Long Division Masters: Two-Digit Divisors

Teacher		**Class**	Year 6
Subject	Maths	**Topic**	Long division
Date		**Room**	
Lesson length	60 minutes	**Country**	United Kingdom

Pupils learn to divide up to 4-digit numbers by two-digit numbers. They practise neat long division in pairs on squared paper.

Curriculum links

- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division [1]
- interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context [1]

Learning objectives

- Students will divide up to 4-digit numbers by two-digit numbers using long division.
- Students will set out calculations neatly with aligned digits and multiples lists.
- Students will interpret remainders for context and check answers by multiplication.

Success criteria

- I can work the divide, multiply, subtract, bring down loop in order.
- I can divide 4-digit numbers by two-digit numbers neatly and accurately.
- I can explain any leftover correctly and check by multiplying back.

What students already know

2-minute recall: chant the 12 times table to 12 x 10, then ask what 12 x 3 and 12 x 9 equal and how subtraction checks multiplication.

Key words

dividend	the large total inside the bracket that is shared out [3]
divisor	the number outside the bracket that you share by [3]
quotient	the answer written above the bracket [3]
remainder	the amount left over after the last subtract that cannot be shared equally [3] [10]
multiple	the result of multiplying the outside number by 1, 2, 3 and so on [5]

Materials

- squared paper
- pencils
- rulers
- rubbers
- mini whiteboards and pens
- Slides 1-6, 9-12
- Video clip 1 (0:00-5:00)

Before the lesson

- Load Slides 1-6 and 9-12 and test Video clip 1 (0:00-5:00) with sound.
- Print Worksheet Task C, Task D and Task E, one per pair plus spares.
- Prepare squared paper, pencils, rulers, rubbers and mini whiteboards.
- Pre-draw empty brackets with faint column guides, one digit per square.

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- Worksheet Task C
- Worksheet Task D
- Worksheet Task E
- pre-drawn brackets with faint column guides
- multiples strips for divisors

- Prepare completed multiples strips for 12 and 14 and blank strips for pairs.

Lesson outline

0–8 min **Starter** 8 min · Whole class

Hook pupils and recall multiplication facts and the bracket layout for long division.

YOU DO

1. Welcome the class and say the hook, then show Slides 1-2 with the title and objectives.
2. Quick-fire the 12 times table and ask where the total and the sharing number sit in the layout.
3. Show Slide 5 mystery of 468 divided by 12 and take estimates on whiteboards.
4. Agree that guessing is slow and that a neat loop will give the exact answer.

STUDENTS DO

1. Chant multiples of 12 and point to inside and outside of the bracket.
2. Write a quick estimate for 468 shared into 12 groups on whiteboards.
3. Read the objectives and repeat the four step names aloud.

Say: No tablets, no calculators, no printed answers. Just you, a pencil and perfect columns. Today we become Long Division Masters and divide big numbers by two digits without guessing.

Ask: Where do we write the total to be divided and the number we divide by? (Total inside the bracket, number dividing by outside [3].) · Why do we write a multiples list for the divisor first? (Writing multiples in order helps avoid mistakes [5].)

Check understanding: Hold up whiteboards with 12 x 4 and 12 x 9; if facts are shaky, keep a times-table chart visible and rehearse again.

Support: Give a times-table chart and a multiples strip for 12 to read from. **Stretch:** Ask for 12 x 11 and 12 x 12 from known facts to extend the list.

Use: Slides 1-2, 5

8–20 min **Teaching** 12 min · Whole class

Model the divide, multiply, subtract, bring down loop for a two-digit divisor.

YOU DO

1. Show Slides 3-4 and name the loop: divide, multiply, subtract, bring down until digits run out [12].
2. Play Video clip 1 (0:00-5:00) on Slide 6 and ask pupils to spot where each answer digit sits.
3. Model 468 divided by 12 on squared paper, one digit per square with straight columns [12].
4. Think aloud the multiples choice and the final check by multiplying back [3].

STUDENTS DO

1. Watch the video and whisper each step name as it happens.
2. Copy the bracket layout and chant divide, multiply, subtract, bring down.
3. Check the model by working 39 x 12 on whiteboards.

Say: We always start with the leftmost digits of the dividend and write the quotient above the bracket. We divide a little, multiply to check it, subtract what we used, then bring down the next digit and go round again.

Worked example: 468 ÷ 12 = 39 [6]. Multiples of 12: 12, 24, 36. 46 ÷ 12 goes 3 times because 3 x 12 = 36. Write 3 above 6. 46 - 36 = 10. Bring down 8 to make 108. 108 ÷ 12 goes 9 times because 9 x 12 = 108. Write 9. 108 - 108 = 0. Answer 39. Check: 39 x 12 = 468 [5].

Ask: 46 is too big to guess, how many 12s fit in 46? (3, because 3 x 12 = 36 and 4 x 12 = 48 is too big [5].) · After 46 minus 36 leaves 10, what must we do next? (Bring down the next digit, 8, to make 108 [8].)

Check understanding: Pupils hold up the two quotient digits 3 and 9; re-model any step where digits drift out of column.

Support: Keep a ready-made multiples list for 12 in view so pupils choose 36 and 108 without stalling [5].
Stretch: Ask what 4,680 ÷ 12 will be and why an extra zero appears in the answer.

Use: Slides 3-6, Video clip 1 (0:00–5:00)

20–40 min **Main activity** 20 min · Pairs

Solve two 4-digit by 2-digit divisions neatly in pairs using the loop and a check.

YOU DO

1. Show Slide 9, pair pupils as Student A and Student B and give out squared paper and rulers.
2. Direct pairs to write the multiples list for the divisor first, then work the loop step by step.
3. Circulate to check one digit per square, quotient digits above the correct columns and tidy subtraction [12].
4. Stop the class midway to fix lining-up and remind pairs to check by multiplying the quotient by the divisor [5].

STUDENTS DO

1. Write the multiples list, then solve Worksheet Task C divisions using divide, multiply, subtract, bring down.
2. Student A solves the first calculation, Student B solves the second, each watching alignment.
3. Complete Worksheet Task D checks by multiplying quotient by divisor to get the dividend [5].

Say: In pairs, solve two 4-digit by 2-digit divisions on squared paper. Student A writes while Student B checks the multiples list, then swap. Work the loop step by step and prove it by multiplying back.

Worked example: 4,680 ÷ 12 = 390. 46 ÷ 12 = 3 remainder 10 (3 x 12 = 36). Bring down 8 to make 108. 108 ÷ 12 = 9 remainder 0 (9 x 12 = 108). Bring down 0. 0 ÷ 12 = 0. Write 0 in the quotient because when the divisor does not fit a 0 still has to go in the quotient [12]. Answer 390. Check: 390 x 12 = 4,680.

Ask: The next part is smaller than the divisor, for example 0 shared by 12, what do you write? (Write 0 in the quotient above that digit, then continue [12].) · How do you prove the division is correct? (Multiply the quotient by the divisor to get the dividend [5].)

Check understanding: Pairs hold up quotients for checking and swap books to tick neat columns and correct answers; re-teach bring down if skipped.

Support: Give pre-drawn empty brackets with faint column guides and a completed multiples strip for the divisor. **Stretch:** Solve a division that needs a zero placeholder in the quotient and explain why the zero cannot be missed.

Use: Slide 9, Worksheet Task C, Worksheet Task D

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40–52 min **Remainder Roundtable** 12 min · Pairs

Decide whether a leftover stays as a remainder, becomes a fraction or needs rounding.

YOU DO

1. Show Slide 10 and model a final subtraction that ends with zero compared with one that leaves a leftover [10].
2. Explain that answers can be shown as whole number remainders, fractions, or by rounding, as appropriate for the context [1].
3. Give three short contexts for Worksheet Task E sorting, for example spare pencils, extra minibus seats and money.
4. Use Slide 11 to ask which first helper is best for 2,456 ÷ 14 before pairs justify their sort.

STUDENTS DO

1. Discuss the three cards in pairs and sort them into keep as remainder, make a fraction or round up.
2. Complete Worksheet Task E by sorting leftovers into the correct column.
3. Explain one choice aloud, for example why spare items stay as R but seats round up.

Say: If something is left after the last subtract, that is the remainder. Spare pencils stay as R, but if we need enough minibuses or boxes we round up, and sometimes we show the leftover as a fraction.

Worked example: 157 ÷ 4 = 39 R1 [12]. 4 x 39 = 156, 157 - 156 = 1. As pencils, keep 39 R1. As minibuses for 157 pupils with 4 seats filled differently, or boxes for eggs, round up because the 1 extra still needs a seat or box. As a fraction the leftover is 1 out of 4.

Ask: We have 39 R1 pencils, can we write 39.5 boxes? (No, keep 39 R1 because the spare cannot be split usefully.) · We have 157 people and 4-seater cars, is 39 R1 enough? (No, round up to 40 cars so the last person has a seat.)

Check understanding: Hinge vote on Slide 11 for best first helper for 2,456 ÷ 14; if unsure, build the 14 multiples list together.

Support: Show the zero-ending subtraction next to the leftover-ending subtraction to make remainder visual.
Stretch: Rewrite a remainder answer as a fraction and explain when that would be more useful.

Use: Slides 10-11, Worksheet Task E

52–60 min **Plenary** 8 min · Whole class

Return to the objectives and check accurate neat division and remainder choices.

YOU DO

1. Revisit the loop and neat columns: line up digits and the method never gets lost.
2. Take answers for 936 ÷ 12 and model the check 78 x 12 = 936 on the board.
3. Show Slide 12 exit ticket and collect one thing learnt and one question.
4. Praise straight columns and correct zero placeholders and set the homework.

STUDENTS DO

1. Solve 936 ÷ 12 on squared paper and hold up the quotient for checking.
2. Write the exit ticket with one thing learnt, one question and the answer.
3. Self-assess thumbs up if they can divide, explain leftovers and check.

Say: Show me perfect columns one last time. Solve 936 shared by 12, check it backwards, and tell me what you learnt and what you still want to ask.

Ask: What is 936 ÷ 12 and how do you know? (78, because 78 x 12 = 936.) · Say the loop in order without looking. (Divide, multiply, subtract, bring down [12].)

Check understanding: Collect exit tickets and scan quotients and remainder explanations; reteach zeros and checks next lesson if needed.

Support: Allow copying the multiples list for 12 and a place-value guide for the check. **Stretch:** Ask pupils to write a tricky 4-digit by 2-digit example that forces a zero in the quotient.

Use: Slide 12

Common mistakes

Mistake	How to spot it	How to fix it
Missing a zero in the quotient when the divisor does not fit	Answer looks ten times too small and a column has no digit above it	Write 0 above that digit before bringing down, because every position needs a digit [12].
Messy columns so digits drift and place value is lost	Subtraction is wrong even though times tables are right	Use one square per digit and keep straight columns, as most errors are lining-up errors [12].
Skipping bring down or choosing the multiple by guessing	Remainder larger than divisor or step order muddled	Say divide, multiply, subtract, bring down each loop and check the multiples list first [5] [12].

Support

- Give pre-drawn empty brackets with faint column guides and a completed multiples strip for the divisor.
- Let pupils keep a times-table chart nearby while they build multiples lists.
- Show a zero-ending subtraction next to a leftover-ending subtraction to make remainder visual.

Stretch

- Solve a division that needs a zero placeholder in the quotient and explain why the zero cannot be missed.
- Solve 4,680 divided by 12 and explain the extra zero in 390.
- Rewrite a remainder answer as a fraction and explain when that would be more useful.

For the LSE or teaching assistant

Sit with pairs needing alignment help; point to one square per digit, prompt the multiples list before each divide step, and scribe the check multiplication if needed.

Check for understanding

Question	Answer
My answer to 936 ÷ 12 is...	78
Write the four long division steps in order.	Divide, multiply, subtract, bring down
Buses take 14 pupils. For 2,456 pupils with 6 left over, how many buses?	176, round up so no one is left without a seat

Homework

Solve two 4-digit by 2-digit divisions on squared paper and prove each by multiplying back.

Sources

1. National curriculum in England: mathematics programmes of ... · gov.uk · https://www.gov.uk/government/publications/national-curriculum-in-england-mathematics-programmes-of-study/national-curriculum-in-england-mathematics-programmes-of-study
2. Understanding Long Division: Mastering Basic Math Skills · themathtutor.co.uk · https://www.themathtutor.co.uk/division-long-division
3. Year 6 Maths: Long Division | KSL - Key Stage Learning · keystagelearning.co.uk · https://keystagelearning.co.uk/year-6-maths-long-division/
4. Square Root By Long Division · solipsys.co.uk · https://www.solipsys.co.uk/new/SquareRootByLongDivision.html
5. Kids Math: Long Division - Ducksters · ducksters.com · https://www.ducksters.com/kidsmath/long_division.php
6. Long division Facts for Kids · kids.kiddle.co · https://kids.kiddle.co/Long_division
7. Polynomial long division - Wikipedia · en.wikipedia.org · https://en.wikipedia.org/wiki/Polynomial_long_division
8. Flexi answers - How is long division performed? | CK-12 Foundation · ck12.org · https://www.ck12.org/flexi/math-grade-6/divide-up-to-four-digits-by-two-digits-with-remainders/how-is-long-division-performed/
9. Long division can be easy! (Module 5) | young.2341's Blog · u.osu.edu · https://u.osu.edu/young.2341/2016/04/18/long-division-can-be-easy-module-5/
10. Division (mathematics) Facts for Kids · kids.kiddle.co · https://kids.kiddle.co/Division_(mathematics)
11. long division · planetmath.org · http://planetmath.org/longdivision
12. Long Division Explained: A Simple Step-by-Step Method ... · mathsheetfree.com · https://mathsheetfree.com/guides/long-division-step-by-step.html
13. Long Division - Math is Fun · mathsisfun.com · https://www.mathsisfun.com/long_division.html
14. Step-by-Step Guide to Long Division for Kids - emc.school · emc.school · https://www.emc.school/math-tips/step-by-step-guide-to-long-division-for-kids
15. Introduction to Long Division – A video • Teacha! · teacharesources.com · https://www.teacharesources.com/product/introduction-to-long-division-a-video/
16. Kids Math: Division Tips and Tricks - Ducksters · ducksters.com · https://www.ducksters.com/kidsmath/division_tips_tricks.php