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The components

Teacher's Book

The *Scholastic Times Tables Teacher's Book* provides you with a wealth of activities to help your children master the times tables. Work through the activities one by one or dip in and out – whatever works best for you and your class!

Choose from a bank of activities which promote problem-solving, reasoning and fluency. Aim to use a range of activities so that children have an opportunity to approach the times tables in a variety of ways.

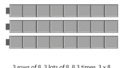
The activities use a wide range of resources: some rely on using concrete resources, others have a whiteboard component to them, and others may require a photocopiable resource which can be downloaded from www.scholastic.co.uk/timestables-resources. Finally, some require no resources at all.

Key information to help you get the most out of your times tables practice

Visual examples of how to represent multiplication across all key stages

1 MASTERING THE TIMES TABLES

This section provides 12 activities which focus on the fundamental facts and methods underpinning times tables mastery. They cover the knowledge, skills and understanding detailed in the National Curriculum Properties of number, mathematical operations and laws which lead to true conceptual understanding and competent mathematical thinking. They can be used for reviewing and diagnosing difficulties. Although many children's thinking is beginning to become more abstract by upper Primary, you may also wish to use apparatus such as number rods and snap cubes, as well as visual representations such as arrays and number lines, to support understanding. The activities are also useful for making content and activities which children understand the focus of each activity they should be secure using and applying the times tables.



Activity	Objective	Focus	Organisation	Development
Counting in multiples (p1)	Count in multiples (any number from 2-12)	Revising counting on as a basic method. Considering effective methods of counting on.	Pairs	Reasoning
Arrays (p1)	Recall multiplication and division facts for multiplication tables up to 12 x 12, recognise and use factor pairs and commutativity in mental calculations.	Revising arrays as a method of understanding multiplication. Drawing arrays to times tables facts.	Pairs or small groups	Reasoning
Multiplication (p4)	Recall multiplication and division facts for multiplication tables up to 12 x 12.	Revising multiplication as a key mathematical skill. Looking at the commutative nature of multiplication. Creating multiplication statements.	Independent	Reasoning
Know your facts (p4)	Recall multiplication and division facts for multiplication tables up to 12 x 12.	Raising awareness of children's current times tables knowledge. Examining the tables square - identify personal strengths and weaknesses.	Groups	Reasoning
Mirror mirror (p5)	Recall multiplication and division facts for multiplication tables up to 12 x 12, recognise and use factor pairs and commutativity in mental calculations, recognise and use square numbers.	Understanding the commutative law. Revising the tables square. Investigating the diagonal symmetry of the times tables square.	Pairs	Reasoning

Handy table to help you choose quickly which activity will work best with your children

Activity	Objective	Focus	Organisation	Development
Lower and middle (p5)	Identify multiples and factors, including finding all factor pairs of a number, and common factor of 2 numbers.	Investigating the recurrence or absence of numbers on the times tables square.	Independent	Reasoning
It's big to be square (p6)	Recognise and use square numbers and the reasons for squared 3 solve problems involving multiplication and division including applying their multiples, square and cube numbers, square and cube.	Introducing the concept of square numbers. Considering the properties of square numbers in the times tables.	Independent	Reasoning
In your prime (p6)	Establish whether a number up to 100 is prime and recall prime numbers to 10, know and use the vocabulary of prime numbers, prime factors and composite (non prime) numbers.	Introducing the concept of prime numbers. Reflecting on the presence of prime numbers in the times tables square.	Pairs	Reasoning
Division (p7)	Recalling the concept of division in relation to the times tables. Using a times tables square to divide.	Revising the concept of division in relation to the times tables. Using a times tables square to divide.	Pairs	Reasoning
Inverse operations (p7)	Multiply and divide numbers mentally, developing open mental calculations.	Appreciating that division and multiplication are inverse operations. Revising a multiplication statement to create a division statement.	Small groups	Reasoning
Multiple facts (p7)	Recognise and use factor pairs and commutativity in mental calculations.	Understanding that each calculation provides 4 different facts. Establishing a method for quickly stating connected facts.	Independent	Reasoning
Rule of Law 1: Commutative (p8)	Recognise and use factor pairs and commutativity in mental calculations.	Establishing the commutative nature of multiplication. Recognising that numbers can be multiplied in any order.	Pairs, groups or whole class as preferred	Reasoning

Assessment

These quick questions will help to ensure that children are competent with all the strategies to use, the patterns to look out for and all of the vocabulary to use for mastering the times tables.

- As quick as you can, count on to ...
- You know ... and ... well? Fact fighter and I drew from the same table. How do you know you are correct?
- Explain how to generate a simple multiplication, give me the 'times fact' for a x b.
- What if the commutative law or associative distributive law, and how can it help with your calculations?
- Explain the meaning of multiple, factor, divide etc.
- Define a prime number. Can you give me an example?
- Can you name all the square numbers in the times tables?

Test all tables up to 12 x 12

Assessment questions to use during activities or after. Many are easily adaptable to use with a variety of activities or times tables.

Practice Book links provide further opportunities for revision and practice

List of all resources, including photocopiable pages and digital files for class display

MULTIPLE FACTS

You need: digital file 3 (Multiple facts resource) (2 Times tables square)

STEPS

- Show the multiplication diagram on the board.
- Write the number in the central circle.
- Ask: Which calculation uses 2, 3 and 6?
- Discuss how each multiplication has its own name, but also has its factors in the times tables square.
- Enter working mentally or with a times tables square (resource 2), ask the children to investigate a range of numbers, drawing the multiplication diagram above for each number. Ask: All the options used for all numbers on the times table square (which numbers will have been there if fact?) How different does your notice between odd and even numbers?

EXTEND

Ask children to write out a times table simply by counting on (for example 4 x 2, 12, 16), leaving lots of space between each number. When all the numbers are written, ask them to quickly write all the associated multiplication and division facts around each number.

RULE OF LAW 1: COMMUTATIVE

You need: digital file 1 (Times tables square for class display; resource 2 (Times tables square) (optional)

STEPS

- Enter a 5 times tables square (digital file 1) and identify a known times table fact, for example 2 x 5. Remind children how to find specific facts by either first going along and then down, or first down and then along.
- Model how reversing the numbers gives 5 x 2, and using the times tables square correctly, model how to find the related fact. Discuss how both answers are the same and that the answers 'mean' each other in the diagonal.
- Using appropriate vocabulary, explain the commutative law (numbers can be multiplied in any order), and ask children to provide examples to prove this, for example 2 x 5 is the same as 5 x 2. Explain that this allows us to know 2 facts instantly!
- Write on the board a number from the times tables square. Ask: This is the answer, what are the questions? (for example for an answer of 45 the questions could be 5 x 9 or 9 x 5. Repeat this using numbers that only appear twice on the square, such as 29, 27, 35, 33, 39, and 47)
- Working in pairs, groups or as a whole class, challenge the children to identify a grid of multiplication facts that they know, and then find the related fact by reversing the order of the multiplication.

EXTEND

Give the class some quick fire questions (either with the times tables square displayed or hidden). If a child claims to know the answer they must state x, and then list the related numbers as a times table question to someone else.

RULE OF LAW 2: ASSOCIATIVE

You need: resource 2 (Times tables square) for support where needed

STEPS

- Write out the number sentence 2 x 3 x 4, and discuss the answer, discussing the multiplication facts used at each stage, such as 2 x 3 = 6, 6 x 4 = 24.
- Write on the same sentence in different order, (2 x 4) x 3, 3 x 2 x 4 x 3, etc.) Repeat the calculation process for each one and ask why the answers are the same each time. Ask the children to consider how this might help them with their mental calculations.
- Write the calculation 2 x 8 x 5. Ask: What are the 'neighbour numbers' to multiply together first? Through discussion, demonstrate that first finding 2 x 8 = 16 makes the final calculation much easier: 16 x 5 = 80. Contrast this with doing the calculation in the order given: 2 x 8 = 16, 16 x 5 = 80. Emphasise that even though you get the right answer, it takes more time and both are to get it right!
- Present a list of 5-number multiplication statements (for example 2 x 4 x 4 x 8 x 5, 5 x 7 x 2 x 4 x 10, 3 x 7 x 7 x 2) and challenge the children to solve them. Emphasise that a mental approach is preferred though for some harder ones a times tables square can be used. Ask for each calculation why they do it that way!

EXTEND

The complexity of this work can be considerably increased by providing an answer and asking children to find the 3 numbers that could make up the statement: such as 8 (3 x 4 x 2), 100 (5 x 5 x 7), or 270 (5 x 6 x 9). Note that the last 2 examples go beyond the times tables.

RULE OF LAW 3: DISTRIBUTIVE

You need: resource 2 (Times tables square) for support where needed

STEPS

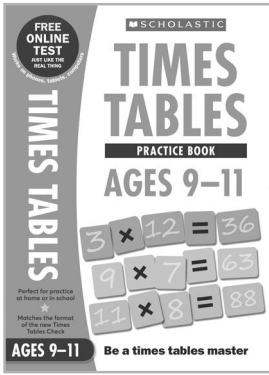
- Write on the board the calculation 5 x 4 = 5 x 4, then work with the class to solve it mentally, asking children to explain their answers as they work through (20 is 5 x 4, 10 is 5 x 2).
- Re-write the calculation as 5 x (4 + 6), emphasising that the calculation in the brackets must always be done first (practice this as required). Discuss the answer and compare the process to the previous calculation.
- Explain that for the distributive law, if the same numbers to be multiplied are in each part, the calculation can be rearranged to make the final multiplication easier.
- Present a list of multi-multiplication statements (for example 5 x 4 + 3 x 2 x 4 + 3, 6 x 4 + 4 x 5, 5 x 5 + 3 x 5 + 1 x 5) and challenge the children to solve them. Emphasise that a mental approach is preferred, though for some harder ones a times tables square can be used.
- Discuss their work and ask: How you developed a good method? Can you do it in your mind only on paper? What makes it difficult? Do you 'faster' way?

EXTEND

Most such calculations that include subtraction should be introduced carefully to emphasise that order is important, for example 4 x 9 - 3 x 4 can be rearranged as 4 x 9 - 3 = 24, highlighting that the 2 and the 3 cannot be moved because subtraction is not commutative. (To demonstrate this discuss why 9 x 4 + 3 = 3 x 6 + 9 = 9 - 3 does not equal 3 - 9)


Clear breakdown of how to work through each activity, including questions for deepening and assessing understanding

Strategies for extending each activity to encourage deeper thinking and provide further practice



The Practice Book

The *Scholastic Times Tables Practice Book* has been designed to provide children with further opportunities for revision and practice of the times tables.

Use it alongside the *Teacher's Book*, as part of general class practice or for home learning. Look for the *Practice Book* icon  in the 'You will need' section at the start of an activity for activities which relate directly to the *Times Tables Practice Book*.

Detailed answers are included at the back of the book.

Each unit focuses on a different topic or times table.

This section provides children with the opportunity to revisit what they have learned with visual examples to support their understanding.

Children should work through the questions in order for varied practice which builds in difficulty.

7 Patterns in the tables

The times tables are full of hidden relationships, patterns and unusual facts. There are numbers that appear several times, numbers that only appear once, and numbers that don't appear at all. What's more, there are numbers that have connections to each other. Understanding all these facts will improve your mathematics.

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

The diagonal line shows all the numbers that are multiplied by themselves, for example, 4×4 . These are the 'square numbers'. Look carefully at the other two areas - they are like mirror images of each other.

Each fact in the top half has a 'partner fact' in the bottom half, like $3 \times 4 = 12$ and $4 \times 3 = 12$.

Now try this

1 Explain to an adult why 18 appears four times on the times tables square, but 16 only appears three times.

2 Only one quarter of numbers on the times tables square are odd. How many is that? Explain to an adult the pattern the odd numbers make and why there are more even numbers.

3 Look at the times tables square and answer these questions.

a. What are the most frequent numbers and how many times do they occur?

b. Which numbers appear four times?

c. List all the numbers that appear only once on the times tables square.

d. List 6 numbers between 1 and 32 that are not on the times tables square.

4 24 books are shared equally onto shelves, with no books left over. How many shelves might be needed, and how many books would be on each shelf? How many possible combinations can you find? Use a separate piece of paper for calculations if you need to.

Choose a number from the times tables square, and challenge an adult to say every way that it can be made. Can they find all the ways?

There are opportunities throughout for children to explain their reasoning aloud in pairs if appropriate or with an adult.

Space is provided for children to write their answers or share their reasoning.

Encourage children to use a separate piece of paper if they need to.


Using easy-to-access resources, children gain further practice at home or away from their desks.

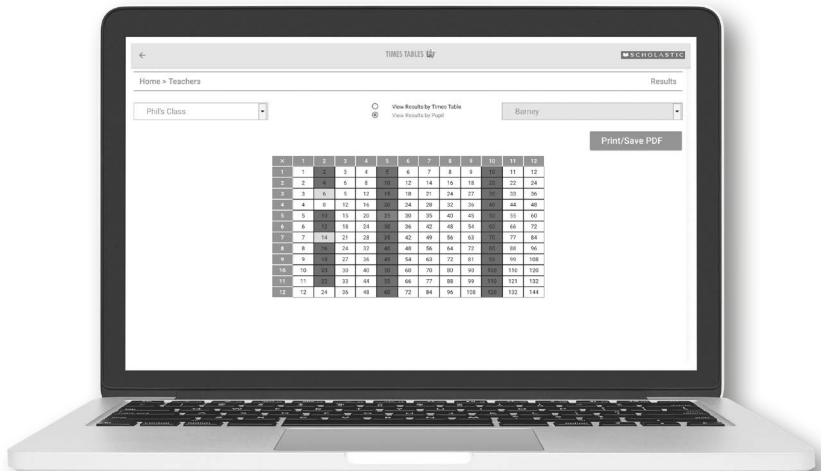
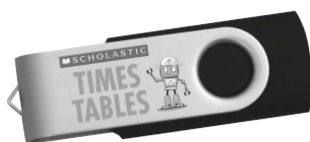
Digital

Additional materials for this book can be found online at the following address:

www.scholastic.co.uk/timestables-resources these include:

- resource pages including games and worksheets
- supporting PowerPoint digital files for display during your classroom teaching
- quick-fire written tests for additional practice or homework. These tests have three levels of differentiation and are aligned with a unit or group of units from the *Teacher's Book*. Assign one of the three sections at a time and progress through them in order.

If resource pages or digital files are required, they will be listed in the 'You will need' section at the start of an activity. Look for the digital icon  for activities using digital content.



MASTERING THE TIMES TABLES

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3 rows of 8, 3 lots of 8, 8 3 times, 3×8

Activity	Objective	Focus	Organisation	Development
Counting in multiples (p13)	Count in multiples (any number from 2–12)	Revising counting on as a basic method. Considering effective methods of counting on.	Pairs	Reasoning
Arrays (p13)	Recall multiplication and division facts for multiplication tables up to 12×12 ; recognise and use factor pairs and commutativity in mental calculations	Revising arrays as a method of understanding multiplication. Relating arrays to times tables facts.	Pairs or small groups	Reasoning
Multiplication (p14)		Revising multiplication as a key mathematical skill. Looking at the commutative nature of multiplication. Creating multiplication statements.	Independent	Reasoning
Know your limits (p14)	Recall multiplication and division facts for multiplication tables up to 12×12	Raising awareness of children's current times tables knowledge. Examining the times tables square – identifying personal strengths and weaknesses.	Groups	Reasoning
Mirror mirror (p15)	Recall multiplication and division facts for multiplication tables up to 12×12 ; recognise and use factor pairs and commutativity in mental calculations; recognise and use square numbers	Understanding the commutative law illustrated by the times tables. Investigating the diagonal symmetry of the times tables square.	Pairs	Reasoning

8-TIMES TABLE: SPIDERAMA



You need: digital file 10 (Spiderama); digital file 11 (Spider legs)

STEPS

- Display digital file 10 (Spiderama). Point out that all spiders have 8 legs, and so we have written a large 8 inside the body.
- Explain the meaning of 'arachnophobia' (fear of spiders), and explain that a young person who has this wants to persuade their parents that they need to act. Telling their parents that there are 3 spiders in their room doesn't sound very dramatic, but saying that there are 24 creepy, hairy, spider legs walking towards them has more impact!
- So, the child wants to keep a legs log. They will count the number of spiders in the house each day then work out how many legs this is.
- Create a chart like the one below, or use digital file 11 (Spider legs) adding as many facts as desired. Challenge the children to copy and complete it. Try doing a week's worth, and ask for total numbers of spiders and legs.

Day	Spiders spotted	Legs
1	6	48
2	3	

In reviewing work, ask: *Could you use earlier answers to help with later ones? Which facts did you find harder to recall?*

EXTEND

Repeat the above activity, but for larger numbers of spiders between 13 and 24. Demonstrate how, for larger numbers of spiders, the number can be split to enable the use of times tables facts, for example 18 spiders is 2 lots of 9 spiders, which is $72 + 72 = 144$ legs).

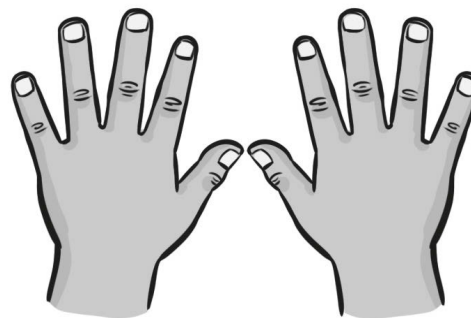
Test the 5-, 6-, 7- and 8-times tables

9-TIMES TABLE: GET HANDY

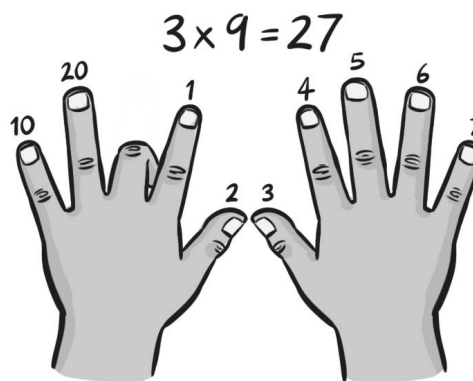
You need: no resources needed

STEPS

- Demonstrate the method of using our hands to find 9-times table facts up to 90. Hold the hands together in front of you, palms down.



- Show how by dropping a finger, 9-times table facts are revealed. So, dropping the middle finger of the left hand – the third digit along from the left – represents 3 9s. The fingers to the left represent 10s, and those to the right represent 1s.



- Give the children time to practise looking at their hands and moving fingers while stating times tables facts from $1 \times 9 = 9$ to $10 \times 9 = 90$.
- Progress to challenging children to recite the 9-times table without looking at their hands (they can still move them under the desk if it helps).
- Conclude by calling out random facts from the table, challenging the class to make each fact with their hand, and to state it followed by 2 other connected facts.

EXTEND

Challenge the children, in pairs, to produce a written or recorded explanation of the method to try on an adult at home. Given that the 'hands' method only works up to 90, be sure to practise recital up to $12 \times 9 = 108$.