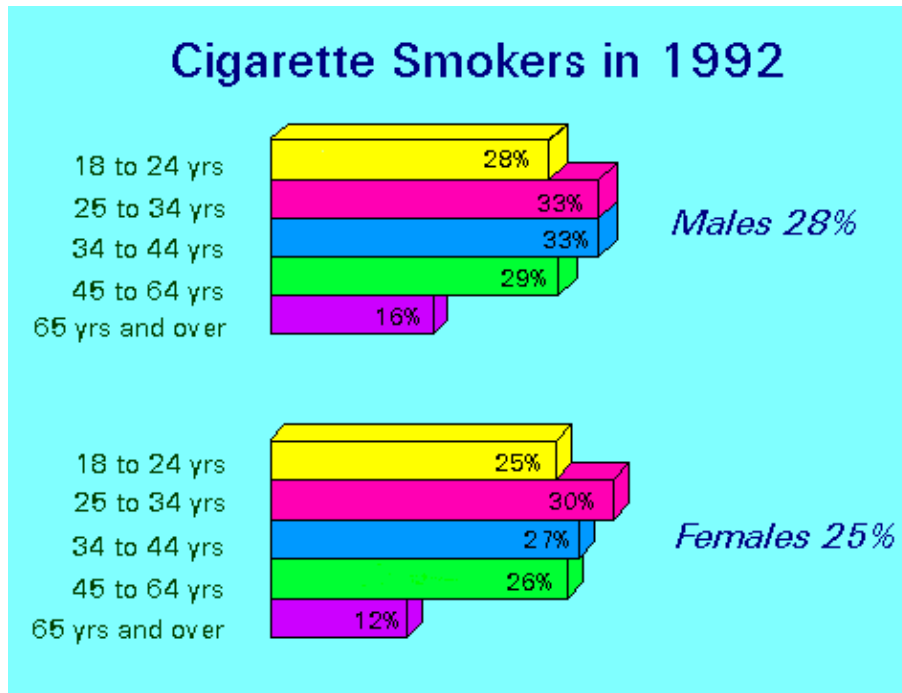
GraphJam.com

b) histogram (no space between bars)

\*\*\* also good for showing differences between categories



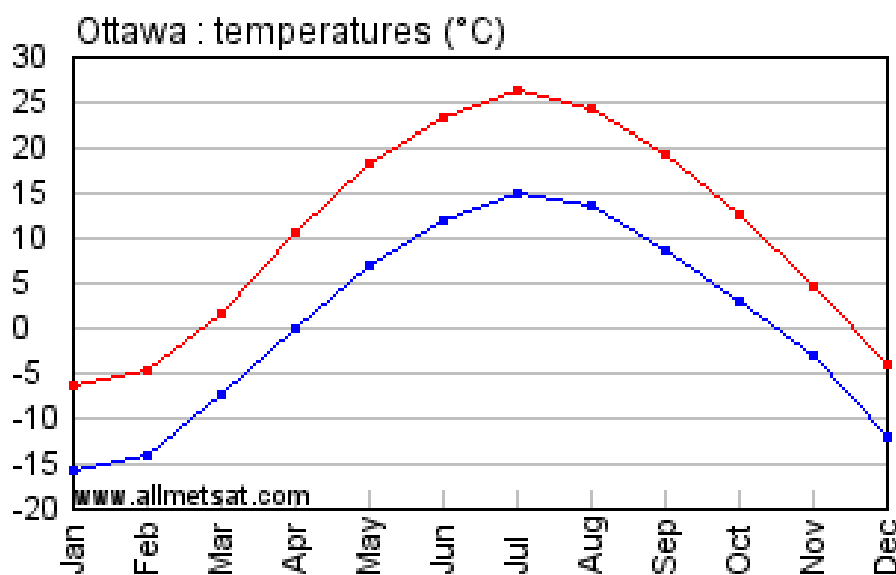
*...more histograms...*



c) line graph

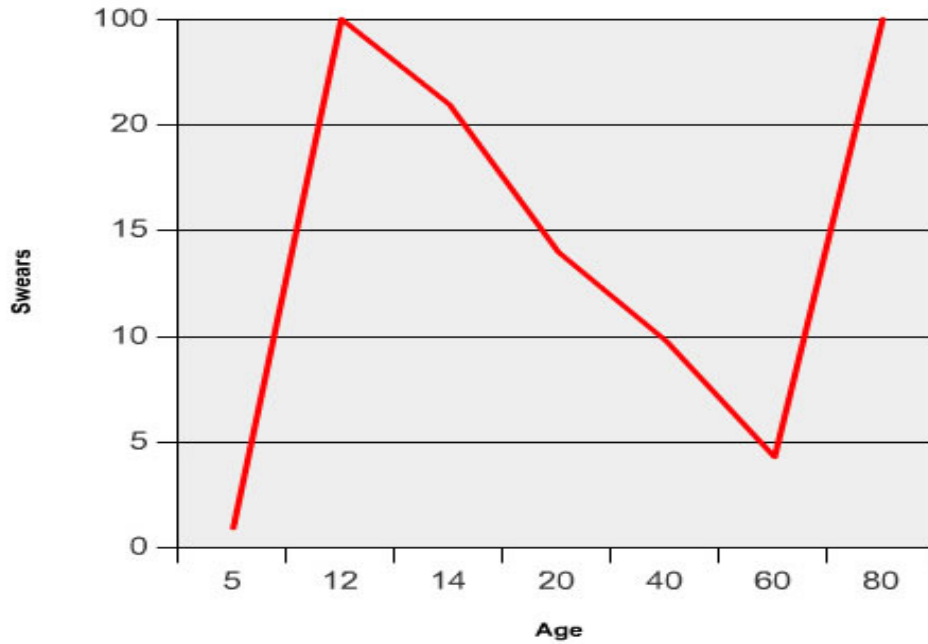
*broken-line graph*

*\*\*\* good for showing changes over time*



...more line graphs...

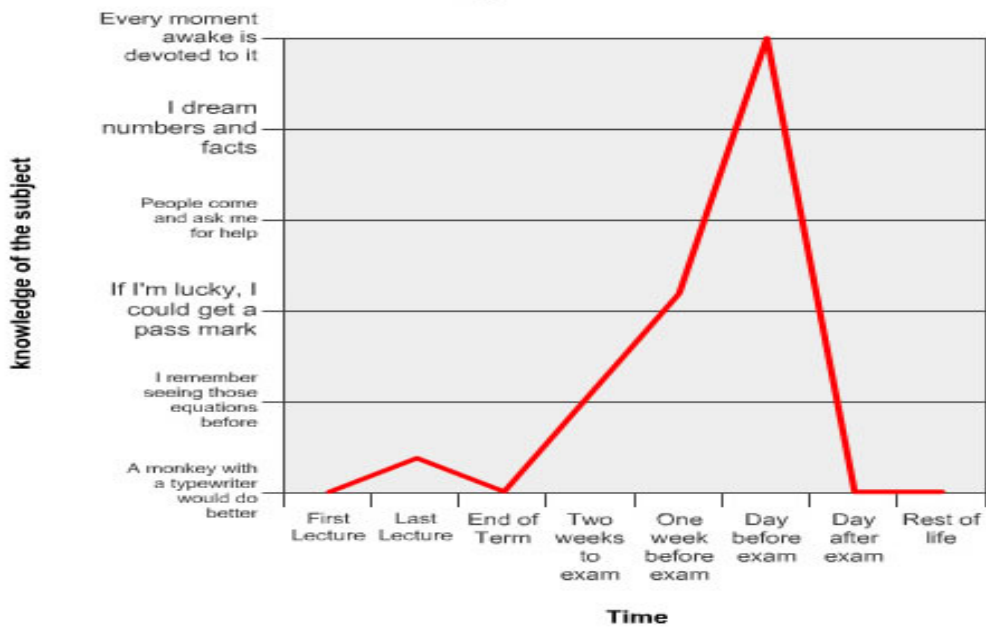
### Amount of Swears per Conversation



GraphJam.com

...more line graphs...

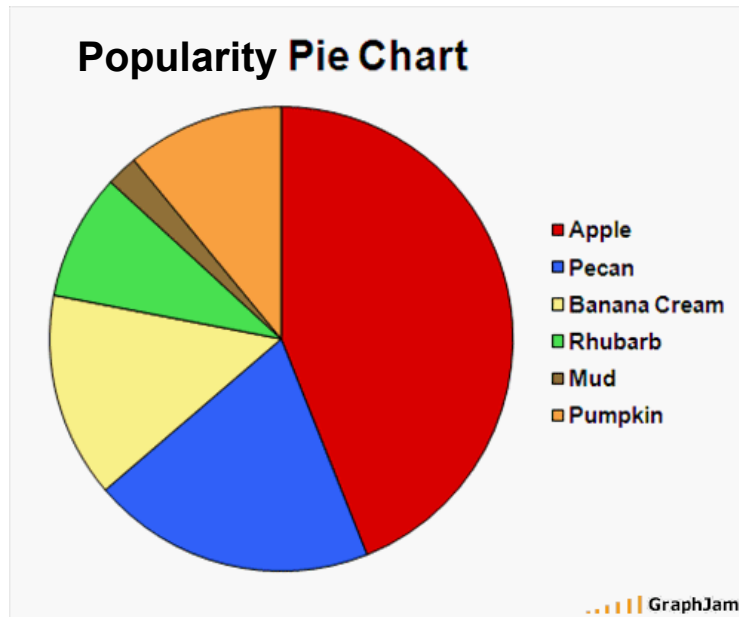
### Knowledge vs Time



GraphJam.com

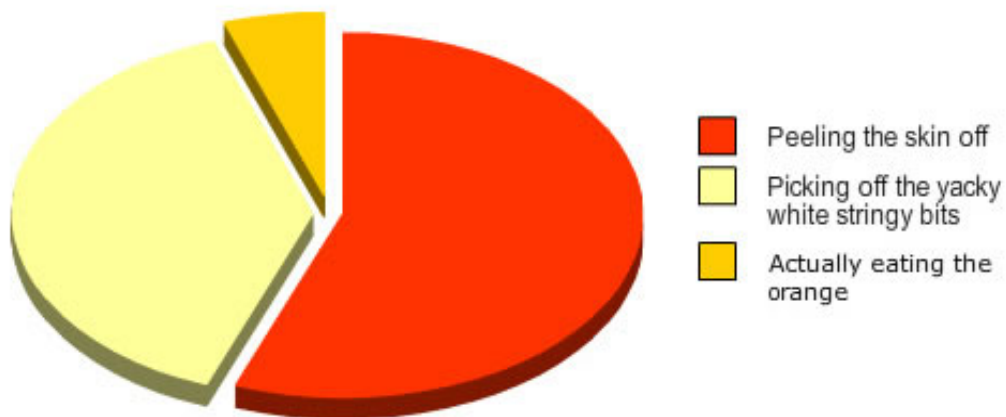
### d) circle graph

\*\*\* good for showing parts (percentages of a total)



...more circle graphs...

### Time spent eating an orange

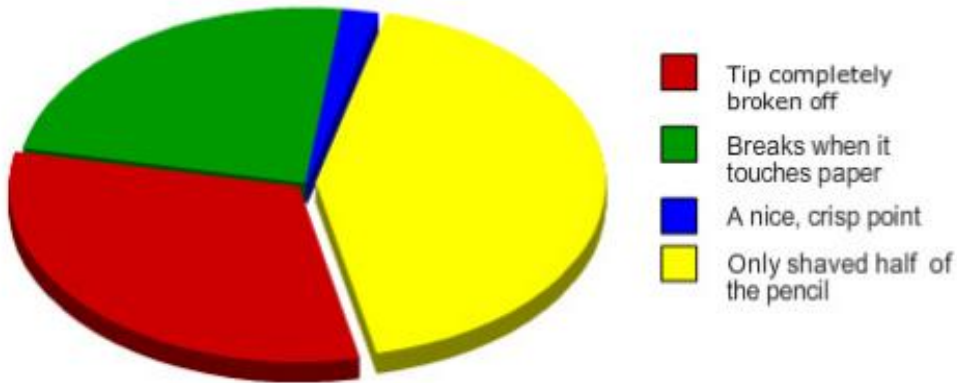


GraphJam.com

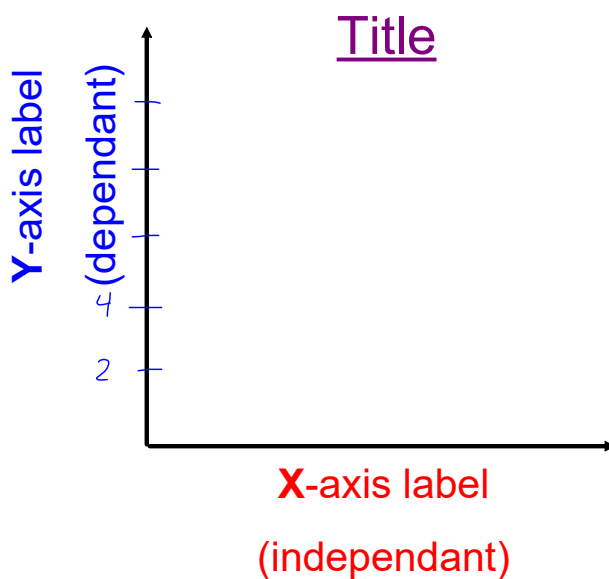


*...more circle graphs...*

## Pencil Sharpeners Results



Graphs should always include the following!!!...



Also,

- use a pencil (NO pen!)
- use a ruler
- use graph paper
- use appropriate scales

*go up by the same amount*


**DISPLAY DATA – CREATING GRAPHS BY HAND**

Once survey data is collected, it needs to be *displayed* in a meaningful way so that it can be easily *analyzed* and *interpreted*.

**THE BAR GRAPH**

Suppose we would like to know what sport the favourite is amongst our classmates. Survey your class to determine the most popular sport.

SPORT	TALLY	FREQUENCY	PERCENTAGE
Baseball		1	$\frac{1}{20} = 5\%$
Basketball		2	$\frac{2}{20} = 10\%$
Football		2	10%
Hockey		6	$\frac{6}{20} = 30\%$
Soccer		5	$\frac{5}{20} = 25\%$
Tennis		0	0%
Other		4	$\frac{4}{20} = 20\%$
<b>TOTAL</b>		<b>20</b>	<b>100%</b>

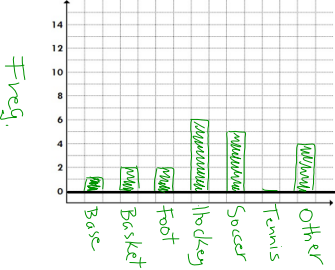


**Tally** – put a tick for each person counted.

**Frequency** – count the number of ticks in the tally column and express as a number

**Percentage** – calculate  
Frequency ÷ Total x 100

Create a bar graph. Remember to fully label your graph (title, axes, etc.)



The numbers on the left side indicate the frequency.

Label the bottom of the bar graph with the category (sport).

**Categorical Data** – data that are types rather than numbers. For example, sports: Baseball, Basketball, Football, soccer ...

Write a statement about your findings.

Hockey is the most popular and tennis is the least popular in this class

## Histograms - no gaps

11.5, 13.2, 3, 16, 24, 6, 0, 28, 13.8, 7,  
16.6, 2, 24, 12, 18, 18, 9, 13.9, 12, 18.5,  
4.5, 19, 14.9, 7.1, 21, 12

Find Range

Highest - Lowest

$$28 - 0 = 28$$

Determine the number of intervals (5-20)

range ÷ # of intervals

$$28 \div 7 = 4$$

Don't overlap intervals

↑  
# of bars width of bars

**THE HISTOGRAM**

Tina would like to know the average number of hours her classmates spend watching T.V. during the week (Monday to Friday).

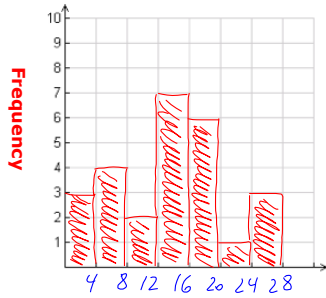
→ 3.999...

TIME INTERVALS (hrs)	TALLY	FREQUENCY
[0-4)		3
[4-8)		4
[8-12)		2
[12-16)		7
[16-20)		6
[20-24)		1
<b>TOTAL</b>	<del>25</del>	



(24-28) ||| 3

Create a histogram. Remember to fully label.



Write a statement about your findings.

Most people watch 12-16 h/week.

What is the difference between a bar graph and a histogram?

bar - gaps  
 histograms - no gaps  
 histograms - continuous data  
 - intervals  
 - #s on the x-axis

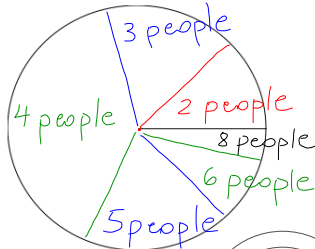
**Continuous Data** - data that can hold any numerical value

**THE CIRCLE GRAPH (PIE CHART)**

Shawn is curious to know the number of people his classmates had in their family. The following shows what Shawn recorded in his notebook.

# Of People	Tally	Frequency	Percent (round to 1 decimal)	Measure of Angle (degrees)
2		3	$\frac{3}{24} \times 100 = 12.5\%$	$\frac{3}{24} \times 360 = 45^\circ$
3		4	$\frac{4}{24} \times 100 = 17\%$	$\frac{4}{24} \times 360 = 60^\circ$
4		10	42%	$\frac{10}{24} \times 360 = 150^\circ$
5		4	17%	60°
6		2	8%	30°
7		0	0%	0°
8		1	4%	15°
<b>TOTAL</b>	24		100%	360°

Create a circle graph. Remember to fully label.



Percent is calculated by:  
 $\frac{\text{Frequency}}{\text{Total}} \times 100 =$

Degrees is calculated by:  
 $\frac{\text{Frequency}}{\text{Total}} \times 360 =$

In order to label / colour the different portions of the circle, a compass or protractor must be used.

Write a statement about your findings.

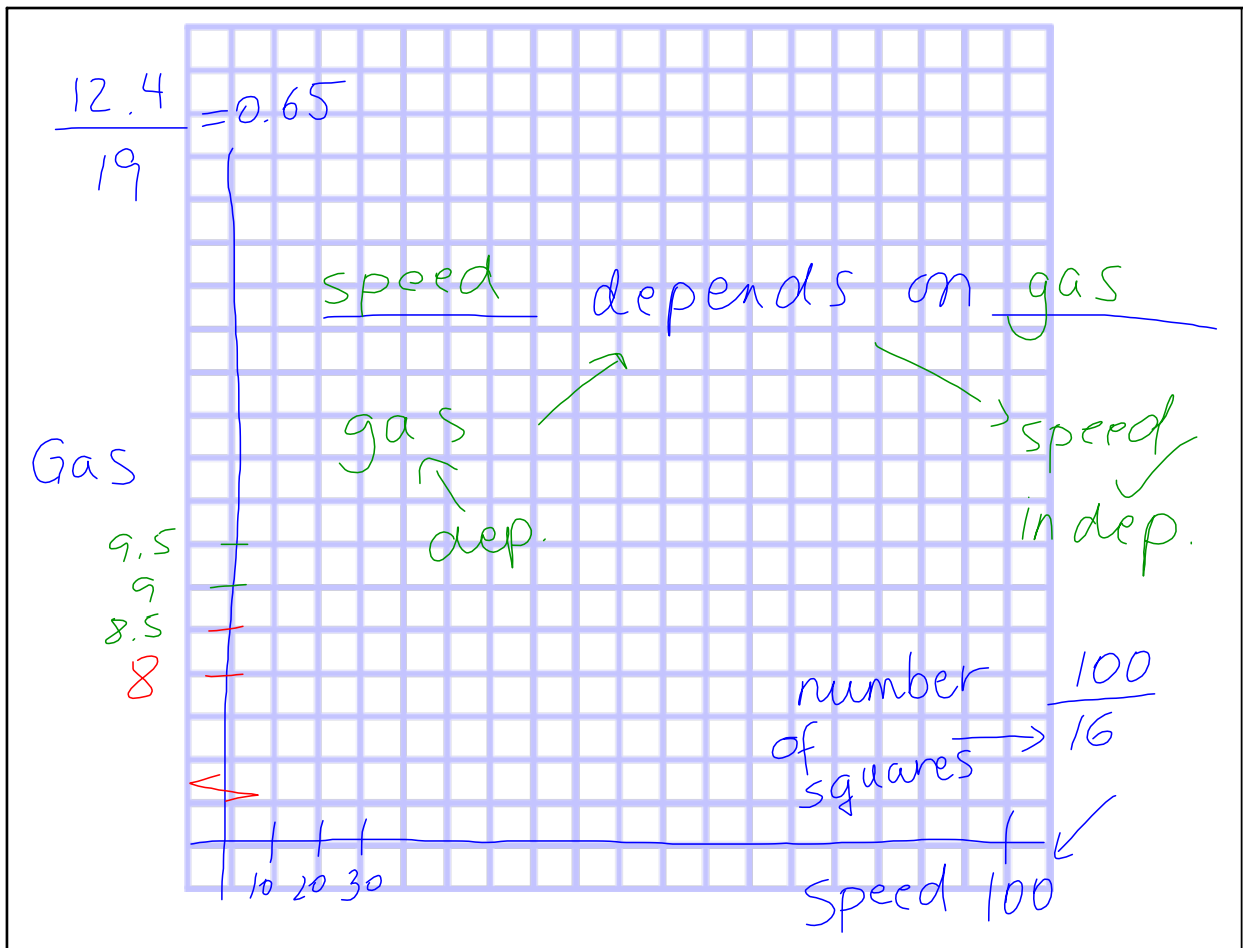
**Discrete Data** - data that is distinct and can be counted. i.e. family members, marks on a test

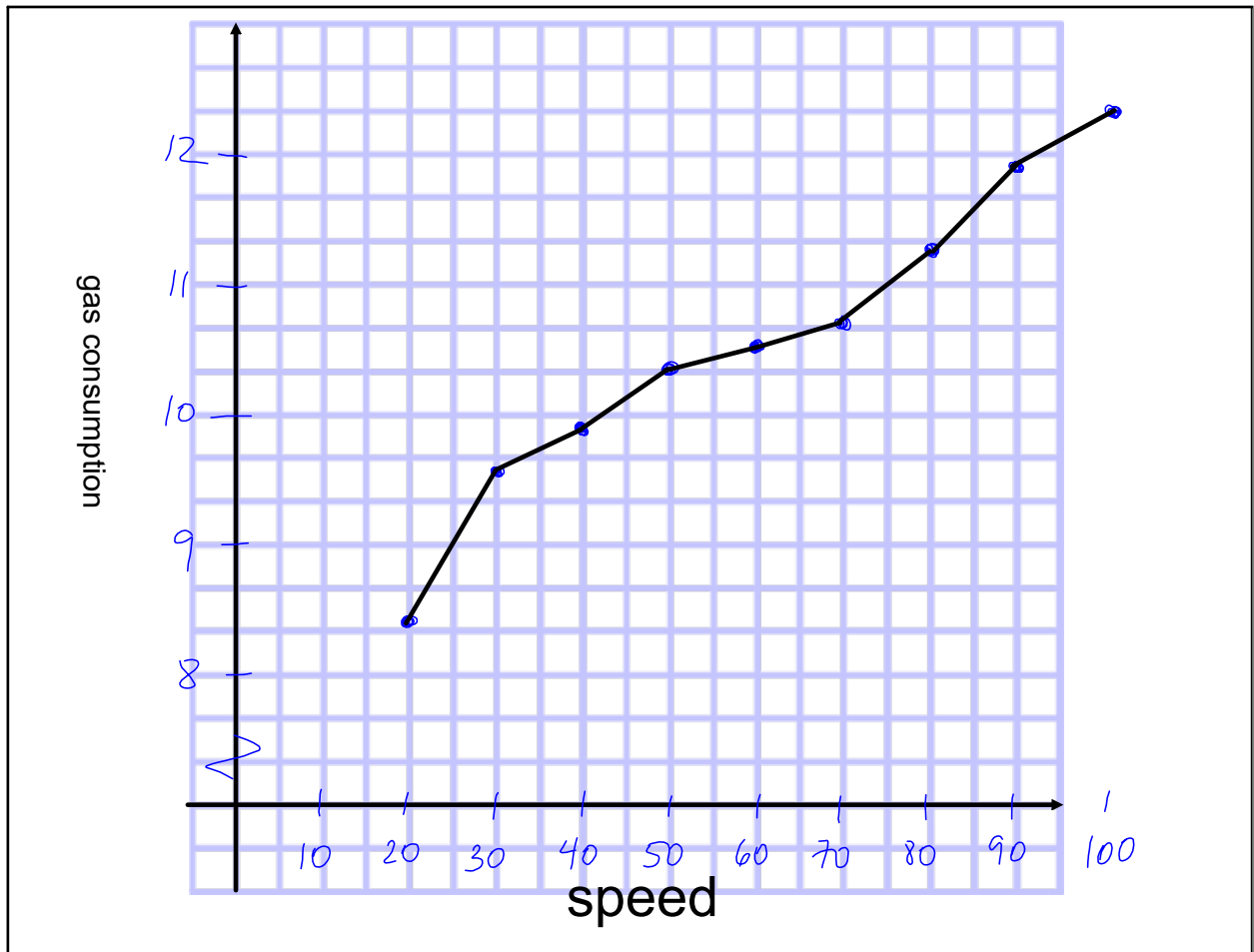
Majority of people have 4 people in their family.

Gasoline consumption depends on a number of factors, such as the type of car, size of engine, speed, and so on. One car maker recorded the following gasoline consumptions at certain speeds for their new model.

Speed (km/h)	20	30	40	50	60	70	80	90	100
Gasoline (L/100-km)	8.4	9.6	9.9	10.4	10.6	10.8	11.3	11.9	12.4

- (a) Draw a broken-line graph for the above data.
- (b) You drive at 40 km/h. How much gasoline will you use for a 500-km trip?
- (c) You drive at 80 km/h. How much gasoline will you use for a 500-km trip?
- (d) Create a problem of your own using the graph. Compare your problem to others in the class.





$$b.) \quad 40 \text{ km/h} \rightarrow 9.9 \text{ L/100 km}$$

$$9.9(5) = 49.5$$

$$\therefore 49.5 \text{ L}$$

$$c.) \quad 80 \text{ km/h} \rightarrow 11.3 \text{ L/100 km}$$

$$11.3(5) = 56.5 \text{ L}$$

ADDITIONAL PRACTICE:

PG. 125 # 1, 2, 5, 12 (CIRCLE GRAPH)