

## Numeracy

*“Good numeracy is the best protection against unemployment, low wages and poor health.”*

Andreas Schleicher, OECD.

What is numeracy?

By numeracy we mean the ability to use mathematics in everyday life.

Being numerate means having the confidence and skill to use numbers and mathematical approaches in all aspects of life - at work, in practical everyday activities at home and beyond, as consumers, in managing our finances, as parents helping our children learn, as patients making sense of health information, as citizens understanding the world about us. We have worked with experts to define these as the Essentials of Numeracy.



Numeracy complements literacy and is sometimes called ‘mathematical literacy’. Both skills are needed in order to function fully in modern life. It is a proficiency that is developed mainly in Mathematics but also in other subjects.



Being numerate is as much about thinking and reasoning logically as about 'doing sums'.

It means being able to:

- Interpret data, charts and diagrams
- Process information
- Solve problems
- Check answers
- Understand and explain solutions
- Make decisions based on logical thinking and reasoning.

# 49%

49% of the working-age population of England have the numeracy level that we expect of primary school children.

# £20bn

The total cost to the UK economy (to the Exchequer, employers and individuals) has been put at £20 billion a year.

# £460

Estimated cost per year to each of the 20 million working adults with low numeracy





*Poor numeracy is a pervasive but hidden issue across the UK workforce - impacting negatively on individuals and the productivity of UK plc. We clearly need to do things differently given that approximately half the adult population have the number skills that we expect of primary school children.*



**Lord Gus O'Donnell,  
Chair of Frontier Economics and former Cabinet Secretary**

## Our Mission Statement

Horizon Community College is committed to raising the standards of numeracy of all of its students, so that they develop the ability to use numeracy skills effectively in all areas of the curriculum and the skills necessary to cope confidently with the demands of further education, employment and adult life.

Developing the numeracy skills of all students is a priority at Horizon. All subjects explore the numeracy skills required in their curriculum and develop understanding of these with students, highlighting its importance outside of the Maths classroom. It is imperative that students identify how numeracy underpins contexts in all subjects. Within Maths we use problem solving and real life contexts to relate skills to everyday scenarios.

Students in years 7, 8 and 9 complete Numeracy Ninjas twice a week to reinforce their mental and written calculations. This entails 30 questions being completed within five minutes. The key skills being covered underpins approximately 60% of the Mathematics GCSE specification.

In October we hosted our first numeracy week. There were puzzles across school, numeracy starters in all lessons and teachers from all subjects were taking part/competing against students in Numeracy Ninjas. We were also lucky enough to welcome Dr Katie Steckles from 'Think Maths' into school. She hosted four sessions in the theatre to captivated audiences, using hands-on topology activities (some involving möbius loops) to help students reflect on how their brains learn mathematics. For our older students she looked into the hidden maths in technology.

There has been an increase in the numeracy skills required in all subjects across the curriculum. , To improve these skills is a whole-school matter and every department is making a contribution towards teaching numeracy and other mathematical skills so that pupils become confident at tackling mathematics in any context. Poor numeracy skills hold back pupils' progress and can lower their self-esteem. At Horizon we are using this opportunity to consolidate and enhance mathematical skills. We use a logo to highlight when numeracy skills are being taught and we have developed a common policy for calculations. This is to support students in seeing their skills in one subject being transferable to another.



### School vs Real world

#### School Mathematics

$$2x - 5 = 13$$

**Solve for x**

#### Real world Mathematics

A monthly train ticket costs £194.

The daily return fare is £13.50.

**Should you buy individual daily tickets, or a monthly season ticket?**

*Above all, it is imperative that we encourage our students to appreciate the importance of numeracy, foster their enjoyment of numeracy and build their self-belief.*



Attitudes: 'I can't do; the problem of attitudes: the social acceptability of saying 'I can't do maths', the belief that maths doesn't really matter that much, that it is an obscure subject often feared and best avoided. This is not something that adults would brag about in those countries that outperform the UK both in numeracy and productivity. National Numeracy has challenged this approach at every opportunity since our inception in 2012 and there have been some successes – for example, the cosmetics giant L'Oréal agreed to drop the 'maths

was never my thing' line from an advertising campaign. But challenges arise from unexpected quarters: in 2016 The Times of India reported Prince William quipping to a no doubt puzzled audience of students in Mumbai that he was 'terrible at maths'. Clearly the problem remains deepseated and nuanced – and more needs to be done to tackle it and thereby encourage those whose opportunities to get on in life are limited by their poor numeracy.

For more information, ideas for numeracy at home and to test your numeracy level please try the following website.

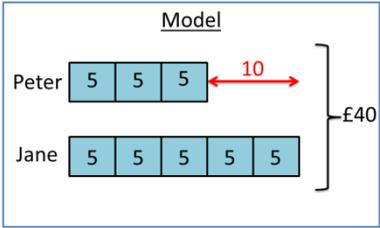
[www.nationalnumeracy.org.uk](http://www.nationalnumeracy.org.uk)

### Bar Models and Double Number Lines

Often students are confident at carrying out calculations but when a question is worded it can be difficult to recognise what you are being asked to do. As a Mathematics department we have received a lot of training on the use of bar modelling and double number lines to support students accessing more difficult problems and interpreting difficult questions accurately. We will be providing this training to all teachers across the college over the year. Please see below for some examples.

<p>Encik Hassan gave <math>\frac{2}{5}</math> of his money to his wife and spent <math>\frac{1}{2}</math> of the remainder. If he had \$300 left, how much money did he have at the start?</p>		<p>Peter and Jane share £40 in the ratio of 3:5 How much money does each person get?</p>	
<p><b>Model</b></p>	<p><b>Calculations</b></p> $2 \times 300 = 600$ $600 \div 3 = 200$ $5 \times 200 = 1000$	<p><b>Model</b></p>	<p><b>Calculations</b></p> $40 \div 8 = 5$ $\text{Peter: } 3 \times 5 = 15$ $\text{Jane: } 5 \times 5 = 25$

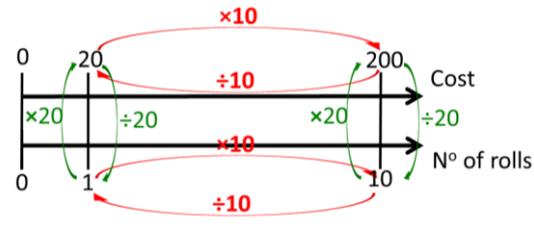
Peter and Jane share £40 in the ratio of 3:5  
How much more money does Jane have than Peter?



**Calculations**

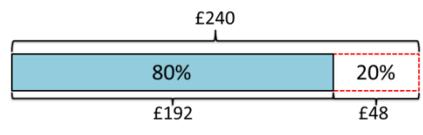
$40 \div 8 = 5$   
Peter:  $3 \times 5 = 15$   
Jane:  $5 \times 5 = 25$   
 $25 - 15 = 10$

**Double number line:**



**Percentage Increase/Decrease:**

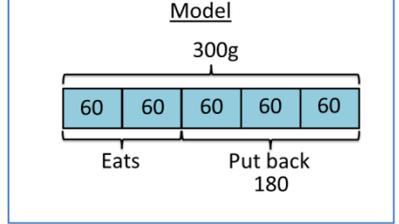
Decrease £240 by 20%



20% of 240 = 48      or      80% of 240 = 192  
 $240 - 48 = 192$

**Fractional Increase/Decrease:**

Matthew has a 300g block of cheese. He eats  $\frac{2}{5}$  of the cheese and puts the rest back in the fridge.  
How much cheese did Matthew put back in the fridge?



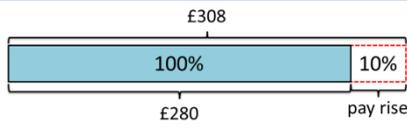
**Calculations**

$300 \div 5 = 60$   
 $3 \times 60 = 180$

The following questions throw up many common misconceptions as they are requiring students to find the original quantity. Students will 'divide by 10 to find 10%' but for these questions they have not been given 100% and therefore this method is not appropriate.

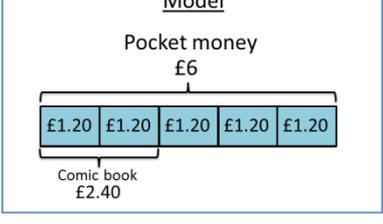
**Finding the original amount:**

Jane got a 10% pay rise.  
She now gets paid £308 per week.  
How much did she get paid before her rise?



$\frac{£308}{11} = £28... \quad 10\%$   
 $\frac{£308}{110} = £2.80... \quad 1\%$

Jenny spent  $\frac{2}{5}$  of her pocket money on a comic book.  
The price of the comic book was £2.40  
How much pocket money did Jenny get?



**Calculations**

$2.40 \div 2 = 1.20$   
 $5 \times 1.20 = 6$