Calculations Policy

Our Mission Statement

At Hayle Academy we are committed to raising the standard of every student.   We aim to develop their ability to use numeracy skills effectively, not only in Maths but in all areas of the Curriculum.   We want students to be confident in their numeracy skills in school, further education, employment and adult life.

Addition & Subtraction

Addition   3456 + 975

```
    3 456          Estimate
+    975           3 500 + 1 000 = 4 500
  4 431
  1  1 1
```

Subtraction by decomposition   8003 – 2569

```
      7 9 9 1       Estimate
eg 8 0 0 3         8 000 – 3 000 = 5000
   -2 5 6 9
    5 4 3 4
```

Addition and subtraction of decimals is completed in the same way but reminders may be needed to maintain place value by keeping decimal points in line underneath each other.

Multiplication

```
    3 2 7
  x   5 3
    9 8 1       ←——— 327 x 3
  1 6 3 5 0     ←——— 327 x 50
  1 7 3 3 1
```

Conventional multiplication as set out above may not suit all pupils and teachers should be aware that other methods may be employed by some pupils.
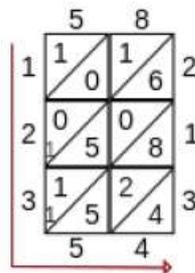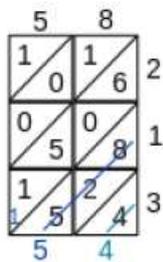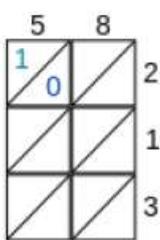
Example 1 - Partitioning   327 x 53   Estimate: 300 x 50 = 15 000

X	300	20	7	Total
50	15 000	1000	350	16 350
3	900	60	21	981
Total	15900	1060	371	**17331**

Example 2 – Lattice Multiplication   58 x 213

After all the cells are filled in this manner, the digits in each diagonal are summed, working from the bottom right diagonal to the top left. Each diagonal sum is written where the diagonal ends. If the sum contains more than one digit, the value of the tens place is carried into the next diagonal (see Step 2).

Numbers are filled to the left and to the bottom of the grid, and the answer is the numbers read off down (on the left) and across (on the bottom).

Division

Bus Shelter Method

$7 \overline{)252}$ The first step is how many 7s in 2 – the answer is 0, with 2 left over, so we put the 0 above the bus stop and carry the 2

$7 \overline{)2^2 52}$ with 0 above

$7 \overline{)2^2 52}$ The next step is how many 7s in 25. We can see from our times table that 3x7=21, so the answer is 3, with 4 left over. $7 \overline{)2^2 5^4 2}$ with $0\ 3$ above

$7 \overline{)2^2 5^4 2}$ with $0\ 3$ above The final step is how many 7s in 42. Our times table says 6x7 = 42 so the answer is 6, with nothing left over. $7 \overline{)2^2 5^4 2}$ with $0\ 3\ 6$ above

So, $252 \div 7 = 36$

Order of Operations

It is important that pupils follow the correct order of operations for arithmetic calculations. Most will be familiar with the mnemonic:

BIDMAS. Brackets, **I**ndices, **D**ivision, **M**ultiplication, **A**ddition, **S**ubtraction

$5 + 3 \times 4$
means
$5 + 12$
$= \underline{17}$ ✓

NOT $5 + 3 \times 4$
means 8×4
$= \underline{32}$ **X**

The important facts to remember are that the **B**rackets are done first, then the **P**owers, **M**ultiplication and **D**ivision and finally, **A**ddition and **S**ubtraction.

Teaching for Depth and Understanding

At Hayle Academy we believe in developing a depth of understanding for pupils of all abilities, which requires teaching fewer topics but in much greater detail. This allows teachers to differentiate tasks with greater ease and success. Rather than accelerating high attaining students through topics, they are challenged to delve deeper into it and solve problems with very little structure, a much more Mastery approach to learning. To support

middle or lower attaining students, tasks can be scaffolded in different ways. This enables all students to access the same curriculum, working on the same concepts and skills at the same time.

The key to differentiating through depth of understanding is to plan carefully considered tasks and lessons. A good task should enable all students to access the content and to engage with it. It should be accessible to all students and open to a variety of problem solving approaches. A good task should encourage students to think deeply and to make connections to different areas of mathematics; it should inspire students to want to know more and to engage fully with the concepts being studied.

Differentiating for depth of understanding allows teachers the time to focus on a topic until all students have gained in competence. It allows students to access the entire curriculum and master the skills they meet, equipping them to face the challenges of future topics with greater confidence.

Problem Solving

The development of the skills of problem solving is considered very important at Hayle Academy. Students learn problem solving skills not just by doing problems but by discussing how they are solved. They are given varied opportunities to tackle problems in mathematics. Students at Hayle Academy are to be taught the skills and strategies needed for successful problem solving.

Cross Curricular Links

The maths faculty works closely with the other faculties to ensure that our calculation strategies are common where topics overlap and the language that we use is the same. For example we work together to ensure consistent teaching strategies on percentages, data handling and speed, distance, time problems in science.