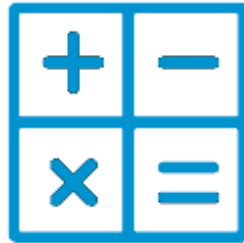


“Nothing but the best will do”



Numeracy at CHS



Departments



Introduction

Welcome to Castlemilk High's Numeracy booklet. In August 2016 a "Numeracy team" was created in Castlemilk High to focus on how we can improve pupils' Numerical skills during S1 – S3.

It was decided a Numeracy booklet would be created which would aid pupils and parents when it came to using Numeracy across the curriculum.

Our aims are:

- To highlight where Numeracy is used in different subjects in Castlemilk High.
- To assist pupils in their layout and calculation of Numerical problems in different subjects.
- To give suggestions to parents of how to support their child's numerical skills.

People often associate Numeracy simply with Maths. While it is undeniable the two are linked, Numeracy is present in all Curriculum areas. With that in mind, the Numeracy team in Castlemilk High asked the rest of the staff to think about where pupils used Numeracy within their subject and to add what they thought would be appropriate and helpful to this booklet.

We hope you will find this an easy to follow and useful document. Our long term goal is to improve the Numerical skills of our pupils and to help parents support their children.

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What is Numeracy?

Numeracy is quite simply working with numbers. We all use Numeracy in our everyday lives and it is so important to ensure that our pupils are as best equipped as possible to deal with real life Numeracy problems as they go into their adult life. We can help them to understand and improve their Numeracy ability by continuously reinforcing good techniques and making sure they know why it is important.

Some examples of Numeracy are: [working with money](#), [using a calendar](#), [following a recipe](#), [telling the time](#), [working out the price of a sale item](#), [estimating prices](#), [measuring a distance](#), [taking information from a chart or graph](#).

Our Mascot - Number Jack

We would like to introduce our Numeracy mascot, **Number Jack**, to you. It is our intention that when teachers are using Numeracy in their lesson they have Number Jack in the class and the pupils will associate those lessons with Numeracy. This will help to dispel any myths that Numeracy is only present in the Maths class.



Ideas for Parents

It is not expected that parents will sit down with their child and test their Numeracy skills. What we hope is that when the opportunity arises parents use real life situations to better develop their child's Numerical skills. Below are some simple examples of how a parent can do this.

- Use a calendar
 - How many days is it until your birthday, Christmas, our holiday?
 - How many days are there in June, July...?
 - How many days are in a week, year...?
- Use a watch
 - Ask your child to tell you the time
 - Buy your child a watch for their birthday or Christmas
 - Ask your child to convert from 12 hour to 24 hour time
- Plan a journey
 - If you are going on a train or bus have a look at the timetable and ask some questions such as: when will you need to leave the house and how long will the journey take?
- Using money
 - Ask your child to work out the change from a purchase
 - Ask your child to work out monthly repayments on anything bought on Hire Purchase or from a catalogue.
 - Ask your child to compare prices to see what the better deal would be. This can be done easily in shops like Asda.
- Play games
 - Play darts to help them with subtraction
 - Play snooker to help them with addition
 - Card games
- Cook
 - Ask your child to follow a recipe. Do they know how to set the scales up to weigh? Do they know how many grams are in a kilogram?

Maths



Numeracy is present in the Maths class every day. The following topics are just a sample of the topics we cover within the Maths department. For a fuller picture of what the pupils are learning then please refer to the pupil's notes jotter, which is either a pink or blue jotter.

Fractions

To find a fraction of an amount pupils are taught to
"divide by the bottom and times by the top"

The layout is:

$$\frac{1}{2} \text{ of } 12 = 12 \div 2 \times 1 \\ = 6$$

$$\frac{3}{4} \text{ of } 16 = 16 \div 4 \times 3 \\ = 12$$



Adding and Subtracting Negative Numbers

A **positive** and a **negative** make a **NEGATIVE**

A **negative** and a **negative** make a **POSITIVE**

Examples 1. $2 + (-7) = 2 - 7$
 $= -5$

2. $-14 + (-1) = -14 - 1$
 $= -15$

3. $8 - (-9) = 8 + 9$
 $= 17$

Multiplying and Dividing Negative Numbers

When multiplying and dividing negatives you **MUST**:

1. Do the calculation first
2. Decide on the sign

$$1. (-3) \times (-4) = 12$$

$$2. 4 \times (-7) = -28$$

$$3. 100 \div (-5) = -20$$

$$4. -99 \div (-3) = 33$$

A **positive** and a **negative** make a **NEGATIVE**

A **negative** and a **negative** make a **POSITIVE**

How do you work out non-calculator percentages?

$$50\% \rightarrow \frac{1}{2}$$

$$25\% \rightarrow \frac{1}{4}$$

$$75\% \rightarrow \frac{3}{4}$$

$$10\% \rightarrow \frac{1}{10}$$

$$20\% \rightarrow \frac{1}{5}$$

$$33\frac{1}{3}\% \rightarrow \frac{1}{3}$$

$$66\frac{2}{3}\% \rightarrow \frac{2}{3}$$

$$1\% \rightarrow \frac{1}{100}$$

Non-Calculator Percentages

To find a percentage of an amount you need to remember the relevant fraction.

Examples

$$1. 10\% \text{ of } \pounds 450 = \frac{1}{10} \text{ of } \pounds 450 \\ = \pounds 45$$

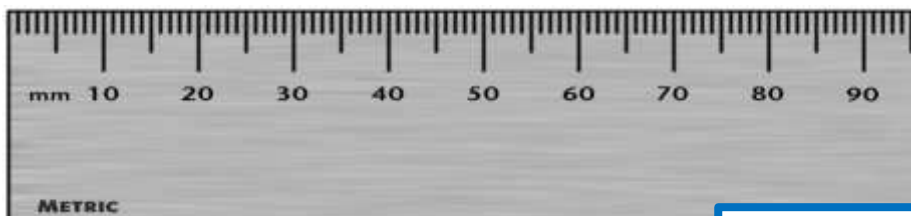
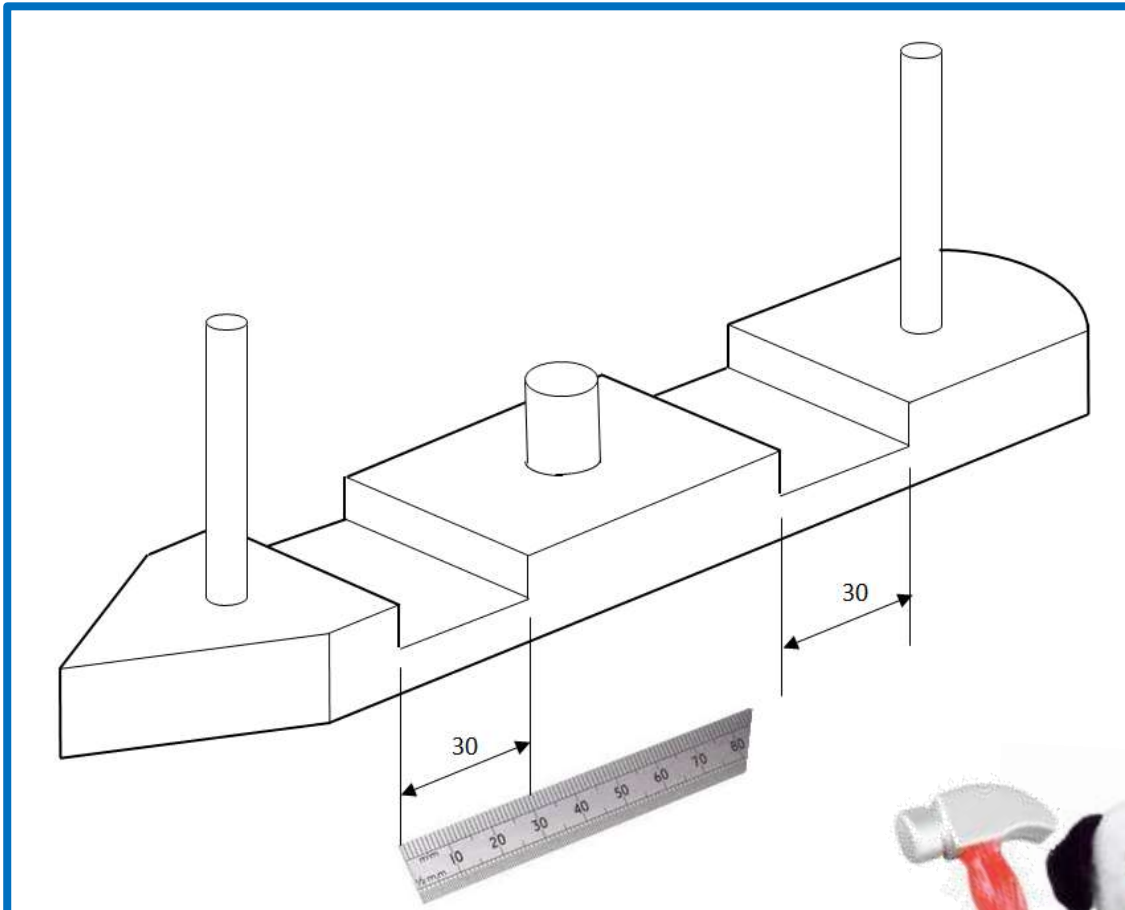
$$2. 66\frac{2}{3}\% \text{ of } \pounds 33 = \frac{2}{3} \text{ of } \pounds 33 \\ = \pounds 22$$

$$3. 25\% \text{ of } \pounds 80 = \frac{1}{4} \text{ of } \pounds 80 \\ = \pounds 20$$

Technical



Numeracy is an essential skill for Technical Subjects. Accurate measurement, as in the diagram below, is fundamental to successfully producing work of a high standard.



You should ALWAYS start measuring from the zero edge when using a ruler!

Art & Design



Using a 16 Square grid to accurately scale up an A4 still life photograph. The ruler is used to help the pupil draw out and measure the grid accurately in centimetres into rectangular sections, on both the photograph and the pupils drawing.



EXERCISE 7: Find the scale

The diagram shows a 16x10 grid. A yellow vertical bar is on the left. A small green hexagon labeled 'Object' is positioned between the 4th and 10th vertical grid lines, with a height of 6 cm. A larger green hexagon labeled 'Drawing' is positioned between the 10th and 16th vertical grid lines, with a height of 18 cm.

PE



We use numbers every day in PE to measure performance, provide feedback and record outcomes. Being able to work with numbers is critical to success.

When we train to improve our fitness it is important that we make sure our Heart Rate is in our Training Zone.

To calculate your training zone you need to use the following equation;

220 minus YOUR AGE

Then find 60% and 80% of that number

Example

- Start with the number 220
- Take away your age (eg for a 14 year old $220 - 14 = 206$)
- To improve fitness you need to be working at 60%-80% of your maximum Heart Rate
- 60% of 206
 - 206 divided by 10 = 20.6
 - 20.6×6
 - = 123.6
 - Round this number to the nearest whole number = **124 beats per minute**
- Next, calculate it for 80% of 206
 - 206 divided by 10 = 20.6
 - 20.6×8
 - = 164.8
 - Round this number to the nearest whole number = **165 beats per minute**

Your Training Zone is 124-165 bpm (Beats per minute)



EFFORT	EFFECT
MAXIMUM 90-100%	BENEFITS: HELPS FIT ATHLETES DEVELOP SPEED
HARD 80-90%	BENEFITS: INCREASES MAXIMUM PERFORMANCE CAPACITY FOR SHORTER SESSIONS
MODERATE 70-80%	BENEFITS: IMPROVES AEROBIC FITNESS
LIGHT 60-70%	BENEFITS: IMPROVES BASIC ENDURANCE AND FAT BURNING
VERY LIGHT 50-60%	BENEFITS: HELPS WITH RECOVERY

Social Subjects



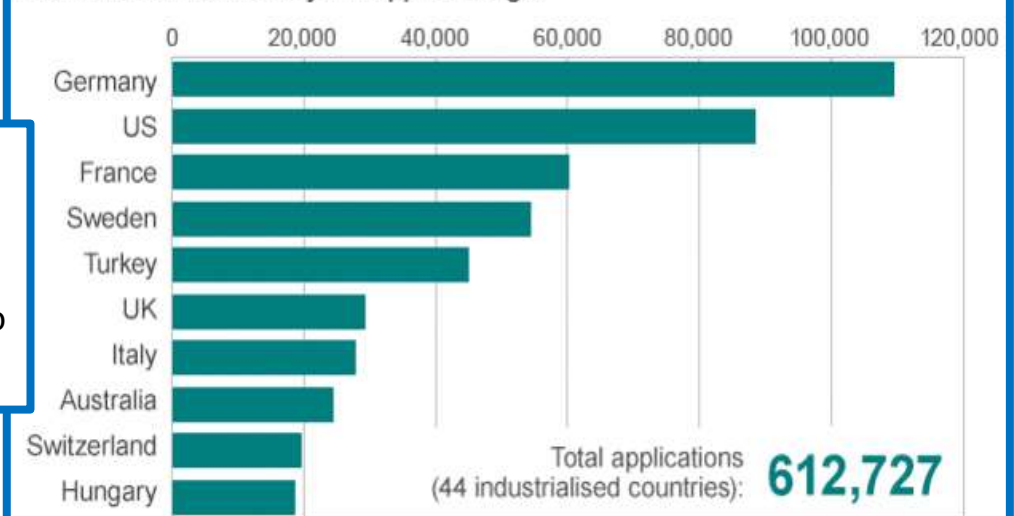
In Social Subjects we frequently have to interpret graphs, pie charts and numerical tables as we use evidence to support arguments. Often, this is about drawing conclusions about the social world, past and present.

United Kingdom	UK and China Compared 2013-2016 (World Bank)	China
64 Million People	<u>Population</u>	1.35 Billion People
81.5 years	<u>Life Expectancy</u>	75.2 Years
4 per 1000	<u>Infant Death Rate</u>	9 per 1000
99.9 percent	<u>Literacy Rate</u>	96.4 %
\$45,603	<u>Average income per person</u>	\$7,503
5.4 %	<u>Unemployment</u>	4.1 %

Life expectancy in the UK is higher than in China by around 6



Where do the world's asylum applicants go?



Source: UNHCR

The country that the world's asylum seekers apply to most is Germany. Around 110,000 apply to go there

Modern Languages



In Modern Languages we will often use every day examples of numeracy to help us understand a new language. For example below, students are asked to calculate how long an event has lasted. Although this requires a knowledge of French there is an underlying numeracy component.

Starter: Can you work out how long each event lasts? Give your answers in French.

eg _____ heure(s) et _____ minutes.

1. Les cours commencent à huit heures et demie, et finissent à quatre heures. La journée dure....

2. Le concert commence à huit heures et finit à onze heures vingt. Le concert dure....

3. Le train part à trois heures moins le quart, et arrive à quatre heures et quart. Le voyage dure....

4. Le film commence à sept heures et demie et finit à neuf heures vingt cinq. Le film dure....



Drama



Although we do not use Numeracy on a regular basis, dramas have to be divided into scenes with times and places outlined. So here are some examples of how we use it:

Scene No:	Time	Place	Action
1	9am	School Social Area	The HT makes an announcement at assembly
2	11am	The Playground	Pupils make plans for the big dance competition
3	3pm	At home	Kids start to practise their dance when there is an accident!
4	8pm	At Casualty	Best dancer's leg is broken and they need to plan for a substitute. Someone has a great idea!



In addition when we are using **stage lighting and sound** we have to refer to numbers e.g.

Cue#	Word/Visual Cue	Lights and levels	Fade time	Effect created	Comments
1	(once all actors are on stage)	3/10 5/8 7/8 9/10	3 seconds	Inside of the school early morning	Wait for all cast to be positioned
2	'See you at break!'	Blackout	3 seconds	End of scene 1	
3	School bell	1/10 3/10 6/10 11/7	3 seconds	Warm sunny day in the playground	
4	'See you later'	4/10 6/10 8/10	3 seconds	Several hours later at home	Cross fade



Converting between Metric Units

There are two main types of units:

Imperial Units

(Stones, pints, miles etc.)

Old system of units



Metric units

(kilograms, litres, metres etc.)

Modern system of units



Metric units follow the decimal system. To convert between them you multiply or divide by multiples of 10.

For example 1 kg = 1000 g

So 3.4 kg = $3.4 \times 1000 = 3400$ g

And 24 g = $24 \div 1000 = 0.024$ kg

When working out calculations it is important that the units you are using are compatible.

$$\text{Speed} = \frac{\text{Distance travelled}}{\text{Time taken}}$$



If the speed is in kilometres per hour then the distance needs to also be measured in kilometres and the speed needs to be measured in hours.

What is the average speed in km/h of a car if it travels 4600 metres in 15 minutes?

$$4600 \text{ m} = 4600 \div 1000 = 4.6 \text{ km}$$

$$15 \text{ minutes} = 15 \div 60 \text{ hours} = 0.25 \text{ hours}$$

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{4.6}{0.25} = 18.4 \text{ km/h}$$



Compound measures

A compound measure is made up of two (or more) other measures.

Speed is a compound measure made up from a measure of length (kilometres) and a measure of time (hours).

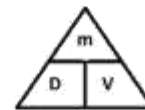


$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

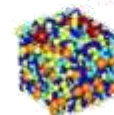


Density is made up from a measure of mass (grams) and a measure of volume (cubic centimetres).

Density tells you how compact a substance is.



$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$



Triangles are often used to show the relationship between the compound measure and the measures it is made up of.

The triangle can be used to rearrange the formula.

For example in this case:

$$\text{Mass} = \text{Density} \times \text{Volume}$$

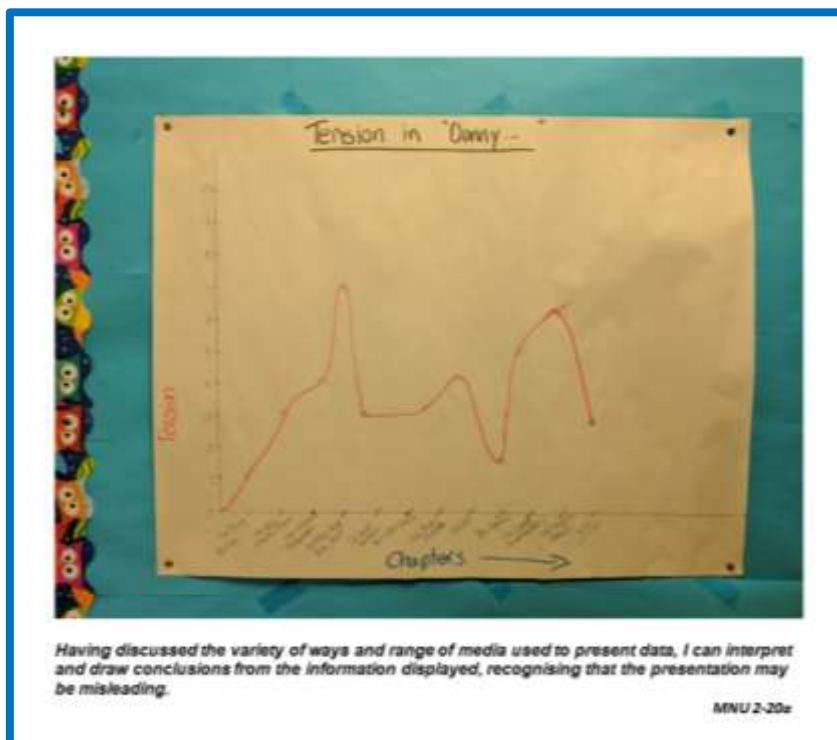
and

$$\text{Volume} = \frac{\text{Mass}}{\text{Density}}$$

English






While not ostensibly associated with English per se, numeracy skills are nevertheless developed throughout the English BGE curriculum. Here are a number of examples:

1. Tension Graph: Pupils plot points in a graph indicating the rising and falling tension throughout the chapters of a novel.
2. Interpreting Statistics: Pupils must convert statistical information into their own words when writing broadly discursive essays.
3. Ordinal Numbers used as linking words/sentence openers: Pupils learn how to use ordinal numbers effectively as sentence openers.
4. Poetry:
 - a. Syllables and metre: Pupils must count syllables in order to ensure a line of poetry's rhythm is consistent.
 - b. Line length and stanzas: Pupils must be aware of line number in a variety of poetic genres including sonnets, limericks and haikus.



Music

The importance of counting and rhythm in music

	Semibreve	4 beats
	Minim	2 beats
	Crotchet	1 beat
	Quaver	$\frac{1}{2}$ beat
	Semiquaver	$\frac{1}{4}$ beat

4 semiquavers looks like this:  This equals 1 beat.

2 quavers look like  this: This equals 1 beat.

A dotted note adds on half the value of the original note e.g.

A  (dotted minim) = 3 beats  2 beats + half its original value



