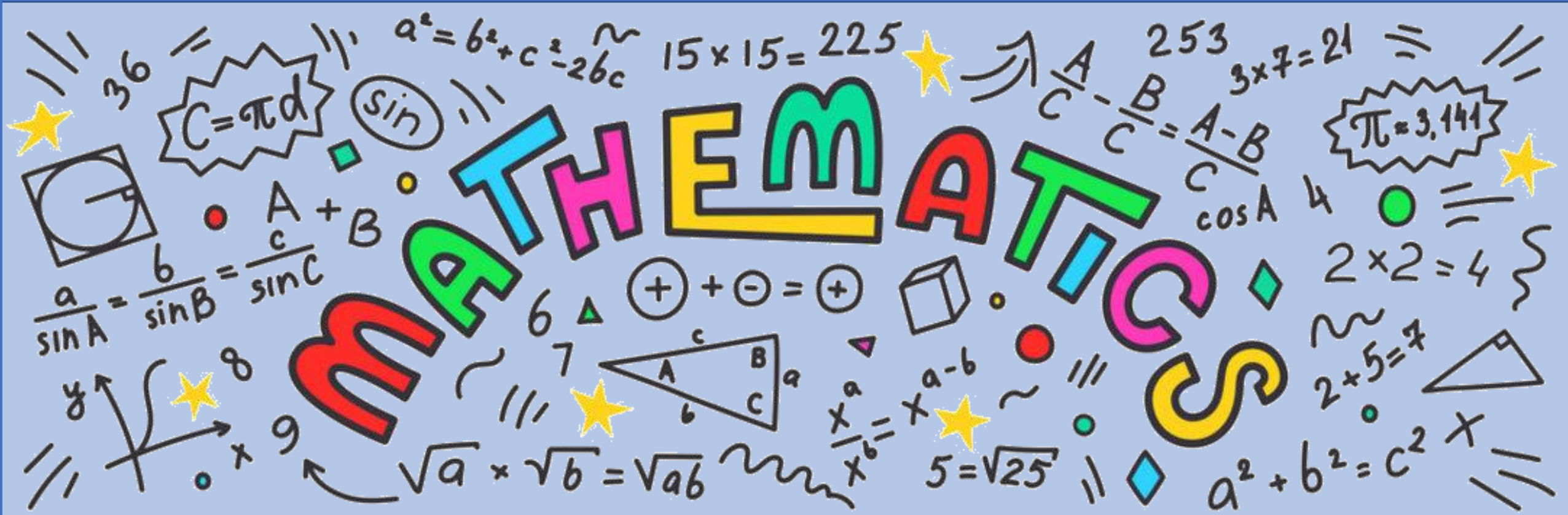


# Mathematics in Year Six at Studley St Mary's



# Introduction to Year Six Mathematics

In Year Six, children build upon the mathematical foundations laid in preceding years. The curriculum focuses on developing fluency in number, understanding of operations, and application of mathematical concepts in various contexts. Today, we will cover essential areas including Times Table knowledge, Key Instant Recall Facts (KIRFs), and our school's calculation policy.



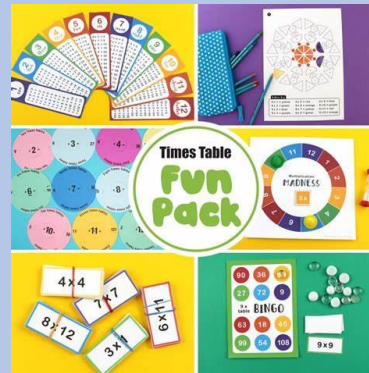
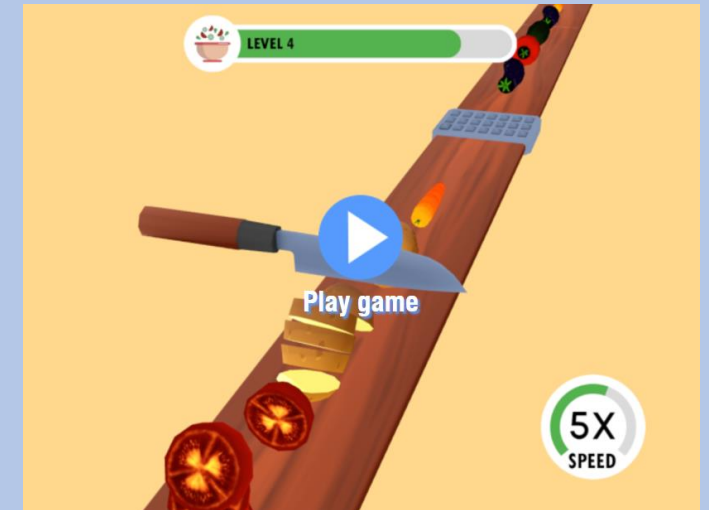
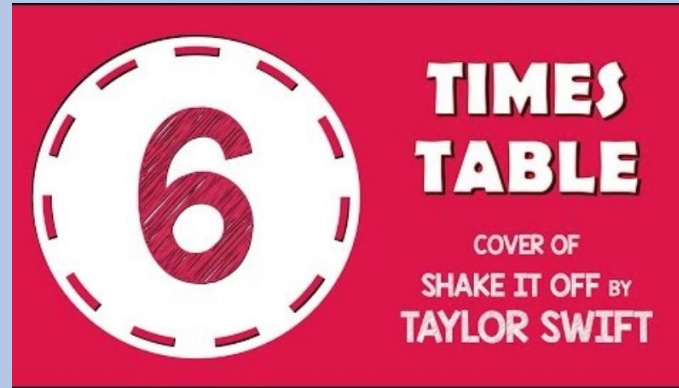
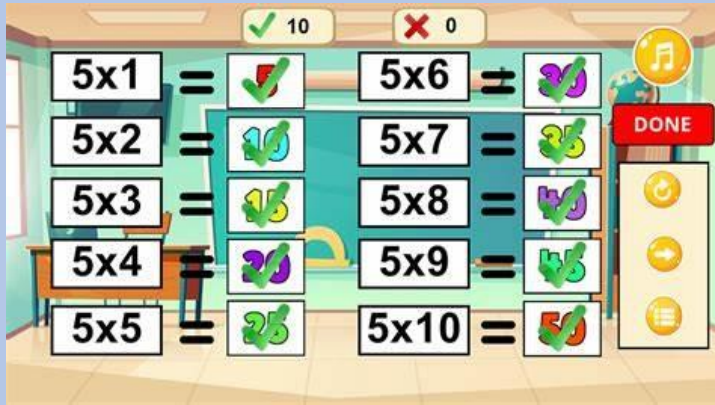
# Importance of Times Tables

Times Tables are a crucial part of the mathematics curriculum in Year Six. Mastering times tables helps children to gain confidence in multiplication and division, enabling them to tackle more complex problems with ease. It is essential that we all encourage regular practice and application of these tables in various contexts to ensure retention and understanding.



# Strategies for Teaching Times Tables

To teach Times Tables effectively, a combination of methods is required. Visual aids, rhythmic chants, interactive games, and consistent practice are key. Engaging children in competitions can also motivate them to enhance their recall speed.



# Key Instant Recall Facts (KIRFs)

Key Instant Recall Facts (KIRFs) are specific facts that children should know by heart, facilitating quick recall in mathematical operations. For Year Six, KIRFs include a range of multiplication, division and number bonds facts. These are crucial for improving fluency and aiding problem-solving skills across the curriculum.

## Year 6

Derive multiplication and division facts using multiples of 10 and decimal numbers

Know the test for divisibility for numbers up to 10,000,000

Multiply and divide decimal numbers by 10, 100 and 1000.

Know square roots of square numbers to  $15 \times 15$

Know all previous number bonds including decimals that total 1 or 10 (two decimal places)

Know doubles and halves of all 2-digit numbers including 2-digit decimals

Key Instant Recall Facts (KIRFs)

Year 6: Spring 1

**Target:** Multiply and divide whole and decimal numbers by 10, 100 and 1,000.

By the end of this half term, children in Year 6 should know the following facts and be able to recall them instantly:

| HTh     | TTh                       | Th | H | T | O       | .                          | Tths | Hths | Thths |
|---------|---------------------------|----|---|---|---------|----------------------------|------|------|-------|
| X 10    | digits move LEFT 1 place  |    |   |   | ÷ 10    | digits move RIGHT 1 place  |      |      |       |
| X 100   | digits move LEFT 2 places |    |   |   | ÷ 100   | digits move RIGHT 2 places |      |      |       |
| X 1,000 | digits move LEFT 3 places |    |   |   | ÷ 1,000 | digits move RIGHT 3 places |      |      |       |

When we multiply by 10, 100 and 1000 we shift the digits to the left. One place left for 10, two places left for 100 and three places left for 1000. When we divide by 10, 100 and 1000, we do the opposite and shift the digits to the right instead.

**Key Questions**

- What number is 10 times greater than 0.1?
- What number is 100 times smaller than 12?
- What is  $152 \div 1,000$ ?
- $45 = \_ \times 10$

**Vocabulary**

- Integer
- Whole number
- Decimal number
- Decimal place
- Place value
- Multiply
- Divide
- Digit

**Top Tips**

The secret to success? Practise little and often! Can you learn these on your way to school? On a car journey? Or even at the breakfast table? You don't need to learn them all at once: start with those you are more confident with before tackling the rest. Why not practise whilst keeping active? You could throw and catch or kick a ball whilst learning them!

**Play games!**

- Create a board game or a treasure hunt related to multiplying/dividing by 10, 100 and 1000.
- Make some flashcards and ask a family member to test you- how quickly can you multiply/divide by 10, 100 or 1000?
- Make up a song about how to multiply/divide by 10, 100 and 1000.
- Create a poster for multiplying/dividing by 10, 100 and 1000.

**Useful websites (games and information):**

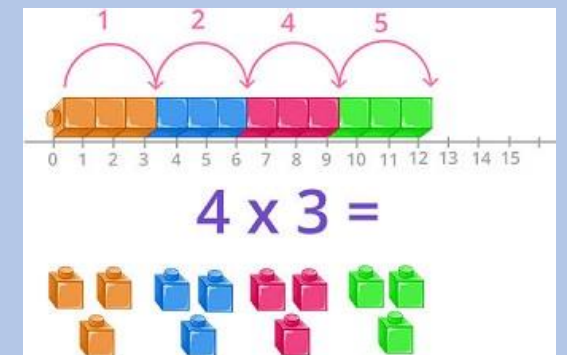
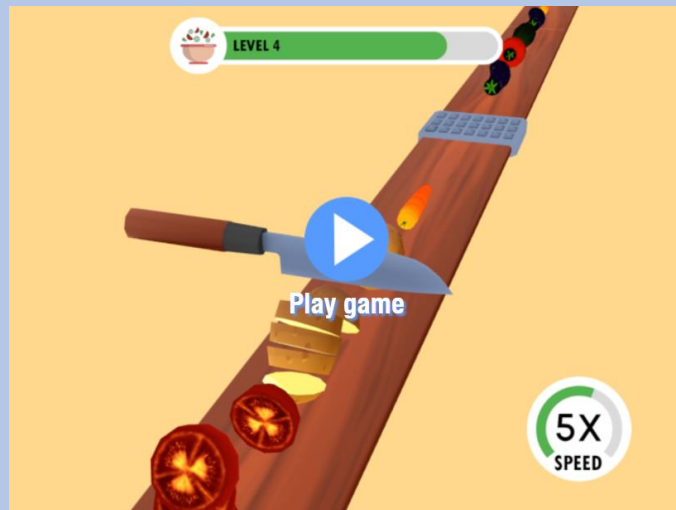
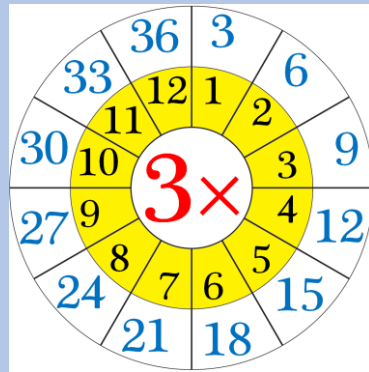
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<https://www.youtube.com/watch?v=Y45H5aCuygm>  
<https://www.topmarks.co.uk/Flash.aspx?f=bingotimesordivide>  
<https://kids.classroomsecrets.co.uk/resource/year-5-divide-by-10-100-and-1000-game/>  
<https://wordwall.net/en-gb/community/multiplication-by-10-100-1000/>

## Multiply and divide decimal numbers by 10, 100 and 1000.

| Understanding  | Fluency   | Reasoning   | Problem Solving  |
|--|---|---|--|
| Describe what happens to the decimal point when you multiply a number by 1000. Give an example to support your explanation.              | Multiply 4.56 by 10 and then divide the result by 100. What is your final answer?                                     | A recipe requires 0.25 litres of oil. If you are making four times the recipe, how much oil is needed? Explain your reasoning.  | At the local cafe, a smoothie costs £2.25. If they sell 100 smoothies in a day, what is their total revenue? Show your calculations clearly.   |
| If you divide 15.625 by 1000, what is the resulting number? Discuss the significance of this operation in relation to decimal placement. | Calculate 2.875 multiplied by 100 and then divided by 10. What is your answer? Explain each step of your calculation. | John measured his garden, which is 150.5 square metres. If he wants to create a path that takes up 10% of that area, how much area will be taken up by the path? Justify your response. | A shop owner decided to increase the price of a toy that originally costs £4.99 by 300%. What will be the new price of the toy? Present a clear method for how you arrived at your answer. |

# Approaches to KIRFs in the Classroom

To effectively integrate KIRFs into the classroom and at home, families and teachers can implement regular practice sessions, quick quizzes, and interactive games. Daily starters focusing on KIRFs can help build speed and fluency. Additionally, tracking progress through assessments can provide insight into areas that require further support.



# Year Six Calculation Policy

The Calculation Policy outlines a consistent approach to teaching mathematical operations across the year group. It defines the methods to be taught for addition, subtraction, multiplication, and division, alongside the progression of complexity to ensure all children can experience success. Teachers and families should familiarise themselves with this policy and adapt their teaching or home-learning to meet the needs of all children.

## Column Addition

$$4,453 + 4,527 =$$

| T | H | H | T | O |
|---|---|---|---|---|
| 4 | 4 | 5 | 3 |   |
| 4 | 5 | 2 | 7 |   |
| + |   |   |   |   |

Align the digits in the correct place value columns.

Starting from the right, add each column in turn. Exchange digits to the next column if the total adds to greater than 9.

| T | H | H | T | O |
|---|---|---|---|---|
| 4 | 4 | 5 | 3 |   |
| 4 | 5 | 2 | 7 |   |
| + |   |   |   |   |
|   |   |   | 0 |   |

Exchange the 1 to the next column.

Add the exchange in the next column and cross it off.

| T | H | H | T | O |
|---|---|---|---|---|
| 4 | 4 | 5 | 3 |   |
| 4 | 5 | 2 | 7 |   |
| + |   |   |   |   |
| 8 | 9 | 8 | 0 |   |

## Column Subtraction

$$34,653 - 4,527 =$$

| T | H | H | T | O |
|---|---|---|---|---|
| 3 | 4 | 6 | 5 | 3 |
| 4 | 5 | 2 | 7 |   |
| - |   |   |   |   |

Align the digits in the correct place value columns.

Starting from the right, subtract each column in turn. Exchange from the next column if the subtraction would result in a negative number.

| T | H | H | T | O |
|---|---|---|---|---|
| 3 | 4 | 6 | 5 | 3 |
| 4 | 5 | 2 | 7 |   |
| - |   |   |   |   |
|   |   |   |   |   |

3 subtract 7 would result in a negative number, so exchange from the next column.

If we exchange one lot of 10 from the tens column, we would then do 13 - 7

|   |   |   |    |   |
|---|---|---|----|---|
| 3 | 4 | 6 | 13 | 3 |
| 4 | 5 | 2 | 7  |   |
| - |   |   |    |   |
| 3 | 0 | 1 | 2  | 6 |

|   |   |   |   |   |
|---|---|---|---|---|
| 3 | 4 | 6 | 5 | 3 |
| 4 | 5 | 2 | 7 |   |
| - |   |   |   |   |
|   |   |   |   | 6 |

## Short Multiplication

$$\begin{array}{r} \text{multiplicand} \\ \text{multiplier} \\ \hline 853 \times 6 = \end{array}$$

$$\begin{array}{r} 853 \\ 6 \times \\ \hline \end{array}$$

Write your multiplicand first and then align your multiplier.

$$\begin{array}{r} 853 \\ 6 \times \\ \hline 18 \end{array}$$

Multiply the ones in the multiplicand by the multiplier  $3 \times 6 = 18$ . Exchange to the next column if the product is greater than 9.

$$\begin{array}{r} 853 \\ 6 \times \\ \hline 3018 \end{array}$$

Multiply the tens in the multiplicand by the multiplier  $5 \times 6 = 30$ . Add on the exchange.  $30 + 1 = 31$ . Exchange to the next column if the product is greater than 9.

$$\begin{array}{r} 853 \\ 6 \times \\ \hline 5118 \end{array}$$

Multiply the hundreds in the multiplicand by the multiplier  $8 \times 6 = 48$ . If there is an exchange, add it on. Exchange if the product is greater than 9.

## Short Division

$$\begin{array}{r} \text{dividend} \\ \text{divisor} \\ \hline 625 \div 5 = \end{array} \text{quotient}$$

$$5 \overline{) 625}$$

Place your divisor on the outside and your dividend on the inside of your short division.

$$\begin{array}{r} 1 \\ 5 \overline{) 625} \end{array}$$

Starting from the left, divide each digit by the divisor.  $6 \div 5 = 1 \text{ r } 1$

$$\begin{array}{r} 1 \\ 5 \overline{) 625} \end{array}$$

If there is a remainder, exchange it to the next column.

$$\begin{array}{r} 12 \\ 5 \overline{) 625} \end{array}$$

Divide the next column by the divisor.  $12 \div 5 = 2 \text{ r } 2$ . Exchange any remainders to the next column.

$$\begin{array}{r} 125 \\ 5 \overline{) 625} \end{array}$$

Divide the next column by the divisor.  $25 \div 5 = 5$ . Record any remainders at the end  $\text{r } \_$ .

# Lesson Structure

At Studley St Mary's, we are committed to providing a high-quality mathematics education that aligns with the National Curriculum. We implement the White Rose Maths scheme of learning, which supports a mastery approach. This scheme emphasises a robust focus on number, crucial for developing our children's competency.

Furthermore, White Rose Maths encourages reasoning and problem-solving, essential for effective learning. We believe in a concrete-pictorial-abstract approach to aid understanding. Our curriculum is cumulative, revisiting topics such as place value throughout the year; complemented by weekly fluency lessons to consolidate key skills and knowledge.

Fluent in  
Five

Revisit

Anchor

Guided  
Practice

Do It

Twist It

Deepen  
It

# Concrete, Pictorial, Abstract (CPA) Approach

Furthermore, White Rose Maths encourages reasoning and problem-solving, essential for effective learning. We believe in a concrete-pictorial-abstract approach to aid understanding.

The diagram illustrates the CPA approach for the equation  $6 + 1 = 7$  through three stages:

- Concrete:** A photograph of seven orange pencils. Six are grouped together on the left, and one is separate on the right.
- Pictorial:** A 2x4 grid of red dots. The top row has one dot in the first column. The bottom two rows have two dots each in the first and second columns.
- Abstract:** A table showing the addition process:

|              |  |  |
|--------------|--|--|
| first group  |  |  |
| second group |  |  |
| total        |  |  |

Below the table are two ten-frames: a teal one with 6 white dots and a pink one with 1 white dot.

On the right side, a blue rounded rectangle contains the equation:  $6 + 1 = 7$ .

# Conclusion and Key Takeaways

In conclusion, effective mathematics teaching in Year Six is multidimensional, involving Times Table knowledge, KIRFs, and a solid Calculation Policy. By implementing the strategies discussed in this presentation and fostering an inclusive and engaging learning environment, we can help our children develop a love for mathematics and the skills they need for future success.

