Knowing 3, 4 and 8 Facts and Fact Families

Teacher		**Class**	Year 3
Subject	Maths	**Topic**	The 3, 4 and 8 times tables
Date		**Room**	
Lesson length	60 minutes	**Country**	United Kingdom

Pupils learn to recall 3, 4 and 8 facts and use them for division. They build arrays, double 4s to make 8s and explain fact families.

Curriculum links

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables

Learning objectives

- Students will recall multiplication facts for the 3, 4 and 8 tables quickly.
- Students will double 4 times-table facts to recall matching 8 times-table facts.
- Students will use known multiplication facts to solve matching division facts.

Success criteria

- I can say 3, 4 and 8 multiplication facts quickly.
- I can double a 4s fact to find the 8s fact.
- I can explain a division fact using its multiplication fact.

What students already know

Show 3 groups of 4 counters. Ask: How many altogether? How did you count it? Listen for repeated addition and skip counting in 4s.

Key words

multiplication	joining equal groups to find how many there are altogether
division	splitting a total into equal groups to find how many in each group
array	rows and columns of objects that show equal groups [2]
multiple	a number you say when you count in equal steps, like 12, 16, 20 in fours [2]
double	to add a number to itself to make twice as many [4]

Materials

- large fact cards for 3, 4 and 8 facts, including 8 x 4 = 32
- mini whiteboards and pens
- counters with one 4 by 8 array ready to keep in view
- printed copies of Worksheet Task C
- printed times tables grids
- slides 1-12 and speaker for Video clip 1

Before the lesson

- Print copies of Worksheet Task C and printed times tables grids, one per pair
- Make large fact cards including 8 x 4 = 32 [16] and 4 x 6 = 24
- Test Slide 6 Video clip 1 Eight times table song (0:00-2:05) with sound
- Set out mini whiteboards, pens and counters with one array in view for support

Lesson outline

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

Brings back quick 3, 4 and 8 recall and hooks pupils with the division question.

YOU DO

1. Display Slide 1 Quick 3s, 4s and 8s and Slide 2 Today we will, and read the objectives together.
2. Lead a quick chant of first multiples: 3, 6, 9, 12 and 4, 8, 12, 16 [2] with claps.
3. Pose the hook: If you know the multiplication, do you already know the division?
4. Take quick hands-up answers for 3 x 4 = 12 [2] and ask how a partner could prove it.

STUDENTS DO

1. Chant the multiples aloud and clap on each answer.
2. Turn to a partner and answer the hook question with one example they know.
3. Show thumbs up if they can already say a 3, 4 or 8 fact quickly.

Say: Today we will recall 3, 4 and 8 facts and use them for division. If you know the multiplication, do you already know the division? Turn to your partner and tell them what you think, then we will test your idea together.

Ask: What is 3 x 4, and how could you prove it without just remembering? (12 [2]; make 3 groups of 4 or a 3 by 4 array and count 4 + 4 + 4 = 12 [2].) · What comes after 8, 16 in the 8s, and why? (24 [2]; each jump adds 8 more, adjacent multiples of eight have a difference of eight [4].)

Check understanding: Mini whiteboards up for 3 x 4. If many miss 12, remake it quickly with counters before moving on.

Support: Let pupils follow a printed number line and point while chanting, since skip counting helps learn tables quickly [2]. **Stretch:** Ask pupils to chant the same sequence backwards from 24 without looking.

Use: Slides 1-2

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

Models arrays and doubling so pupils link 4s facts to 8s facts.

YOU DO

1. Display Slide 3 Where are the groups? and point out neat rows and columns for equal groups.
2. Display Slide 4 4s and 8s are linked and read Count in 4s: 4, 8, 12, 16, 20 and Count in 8s: 8, 16, 24, 32, 40.
3. Model doubling with counters: 4 x 6 = 24 [12], so double it to get 8 x 6 = 48 [12], because products in the eight times table are double the products in the four times table [4].
4. Play Slide 6 Video clip 1 Eight times table song (0:00-2:05), pupils clap softly on each answer and notice which fact feels hard.

STUDENTS DO

1. Chant 4s and 8s jumps with the teacher and show jumps with fingers.
2. Watch and listen to the 8s song and whisper the answers, then say them loudly.
3. Check 4 x 6 = 24 and 8 x 6 = 48 on the printed times tables grid [3].

Say: An array of rows and columns shows why order can swap [2]. Watch how 4 rows of 6 is 24, so 8 rows of 6 must be double, 48. We read the tables out loud because you will learn them more quickly [3].

Worked example: 4 x 6 = 24 [12]. Step 1: make a 4 by 6 array. Step 2: count 4 + 4 + 4 + 4 + 4 + 4 = 24. Step 3: double 24 to get 48. So 8 x 6 = 48, checked where row and column meet on the times tables grid [3].

Ask: How are the 4s and 8s linked? (Products in the eight times table are double the products in the four times table [4].) · If 4 x 7 = 28 [3], what is 8 x 7? (56 [3]; double 28 to make 56.) · How does an array prove 4 x 6 = 6 x 4? (A 4 by 6 array turned round is 6 by 4 and still totals 24 [12][3].)

Check understanding: All point on grids to 8 x 6 = 48 [3]. If unsure, rebuild the 4 x 6 array and double it again.

Support: Start with 2 or 3 rows only and count the total by repeated addition, such as 4 + 4 + 4 = 12 for 3 groups of 4 [2]. **Stretch:** Predict 8 x 9 from 4 x 9 = 36 [3] by doubling to 72 [3] before checking the grid.

Use: Slides 3-4, 7; Slide 6, Video clip 1 (0:00-2:05)

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

Builds fact families so pupils explain division facts using known multiplications.

YOU DO

1. Display Slide 9 Your task and set roles: Partner A says a 3, 4 or 8 fact, Partner B answers then shows doubling or array.
2. Model with large fact card 8 x 4 = 32 [16] and write the matching multiplications and divisions together.
3. Display Slide 11 Think, pair, share: If 8 x 4 = 32, what is 32 ÷ 8? How do you know?
4. Circulate, keep one array in view, and ask pairs to prove 32 ÷ 8 = 4 [3] with counters.

STUDENTS DO

1. Take turns to give and solve 3, 4 and 8 facts, showing doubling or an array each time.
2. Discuss with a partner what divisions 8 x 4 = 32 [16] must give and agree the family.
3. Write the fact family on mini whiteboards and prove it with counters.

Say: Partner A says a fact, Partner B answers and proves it. You can show an array of rows and columns [2] or double a 4s fact to make an 8s fact [4]. Swap roles and then try a division fact.

Worked example: 8 x 4 = 32 [16]. Step 1: make 8 rows of 4. Step 2: total is 32. Step 3: split 32 into 8 equal rows, each row is 4, so 32 ÷ 8 = 4 [3]. Step 4: split 32 into 4 equal groups, each group is 8, so 32 ÷ 4 = 8.

Ask: If 8 x 4 = 32, what is 32 ÷ 8? How do you know? (4 [3]; the same numbers appear in the multiplication and the two matching divisions.) · If 3 x 8 = 24 [3], what two divisions do you already know? (24 ÷ 3 = 8 and 24 ÷ 8 = 3.)

Check understanding: Pairs hold up whiteboards showing 32 ÷ 8 = 4. Re-model with the array if families are incomplete.

Support: Keep one array made from counters in view so pupils can see the rows as divisions, since arrays show groups or rows of objects for multiplication [2]. **Stretch:** Ask pupils to spot and explain a second fact family that gives the same answer.

Use: Slides 9, 11

40–52 min **Practice** 12 min · On their own

Practises recalling 4s to 8s by doubling and spotting near facts.

YOU DO

1. Display Slide 10 Did you know? 6 x 8 is the trickiest fact to remember and read Doubling helps: 4 x 6 = 24, so 8 x 6 = 48.
2. Hand out Worksheet Task C Practice questions: Solve these facts. Use doubling from 4 to 8 to help.
3. Remind pupils to use the times tables grid, which is a handy way of quickly viewing all the tables [3], only to check.
4. Collect in work and note who still counts every step instead of doubling [4].

STUDENTS DO

1. Complete Worksheet Task C on their own, writing multiplications and matching divisions.
2. Check one answer with a partner on the times tables grid [3].
3. Star the fact they can now remember without counting.

Say: Work on your own on Task C. Start from the 4s fact you know, then double to get the 8s fact [4]. If you are stuck, skip-count in 4s or 8s [2], then write both number sentences.

Worked example: Task C style: 4 x 7 = 28 [3], so 8 x 7 = 56 [3]. Double 28: 28 + 28 = 56. Check where row 8 and column 7 meet on the grid [3].

Ask: How did doubling help with 8 x 6? (4 x 6 = 24, so 8 x 6 = 48 [12]; 8s products are double 4s products [4].) · 6 x 8 is tricky [9]. How could you work it out if you forget it? (Use 4 x 6 = 24 then double to 48, or swap to 8 x 6 = 48 [3].)

Check understanding: Quick mark of first four Task C answers on whiteboards. Reteach doubling with counters for pupils below 3 correct.

Support: Give a short strip with only four facts and a 4s number line to skip-count from [2]. **Stretch:** Cover the answers and try to write the highlighted row from memory, then explain the doubling step.

Use: Slide 10; Worksheet Task C

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

Returns to the objectives and checks confident recall and division use.

YOU DO

1. Display Slide 5 Which feels easiest? and take a quick vote for 3, 4 or 8 tables.
2. Ask two pupils to perform one fact and its division, class checks against the printed grid [3].
3. Display Slide 12 Exit ticket and read One 3, 4 or 8 fact I remember, One division fact I can explain.
4. Collect exit lines and link back to Slide 2 objectives.

STUDENTS DO

1. Vote, then say one fact and division pair aloud for the class to check.
2. Write exit ticket lines with one multiplication and one division fact.
3. Note one question they still have for next lesson.

Say: Show what you remember. Say your multiplication fact loudly, then explain its division fact. We copy the tables and say them out loud so we can remember them better [3]. Write your exit ticket clearly.

Ask: Give me a division fact you can explain with multiplication. (For example, 32 ÷ 8 = 4 because 8 x 4 = 32 [16][3].) · Which table feels easiest now, and why? (Any with reason, e.g. 8s because I double my 4s [4].)

Check understanding: Read three exit tickets aloud. If divisions are missing, model one more family on the board.

Support: Allow pupils to read their fact from the grid while saying the division in their own words. **Stretch:** Ask pupils to give the fact family mixed up instead of in order, with the class asking divisions back.

Use: Slides 5, 12

Common mistakes

Mistake	How to spot it	How to fix it
Saying 8 x 6 = 24, mixing the 4s and 8s answers.	Pupil gives the 4s product for an 8s question on whiteboard or Task C.	Rebuild 4 x 6 = 24 then double to 48 [12], stressing 8s products are double 4s products [4].
Treating division as separate from multiplication.	Pupil knows 8 x 4 = 32 [16] but cannot answer 32 ÷ 8.	Split the 8 by 4 array into rows to show 32 ÷ 8 = 4 and 32 ÷ 4 = 8 [3].
Losing place when skip-counting in 3s, 4s or 8s.	Sequence jumps wrongly, e.g. 8, 16, 24, 31 instead of 32 [2].	Mark landings on a number line with equal jumps [12] and chant 8, 16, 24, 32, 40 [2] aloud.

Support

- Keep one array made from counters in view so pupils can see the rows as divisions, since arrays show groups or rows of objects for multiplication [2].
- Use number lines, printed grids and short fact strips with repeated addition like 4 + 4 + 4 = 12 [2].

Stretch

- Ask pupils to spot and explain a second fact family that gives the same answer.
- Predict next multiples and perform facts mixed up, explaining doubling from 4 to 8 [4].

For the LSE or teaching assistant

Stay with the main pairs work: keep the counter array in view, prompt skip-counting in steps [2] and ask pupils to say the division aloud before writing it.

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Check for understanding

Question	Answer
What is 4 x 6 and what is 8 x 6? How are they linked?	24 and 48 [12]; 48 is double 24 because 8s are double 4s [4].
If 8 x 4 = 32, what is 32 ÷ 8?	4 [3].
What is 3 x 5 and what division does it give?	15 [3]; 15 ÷ 3 = 5 or 15 ÷ 5 = 3.

Homework

Practise saying 3, 4 and 8 facts aloud and write one multiplication with its two divisions.

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