Numeracy Policy

Policy Reviewed: January 2025 Policy Approved: February 2025 Next Review: January 2028

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Version	1.0
Next Policy Review Date	January 2028

Version Control Table

Version	Date	Amended by	Rationale
1.0	07/01/2025		The version drafted for committee approval
1.1			
1.2			

Guidance on Version Control:
The above is an example of how to complete the Version control table.

Versions are 0.1, 0.2 etc until such point as the document is approved. Then it becomes version 1.0. Subsequent edited versions become 1.1, 1.2, or if it's a major update, 2.0. Do not worry about the numbers going up and up its about getting the policy right – it's all fine.

INDUCTION PROCEDURES AND CHECKLIST

Policy Coverage

THE POLICY APPLIES OR COVERS THE FOLLOWING GROUPS			
Type of Learner	**Tick (√)**	**Type of Stakeholder**	**Tick (√)**
Key Stage 4 (KS4) GCSE	√	Education Support Staff	√
Key Stage 5 (KS5) Level 2	√	Administrative Support Staff	√
Key Stage 5 (KS5) Level 3	√	Directors	√
Teaching Staff	√	Employers	
Apprentices	√	Visitors / Contractors	

Contents

1. Policy Statement

EC UTC is committed to raising the standards of numeracy of all its learners, providing them with opportunities across the curriculum to develop the ability to apply numeracy skills effectively and consistently. This will also enhance their development of the skills necessary to cope confidently with the demands of further education, employment and adult life.

2. Procedural Aims

Implementing systematically a Numeracy policy across the curriculum, with all teachers confident in the teaching of numeracy in the context of their subject.

1. To promote Mathematics positively.
2. To provide opportunities for pupils to improve and develop numeracy skills outside the Maths classroom.
3. To promote accuracy in calculation and measurement in various real-life contexts.
4. To improve the interpretation and presentation of graphs, charts and diagrams.
5. To improve reasoning and problem-solving skills.

3. EC UTC Commitment

3.1 Role of the Numeracy Co-ordinator and Maths Teachers

- Work with SLT to determine a strategy for dealing with numeracy across the curriculum.
- Provide CPD to staff as required.
- Monitor and evaluate the implementation of the Numeracy Policy.
- Be aware of the mathematical techniques used in other subjects and provide assistance and advice to other departments, so a correct and consistent approach is used in all subjects.
- Seek opportunities to use topics from other subjects in mathematics lessons.
- Provide resources for use in form lessons.

3.2 Role of Faculty Leads and SLT

- Promote Mathematics positively in your subject areas and the college.
- Support the development and implementation of a whole college numeracy policy.
- To review the curriculum plan and ensure it creates opportunities to enable learners to apply mathematical knowledge, concepts and procedures which is appropriate for learners' age.
- Update the audit of where numeracy is used in various subject areas.

- Share best practices and maintain a bank of ideas on how to promote numeracy in your subject areas.
- Evaluate the implementation of numeracy in your faculties
- Curriculum leads will review the quality of numeracy during learning walks.

3.3 Role of all teachers

- Promote Mathematics positively in your subject areas and the college.
- Be aware of the numeracy skills and ensure learners have the opportunity to develop and apply these number, algebra, measuring and data skills within their subject areas. Teachers do this in a way that is appropriate for their age
- Use the resources provided in form lessons to enhance numeracy skills and promote reasoning and problem-solving.
- Reward learners with Numeracy points on EduLink when they complete tasks.
- Use of the correct mathematical language; such as when referring to decimals like 3.14, say "three point one four" rather than "three point fourteen".
- Liaise with Maths teachers if you need clarity on the use of technical language, notations or calculations.

3.4 Protocol on the use of Calculators

- Learners should be encouraged to bring the following scientific calculators to College:
  - Casio FX-83GTX
  - Casio FX-991EX
- Before completing any calculation, learners should be encouraged to estimate a rough value for what they expect the answer to be. This should be done by rounding the numbers and mentally calculating the approximate answer.
- After completing the calculation, they should be asked to consider whether or not their answer is reasonable in the context of the question.
- Learners should be encouraged to set down method working, whether using a calculator or not. Answers only are not acceptable

4. Implementation

Numeracy will be embedded across the curriculum in the following ways:

4.1 The Numeracy Audit

- The numeracy audit with be completed by Curriculum leads with their team: Numeracy Audit
- The numeracy audit will tie into subject curriculum plans and resource links
- Curriculum leads together with the numeracy co-ordinator will monitor implementation every term.

- Teaching and Learning Lead will evaluate the implementation of the numeracy policy across the whole college through learning walks

4.2 Form time numeracy

- Numeracy packs will be given to form tutors for their classes each term. Form tutors will complete these packs with their classes once a week on the designated day.
- The numeracy PowerPoint to be used by form tutors that go alongside the packs will contain all solutions. This PowerPoint will be available on SharePoint for the whole year ahead: Numeracy in Form time
- The pack will consist of numeracy challenges and numeracy skills that will alternate between weeks.
- The Numeracy challenges promote reasoning and problem-solving in various contexts and learner engagement
- The Numeracy skills will be conducted as quizzes in Form Time to improve engagement and numeracy skills
- Learners will be rewarded on SIMS by the allocation of Numeracy points

4.3 Numeracy Champions

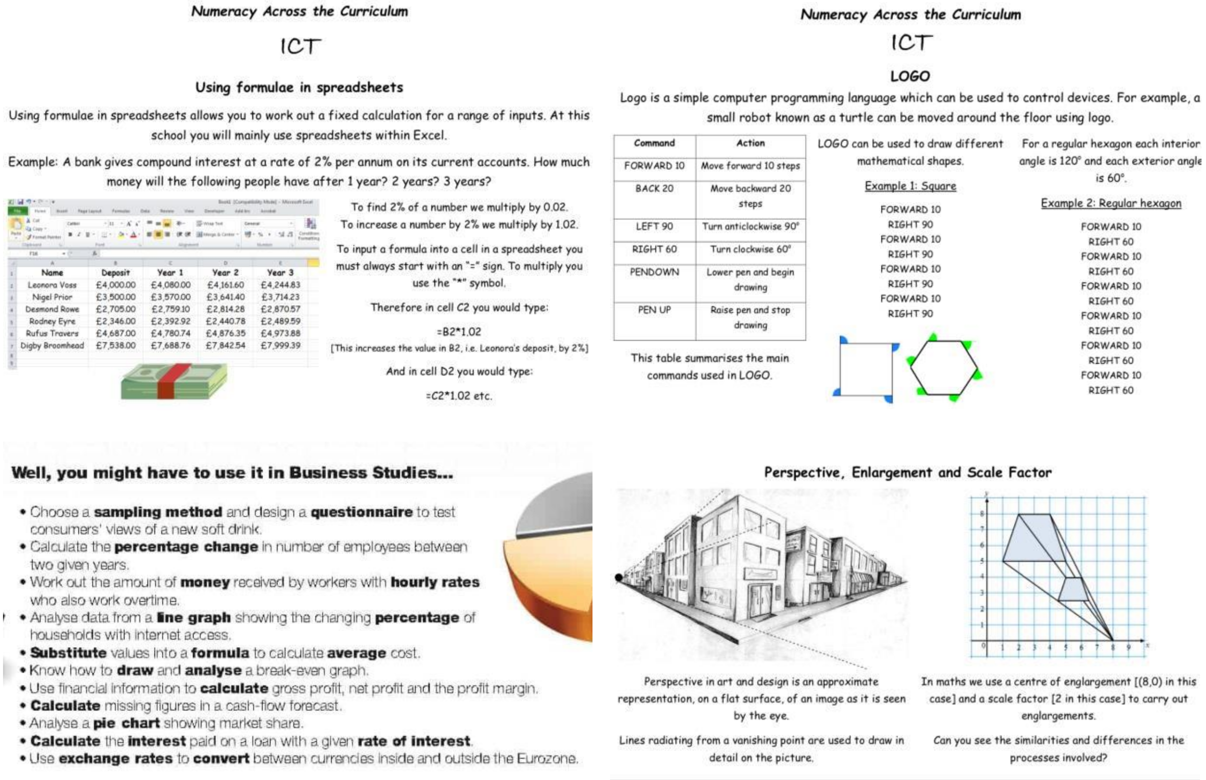
- The role of the numeracy champion is to support form tutors as required in the completion of the form time tasks.
- In each form class, two learners will be identified as numeracy champions by the Mathematics department.
- The numeracy champions will wear a badge to clearly identify themselves.
- Numeracy champions will be reviewed on a termly basis.
- Numeracy champions will be used to help learners that attend the Rising Stars after college club that is being run to close gaps specifically for learners joining in Year 9.

5. Examples of Numeracy Across the Curriculum

The examples below are printed and available in faculty rooms as a reminder of the examples of how numeracy is implemented across all subject areas: [Numeracy examples]

5.1 Examples in English

5.2 Examples in ICT, Business and Digital media



Numeracy Across the Curriculum

ICT

Using formulae in spreadsheets

Using formulae in spreadsheets allows you to work out a fixed calculation for a range of inputs. At this school you will mainly use spreadsheets within Excel.

Example: A bank gives compound interest at a rate of 2% per annum on its current accounts. How much money will the following people have after 1 year? 2 years? 3 years?

Name	Deposit	Year 1	Year 2	Year 3
Leonora Voss	£4,000.00	£4,080.00	£4,161.60	£4,244.83
Nigel Prior	£3,500.00	£3,570.00	£3,641.40	£3,714.23
Desmond Rowe	£2,705.00	£2,759.10	£2,814.28	£2,870.57
Rodney Eyre	£2,346.00	£2,392.92	£2,440.78	£2,489.59
Rufus Travers	£4,687.00	£4,780.74	£4,876.35	£4,973.88
Digby Broomhead	£7,538.00	£7,688.76	£7,842.54	£7,999.39

To find 2% of a number we multiply by 0.02.
To increase a number by 2% we multiply by 1.02.

To input a formula into a cell in a spreadsheet you must always start with an "=" sign. To multiply you use the "*" symbol.

Therefore in cell C2 you would type:

=B2*1.02

[This increases the value in B2, i.e. Leonora's deposit, by 2%]

And in cell D2 you would type:

=C2*1.02 etc.

Numeracy Across the Curriculum

ICT

LOGO

Logo is a simple computer programming language which can be used to control devices. For example, a small robot known as a turtle can be moved around the floor using logo.

Command	Action
FORWARD 10	Move forward 10 steps
BACK 20	Move backward 20 steps
LEFT 90	Turn anticlockwise 90°
RIGHT 60	Turn clockwise 60°
PENDOWN	Lower pen and begin drawing
PEN UP	Raise pen and stop drawing

This table summarises the main commands used in LOGO.

LOGO can be used to draw different mathematical shapes.

Example 1: Square

FORWARD 10
RIGHT 90
FORWARD 10
RIGHT 90
FORWARD 10
RIGHT 90
FORWARD 10
RIGHT 90

For a regular hexagon each interior angle is 120° and each exterior angle is 60°.

Example 2: Regular hexagon

FORWARD 10
RIGHT 60
FORWARD 10
RIGHT 60
FORWARD 10
RIGHT 60
FORWARD 10
RIGHT 60
FORWARD 10
RIGHT 60
FORWARD 10
RIGHT 60

Well, you might have to use it in Business Studies...

- Choose a **sampling method** and design a **questionnaire** to test consumers' views of a new soft drink.
- Calculate the **percentage change** in number of employees between two given years.
- Work out the amount of **money** received by workers with **hourly rates** who also work overtime.
- Analyse data from a **line graph** showing the changing **percentage** of households with internet access.
- **Substitute** values into a **formula** to calculate **average** cost.
- Know how to **draw** and **analyse** a break-even graph.
- Use financial information to **calculate** gross profit, net profit and the profit margin.
- **Calculate** missing figures in a cash-flow forecast.
- Analyse a **pie chart** showing market share.
- **Calculate** the **interest** paid on a loan with a given **rate of interest**.
- Use **exchange rates** to **convert** between currencies inside and outside the Eurozone.

Perspective, Enlargement and Scale Factor

Perspective in art and design is an approximate representation, on a flat surface, of an image as it is seen by the eye.

Lines radiating from a vanishing point are used to draw in detail on the picture.

In maths we use a centre of englargement [(8,0) in this case] and a scale factor [2 in this case] to carry out englargements.

Can you see the similarities and differences in the processes involved?

5.3 Examples in DT and Engineering

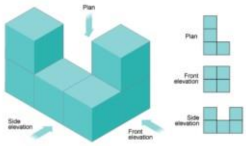
ART & DESIGN

Cubism

George Braque

Violin and Candlestick

1910



Cubism is an early-20th-century avant-garde art movement. In Cubist artwork, objects are analysed, broken up and reassembled in an abstracted form—instead of depicting objects from one viewpoint, the artist depicts the subject from a multitude of viewpoints to represent the subject in a greater context.

In Maths we also draw objects from different viewpoints using plans, elevations or isometric drawing. These are often compared on the same page in order to give a full understanding of what the 3D shape looks like.

How do these mathematical techniques compare with the artistic ones used in Cubism?

ART & DESIGN

Ratio

A ratio tells you how much you have of one part compared to another part.
It is useful if you are trying to mix paints accurately and consistently.

<u>An example</u>

You can make different colours of paint by mixing red, blue and yellow in different proportions.

For example, you can make green by mixing 1 part blue to 1 part yellow.

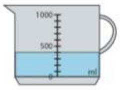
To make purple, you mix 3 parts red to 7 parts blue.

How much of each colour do you need to make 20 litres of purple paint?

.... litres of red and .... litres of blue

Reading Scales

You need to work out how much each division is worth when reading scales.



There are 5 divisions between 0 and 500

Each division is worth
500 ÷ 5 = 100
So the scale reads <u>400 ml</u>

Using the outside scale (g)...
There are 10 divisions between 0 and 50

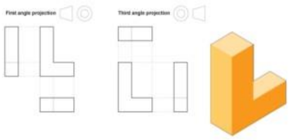
Each division is worth
50 ÷ 10 = 5
So the scale reads <u>70g</u>

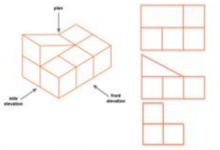
Using the inside scale (oz)...
There are 4 divisions between 0 and 1

Each division is worth
1 ÷ 4 = 0.25
So the scale reads <u>2.5oz</u>

Technical drawings of 3D designs

Technical drawing is an important skill in Design and Technology. Your working drawings should include all the details needed to make your design. In mathematics you will also need to produce accurate drawings which show the exact details of 3D shapes using 2D diagrams.





In D&T, orthographic projection is used to show a 3D object using a front view, a side view and a plan. Orthographic projection may be done using **first angle projection** or **third angle projection**.

In maths we use the same method to show 3D shapes – the views are described as **plan view**, **front elevation** and **side elevation**. An arrow on the 3D image shows which direction is the front.

Ratio

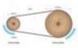
Ratio is how much you have of one thing compared to another.

For levers

Velocity ratio = <u>distance moved by effort</u>
distance moved by load

For pulley systems

Velocity ratio = <u>diameter of driven pulley</u>
diameter of driver pulley



For gears

Gear ratio = <u>number of teeth on driven gear</u>
number of teeth on driver gear

In **D&T** the main ratios you use are the **velocity ratio** in levers and pulley systems and the **gear ratio** when using gears. When you use ratios in D&T they are normally in the form of a calculation involving division.

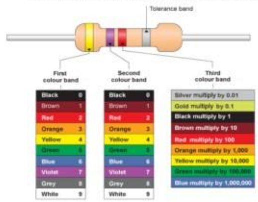
In **maths** we also use ratios to compare quantities.

If there are 15 screws and 12 bolts in a bag, we would say that the **ratio of** screws **to** bolts is
15 : 12
which can be **simplified** to
<u>5 : 4</u>

We also use ratios to share amounts. For example, share a mass of 500 kg in the ratio 2 : 3.
Total number of parts = 2 + 3 = 5
200 ÷ 5 = 40
2 x 40 = 80 and 3 x 40 = 120
<u>80 kg : 120 kg</u>

Percentages

Percentages are used in many aspects of our daily lives.
One example in D&T when you may come across them is when dealing with resistors.



The first three bands on a resistor tell you the resistance.

In this case yellow then violet then red means

Resistance = 4 7 x 100 = 4700 ohms = 4.7 kilo-ohms

The fourth band tells you the tolerance i.e. what accuracy the resistance can be guaranteed to. A red band denotes a tolerance of 2%, gold a tolerance of 5% and silver a tolerance of 10%.

In this case the silver band denotes a tolerance of 10%, this means the actual resistance could be 10% higher or lower than the value given.

To find 10% of a number we divide by 100 (to find 1%) and then multiply by 10.

4.7 ÷ 100 x 10 = 0.47

So the possible range of the resistance is,

4.7 - 0.47 kΩ ≤ resistance ≤ 4.7 + 0.47 kΩ
4.23 kΩ ≤ resistance ≤ 5.17 kΩ

Scale and Scale Factor

In D&T plan drawings, showing a view from above looking down, are often used for room plans, site plans and maps. They should include compass directions, a key and a scale.

The scale on this plan drawing tells us that each centimetre on the drawing, represents 0.5 metres of the actual length of the building.

1 m = 100 cm therefore 0.5 m = 50 cm

So the actual building's dimensions are 50 times bigger than those on the drawing, i.e. the scale factor is 50.

From North to South the length of the building on the drawing measures 7 cm. Therefore to work out how long this is in reality we simply multiply by 50.

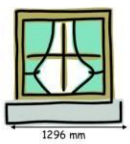
7 x 50 = 350 cm = 3.5 m

Accuracy and Rounding

In both Design and Technology and Mathematics it is at times necessary to give measurements to a certain degree of accuracy. This is usually done by rounding to a given number of decimal places or significant figures. Sometimes you may be asked to round to the nearest whole unit.

The measuring equipment you use will determine what accuracy you can measure something to.

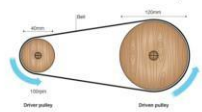
This length has been measured as 1286mm to the nearest mm.



1286 mm = 128.6 cm = 129 cm to the nearest cm

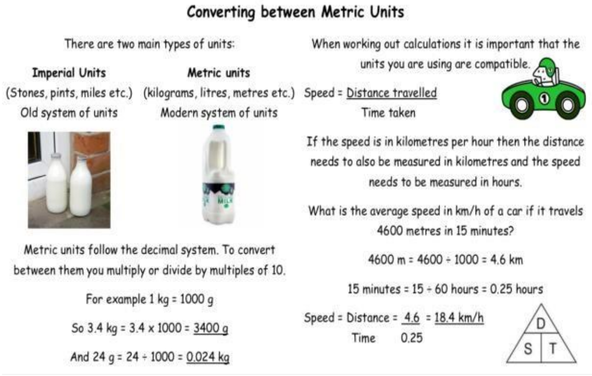
1286 mm = 1.286 m = 1 m to the nearest m

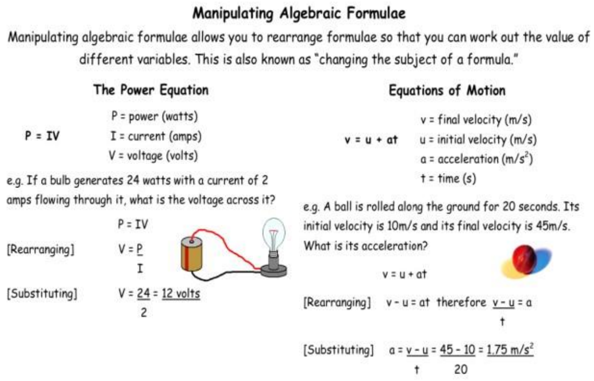
Answers to calculations will often need rounding in order to make them easier to interpret.

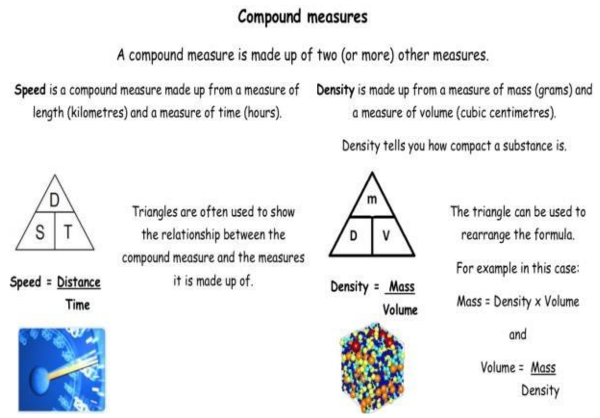


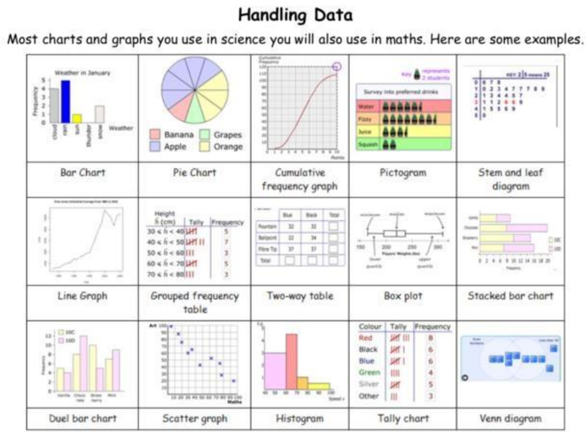
Output speed = Input speed ÷ Velocity ratio = 100 ÷ 3
= 33.3333..... rpm
= <u>33.3 rpm</u> (to 1 d.p.)

5.4 Examples in Science









5.5 Examples in Skills Builder