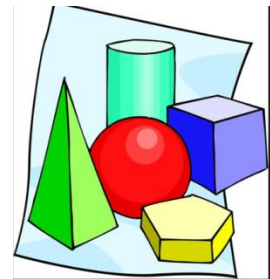
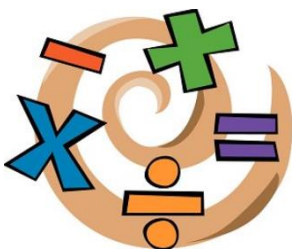




Kingsbury School

Numeracy Policy



Reviewed Jan 16

Introduction

Our aim is to raise the achievement of all pupils by developing the application of their numeracy skills across all areas of the curriculum. This will ensure that all pupils develop their mathematical understanding and will enable them to cope with the future demands of further education, employment and adult life.

Definition of Numeracy

Numeracy is a proficiency, which involves confidence and competence with numbers and measures. It requires an understanding of the number system, a repertoire of computational skills and an inclination and ability to solve number problems in a variety of contexts. Numeracy also demands practical understanding of the ways in which information is gathered by counting and measuring, and is presented in graphs, diagrams, charts and tables.

(National Numeracy Strategy)

Policy Aims

We need to:

1. Promote numeracy throughout the curriculum
2. Raise the standards of numeracy by enhancing the quality of teaching and learning
3. Develop the cross curricular use of numeracy
4. Ensure numeracy is taught effectively across the curriculum

The Numerate Student

1. All students should:
 - Have an understanding of the size of a number and where it fits into the number system
 - Be able to do simple addition, subtraction, multiplication and division using either a mental or written method
 - Make sensible estimates of measurement
2. More able students should:
 - Use mental methods for addition, subtraction, multiplication and division
 - Be able to convert between metric units
 - Have knowledge of fractions, decimals and percentages and the calculations involved with each of them
 - Be able to interpret simple diagrams, charts and graphs
 - Apply arithmetic skills to number problems
3. High ability students should:

- Perform calculations mentally, including three digit numbers and decimals
- Convert between fractions, decimals and percentages
- Explain their methods and reasoning for solving a problem using the correct mathematical language
- Have a range of strategies for checking answers to judge whether they are correct
- Make and explain predictions from data in a graph, chart or table

Department Guidelines

Within their own subject, teachers should:

1. Have high expectations of the students and ensure that the numerical content is of a high standard
2. Encourage pupils to show their working out and not just give answers as this will improve their exam technique
3. Encourage pupils to use estimation to check their answers are realistic
4. Recognise that there is more than one correct method to solve a mathematical problem
5. Allow and encourage pupils to discuss the methods they have used to solve a problem as this helps to further their understanding
6. Promote the use of non-calculator methods whenever possible
7. Encourage students to use the correct mathematical language
8. When an observation or learning walk is conducted, should the observer see incorrect use of numeracy they should consult SEV/TON/MAR for support in addressing this weakness
9. If you are teaching a numeracy topic for the first time please consult a member of the mathematics faculty to ensure it is correctly delivered

Links between mathematics and other subject areas

Art

- Many patterns and constructions are based on properties of shapes, including symmetry.
- Designs can be enlarged or reduced using the ideas of ratio and scale factors.
- When using paints pupils will need to mix colours, this involves proportion and ratio to produce different shades and colours.
- Proportion is used when learning how to draw a human face.

Health and social care

- Students use graphs, charts and measuring skills when looking at nutrition and growth rates.

English

- Students use and analyse statistics in order to understand the writers purpose.
- Data and graphs can be analysed as part of understanding a non-fiction text.
- Time lines can be used to show the change in a characters emotion over time.
- The Dewey classification system is an excellent example of decimal ordering.

Geography

- Reading maps involves scales, grid references, ratio, directions, area and distances.
- Graphs and charts are interpreted and analysed to show trends in data.
- Students will need to collect, analyse and display data in a suitable format to explain patterns and changes.
- Pupils will need to calculate averages to be able to show that their data supports an argument.
- Exponential growth and decay linked to population.

History

- An appreciation of time and the ability to put a series of dates into chronological order.
- Students use statistics when looking at changes over a period of time.
- Pupils make use of graphs that show data that they need to interpret correctly.

ICT

- Students may collect and analyse data in a variety of different software packages.

- When using Excel spreadsheets and appreciation of algebra, formula and how to display data is essential.

MFL

Students use numbers - both in figures and words (where appropriate) - in the target language

- To count or sequence events.
- To express a percentage or a proportion.
- To measure and make comparisons.
- To understand and interpret simple statistics presented as a graph or in an article.
- To understand and use dates (day, month, year).
- To understand and use prices and how currency conversion works.
- To understand and use times using the conventions of both the 12 and the 24 hour clock/.

Music

- Students will use number when counting beats.
- The application of number is also used when recognising patterns, sequences, order and rhythmic relationships in music.

PE

- Measurements are often taken in PE, including the measuring of height, weight, distance, time and speed.
- Movement and direction is used within dance, gymnastics and team sports.
- Mathematics is also used when planning tournaments, scoring in games.
- Pupils will look at beats in dance and shapes in gymnastics.
- Students will look at angles, for example, trajectory in javelin.

RE

- The discussion of moral and social issues can lead to the use of primary and secondary data and the interpretation of graphs, charts and data to make reliable conclusions that aren't based on biased information.

Science

- Students will complete experiments and investigations where they need to accurately measure distances and quantities, estimate outcomes and record results in tables and graphs.

- Results need to be analysed (this may include calculating statistics) and conclusions drawn from an experiment or investigation.
- At a higher level pupils will be required to use algebra when substituting values into a formula.
- In all three sciences, pupils will need to understand how to read axes and draw lines of best fit, calculate averages from a set of data and look at gradients as a rate of change.
- Throughout the year 10 chemistry course, pupils will use the idea of proportion in the context of surface area, extract information from charts, perform calculations using fractions and percentages and use ideas of probability in the context of risks.
- During year 11 chemistry lessons, students will balance chemical equations, use scales when looking at atomic structure and apply ratio to ionic compounds. They will also look at rates of reaction, calculating a percentage of an element in a compound and calculating energy changes using bond energies.
- Students in year 7 physics lessons will look at energy transfer diagrams and calculate energy efficiency using a given formula.
- Year 8 pupils will use various calculations involving forces during physics lessons.
- Students in years 10 and 11 physics lessons will draw graphs and use a range of formulae. Higher ability pupils will also look at rearranging formulae.

Technology and Catering

- The use of measurements is essential in all areas of technology, this includes the conversions of metric and imperial units.
- Ratio is important when looking at scale drawings and recipes.
- Plans and elevations are used when designing products.
- Shapes and tessellations are used when looking at designs in textiles.
- Calculations with money may be used to determine the cost to produce an item.

Media Studies

- Students often look at statistics and figures when analysing audience data.
- Analysis of questionnaire data is part of their coursework requirements.
- Sequencing and ordering are key skills when producing.

Drama

- Students need to understand timings when performing a play/scene.
- Shape, space and area should be considered when constructing stage plans.
- Students will need an appreciation of angles and percentages when looking at lighting and the brightness of lighting.

Tutor & Enrichment Activities

- Numeracy activities should be incorporated within tutor time on a weekly basis
- There will be a STEM Club or numeracy focus incorporated within at least one block of enrichment activities each school calendar year

Support Software

- Every student has an individual login and password for MyMaths which allows them access to support material for the full curriculum for KS3 KS4 and KS5. Any student who misplaces their login details should speak to their maths teacher in the first instance.
- Year 11 students will have an individual login for Conquer Maths for further revision material

Example methods - no one method has to be used, pupils generally use the method they are most comfortable with. The mathematics faculty usually teach traditional methods but any suitable one can be used.

Methods for Addition	Methods for Subtraction									
$\begin{array}{r} 2167 \\ + 251 \\ \hline 2418 \\ 1 \end{array}$ <p>This method involve an understanding of carrying</p>	$\begin{array}{r} 1452 \\ -228 \\ \hline 1224 \end{array}$ <p>This method involves an understanding of borrowing</p>									
$\begin{aligned} 59+39 &= 50 + 9 + 30 + 9 \\ &= 80 + 18 \\ &= 98 \end{aligned}$	$\begin{array}{r} 1452 \\ -228 \\ \hline -6 \\ +30 \\ +200 \\ +1000 \\ \hline 1224 \end{array}$ <p>This method involves an understanding of negatives</p>									
$\begin{aligned} 59+39 &= 60 + 40 - 2 \\ &= 100 - 2 \\ &= 98 \end{aligned}$	$\begin{aligned} 80-48 &= 80 - 50 + 2 \\ &= 30 + 2 \\ &= 32 \end{aligned}$									
Methods for Multiplication	Methods for division									
$\begin{aligned} 20 \times 30 &= (2 \times 10) \times (3 \times 10) \\ &= 2 \times 10 \times 3 \times 10 \\ &= 6 \times 10 \times 10 \\ &= 600 \end{aligned}$	$\begin{aligned} 458 \div 3 \\ 3 \times 100 &= 300 \\ 3 \times 50 &= 150 \\ 3 \times 2 &= 6 \\ 3 \times 152 &= 456 \\ 458 \div 3 &= 152 \text{ remainder } 2 \end{aligned}$									
32×41 <table border="1" data-bbox="193 1317 667 1442"> <tbody> <tr> <td>x</td> <td>30</td> <td>2</td> </tr> <tr> <td>40</td> <td>1200</td> <td>80</td> </tr> <tr> <td>1</td> <td>30</td> <td>2</td> </tr> </tbody> </table> $1200 + 80 + 30 + 2 = 1312$	x	30	2	40	1200	80	1	30	2	<p>To get a remainder answer:</p> $\begin{array}{r} 210 \\ 4) 842 \\ \hline 8 \\ \hline 0 \\ 2 \\ \hline 20 \end{array}$ <p>210 remainder 2</p>
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15×23 using long multiplication $\begin{array}{r} 15 \\ \times 23 \\ \hline 45 \quad (15 \times 3) \\ 300 \quad (15 \times 20) \\ \hline 345 \end{array}$	<p>To get a decimal answer:</p> $\begin{array}{r} 210.5 \\ 4) 842.0 \\ \hline 8 \\ \hline 0 \\ 20 \end{array}$									