THE METRIC SYSTEM

IN THE METRIC SYSTEM OR THE INTERNATIONAL SYSTEM OF UNITS (S.I.) THERE ARE BASE UNITS WITH WHICH WE MAKE COMPARISONS.

1. LENGTH -
2. MASS -
3. TIME -
4. TEMPERATURE -
5. VOLUME -

IN THIS SYSTEM, PREFIXES ARE USED TO INDICATE THE SIZE OF THE BASE UNIT.

USE THIS **CONVERSION LINE** TO MOVE BETWEEN DIFFERENT UNITS.

1. 5000 cm = _____ m
2. 0.005 kg = _____ g
3. 8 mL = _____ μL
4. 6 Ms = _____ das
5. 8.5 m = _____ mm

Scientific Notation

For very large numbers and very small numbers scientific notation is used to avoid writing out many digits.

Ex. 455 000 000 kg can be written as

Ex. 0.000 26 m can be written as

To convert standard notation to scientific notation:

1. Move the decimal so there is one non-zero digit in front of the decimal.
2. If the decimal was moved left the exponent is positive.
3. If the decimal was moved right the exponent is negative.
4. The number of movements is the exponent.

Examples:

1. 580 000
2. 245 000 000 000
3. 23 000 000 000 000
4. 0.000 000 053
5. 0.0007
6. 0.000 0065

To convert from scientific notation to standard notation:

1. Move the decimal point to the right if the exponent is positive.
2. Move the decimal point to the left if the exponent is negative.

Examples:

1. 5.39×10^{6}

2. 9.8×10^{4}

3. 2.3×10^{9}

4. 2.25×10^{-5}

5. 5.5×10^{-8}

6. 9.3×10^{-12}

Rearranging Science Formulas

A knowledge of Math is important in order to study science. Rearranging simple science formulas is a vital skill.

For example:

$$D = \frac{m}{V}$$

Taking Measurements

When taking measurements we should be aware of a few things:

Parallax: The change in position of an object when the angle of view is changed.

Acccuracy: How close you are to a certain measurement.

Precision: How many times you can reapeat a measurement.

SNC 1D/1P
Making Observations

Observations:

Inferences:

Qualitative Observations vs. Quantitative Observations

Qualitative Observations:

Quantitative Observations:

Describing matter

The properties that we can observe with our senses are called **physical properties.** The following list are some physical properties of matter that help us tell one thing from another.

Physical property	Explanation or meaning
Physical State	
Colour	
Odour	
Taste	
Clarity (transmission of light)	
Lustre	
Form	
Texture	
Hardness	
Brittleness	
Malleability	
Ductility	
Viscosity	

How to Plot a Graph

Step #1

Use a sharp pencil when drawing on graph paper. Draw a vertical axis and a horizontal axis. Place the independent variable on the horizontal axis. Place the dependent variable on the vertical axis. Label the axes with the quantities to be plotted. Include appropriate units.

Step #2

Choose a scale so that:

a) All of the points you are plotting fit on the graph
b) The graph fits a large part of the page
c) The scale is easy to use

For the value of one square on your graph paper, it is best to use numbers in multiples of 1, 2, 5, 10 etc…

Step #3

Plot the points in pencil, making a sharp dot surrounded by a small circle.

Step #4

Once you have plotted all the points, draw the smoothest line possible through them. Very often, the line takes the form of a curve. If it is not possible to draw through all of the points with a single line, try to draw an average line. You do this by drawing a line that has equal number of points on-either side of it.

Step #5

Add a neatly printed title to the graph, along with your name and the date.

35 km/h _____
90 km/h _____

SNC 1D/1P
GRAPHING

1. Mr. Arthur decided to take his Porche Carrera GT out for a speed trial. He wants to see how fast it will go. He starts to drive and records the speed every two seconds. The results are below.

Time (s)	0	2	4	6	8	10	12	14	16	18	20
Speed (km/h)	0	9	20	30	41	49	60	70	82	90	100

Plot a graph of this data to show the relationship between speed and time.

2. Mr. Arthur got his Carrera GT tuned up and decided to try another speed trial. The results are below.

Time (s)	0	2	4	6	8	10	12	14
Speed (km/h)	0	15	30	41	55	70	85	100

Plot a speed-time graph for this set of results using the same method.

Answer these questions:

1. How fast was the car moving at: 5 seconds _____
   9 seconds _____
   11 seconds _____

2. At what time was the speed: 10 km/h _____

What is Science?

Science is a way of _____ _____ and _____ our natural world.
Whenever we ask _____ or ____ something happens we are dealing with science.

Major divisions of science:

Chemistry

Physics

Biology

Mathematics

Astronomy

Earth Sciences (Geography)

Social Sciences

The use of scientific knowledge to make products designed to improve the quality of our lives is called _____.

Why study science?

1. Science is _____!
   - new _____ are produced everyday
   - _____/_____
2. Many _____ require knowledge of science.
3. _____, _____ and _____ involve science.
4. Science helps you ask _____ and provides _____ for better answers.
5. _____!!

Cause and Effect Relationships

The primary goal of science is to explain the world in which we live. The knowledge gained is continually being used to create and develop technology. Cause-Effect relationships are very important in science and technology.

The key questions often asked when faced with a scientific problem:

VARIABLE -

There are two types of variables:

1. **Independent variable:**

2. **Dependent variable:**

Controlled Variables:

Examples:

For each questions or problems: Identify the independent variable, dependent variable and one controlled variable.

1. How does the number of hours of light a plant receive affect its height?

   Independent: _____
   Dependent: _____
   Controlled: _____

2. How does the shape of a snowball affect the time it takes to melt?

   Independent: _____
   Dependent: _____
   Controlled: _____

3. How effective are different kinds of salt in melting winter ice?

   Independent: _____
   Dependent: _____
   Controlled: _____

4. Which brand of paper towel absorbs the most water?

   Independent: _____
   Dependent: _____
   Controlled: _____

Steps of the Scientific Method

1. Pose a question.

   How does mass affect the time taken for a whirlybird to fall?

2. Collect information.

3. Suggest a hypothesis. (Maybe . . .)

4. Make a prediction. (If . . . then . . .)

5. Design and conduct an experiment to test the hypothesis.

   All experiments are written in a specific format.

   Title
   Purpose
   Materials
   Procedure
   Observations
   Analysis

6. Conclusions: Did the experiment support your hypothesis?