11+ Maths: Number Operations

Topic: Addition, Subtraction, Multiplication, Division
Target Age: 10-11 years (Preparing for 11+ Exams)
Time: 60 Minutes
Resources: Whiteboard, Worksheets, Calculator (for checking)
Website: https://oatutors.co.uk/

This lesson focuses on mastering the four fundamental number operations essential for 11+ success. Students will practice mental arithmetic, written methods, and word problems using UK curriculum standards.

1 Learning Objectives

By the end of this lesson, students will be able to:

- Apply efficient mental strategies for addition and subtraction

- Use standard written methods for multiplication and division

- Solve multi-step word problems involving all four operations

- Check answers using inverse operations

- Work confidently with numbers up to 10,000

2 Starter Activity (10 Minutes)

Time	Activity	Description
5 mins	Mental Maths Warm-up	Quick-fire questions: $47 + 28$, $83 - 39$, 7×8, $72 \div 9$. Use fingers, whiteboards for responses.
5 mins	Number Bond Revision	Review number bonds to 10, 20, and 100. Essential for mental calculation strategies.

3 Main Teaching (25 Minutes)

3.1 Addition and Subtraction Strategies (12 minutes)

Key Methods for 11+ Success:

1. **Column Method:** Essential for larger numbers

$$\begin{array}{r} 3847 \\ + \ 2695 \\ \hline 6542 \end{array}$$

2. **Mental Strategies:**

   - Partitioning: $47 + 28 = (40 + 20) + (7 + 8) = 60 + 15 = 75$
   - Compensation: $47 + 29 = 47 + 30 - 1 = 77 - 1 = 76$
   - Near doubles: $47 + 46 = 46 + 46 + 1 = 92 + 1 = 93$

3.2 Multiplication and Division Methods (13 minutes)

Multiplication Strategies:

1. **Grid Method:**

×	30	4
20	600	80
7	210	28

$34 \times 27 = 600 + 80 + 210 + 28 = 918$

2. **Long Multiplication:** For 11+ standard

3. **Mental Tricks:**

   - Times by 10, 100, 1000: Move digits left
   - Times by 5: Half and times by 10
   - Times by 9: Times by 10, subtract original

Division Strategies:

1. **Short Division:** For single-digit divisors

2. **Long Division:** For two-digit divisors (essential for 11+)

3. **Mental Division:** Using times tables knowledge in reverse

4 Guided Practice (15 Minutes)

Worksheet: Number Operations Practice

Section A: Mental Arithmetic (5 minutes)

1. $56 + 47 =$ ___

2. $124 - 67 =$ ___

3. $8 \times 37 =$ ___

4. $156 \div 12 =$ ___

5. $2.5 \times 8 =$ ___

Section B: Written Methods (7 minutes)

6. Use column addition: $2847 + 1395 + 726 =$ ___

7. Use grid method: $47 \times 38 =$ ___

8. Use long division: $1248 \div 24 =$ ___

Section C: Word Problems (3 minutes)

9. A school orders 24 boxes of pencils. Each box contains 36 pencils. How many pencils in total?

10. Sarah has £4.50. She buys 3 items costing £1.25 each. How much change does she get?

5 Independent Work (8 Minutes)

Students complete challenging 11+ style questions:

1. What is the missing number? $347 + \_\_\_ = 1000$

2. A factory produces 1,440 widgets per day. How many widgets are produced in a week?

3. Find two numbers that multiply to give 144 and add to give 24.

4. $7{,}245 \div 15 = \_\_\_$ remainder $\_\_\_$

6 Plenary and Assessment (2 Minutes)

Time	Activity	Description
2 mins	Quick Assessment	Exit ticket: One addition, one multiplication, one word problem. Check understanding before next lesson.

7 Homework Assignment

Practice Sheet: Number Operations Mastery

1. Mental arithmetic: 20 mixed questions

2. Written methods: 5 complex calculations

3. Word problems: 3 multi-step scenarios

4. Challenge: Find all factor pairs of 72

8 Extension Activities

For more able students:

- Investigate different multiplication methods (Russian peasant method)

- Create word problems for given calculations

- Explore patterns in division remainders

Answer Key - For Teachers

Guided Practice Answers

Section A: Mental Arithmetic

1. 56 + 47 = 103

2. 124 - 67 = 57

3. 8 × 37 = 296

4. 156 ÷ 12 = 13

5. 2.5 × 8 = 20

Section B: Written Methods

6. 2847 + 1395 + 726 = 4968

7. 47 × 38 = 1786

8. 1248 ÷ 24 = 52

Section C: Word Problems

9. 24 × 36 = 864 pencils

10. £4.50 - (3 × £1.25) = £4.50 - £3.75 = £0.75

Independent Work Answers

1. 347 + 653 = 1000

2. 1,440 × 7 = 10,080 widgets

3. 12 and 12 (12 × 12 = 144, 12 + 12 = 24)

4. 7,245 ÷ 15 = 483 remainder 0

Teaching Notes

- Emphasize checking answers using inverse operations

- Common errors: Place value mistakes in addition/subtraction

- Ensure students show working clearly - essential for 11+ marking

- Use real-world contexts to make problems engaging

- Differentiate by providing scaffolding for less confident students