Fair Teams, Same Time, Smaller Sums

Teacher		**Class**	Grade 6
Subject	Math	**Topic**	Greatest common factor and least common multiple
Date		**Room**	
Lesson length	60 minutes	**Country**	United Kingdom

Students learn to find GCF, LCM, and rewrite sums with the distributive property. They hunt and fix mistakes in pairs and prove the corrections.

Curriculum links

- Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12 [1].
- Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express 36 + 8 as 4 (9 + 2) [1].

Learning objectives

- Students will find the GCF of two whole numbers up to 100.
- Students will find the LCM of two whole numbers up to 12.
- Students will rewrite a sum 1-100 as GCF times a simpler sum.

Success criteria

- I can list factors and pick the greatest shared factor.
- I can list multiples and pick the least shared multiple.
- I can factor a sum with the GCF using parentheses.

What students already know

Ask: give me a factor of 12 and a multiple of 6. Listen for factor divides evenly and multiple is in the times table. Clear any mix-up in 2 minutes.

Key words

factor	a whole number that goes into another number with no remainder [8]
multiple	a number in that number's times table [7]
greatest common factor	the largest number that goes into both numbers evenly [5]
least common multiple	the smallest number found in both times tables [5]
distributive property	a rule to rewrite a sum as an outside number times an inside sum, as in 36 + 8 as 4 (9 + 2) [1]

Materials

- Slide deck Slides 1-12
- Video clip 1 GCF by listing factors and Video clip 2 LCM by listing multiples
- Error cards with faulty GCF, LCM, and distributive work

Before the lesson

- Print error cards, correction slips, and Worksheet Tasks B-C for pairs
- Test Slides 6 and 8 and Video clip 1 (0:00–4:26) and Video clip 2 (0:00–4:29) with sound

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- Correction slips
- Printed Worksheet Tasks B and C, one per student
- Mini whiteboards, markers, erasers
- Set mini whiteboards and markers on desks and queue Slides 1-3 for starter

Lesson outline

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

Recall factor and multiple language and hook students as error checkers.

YOU DO

1. Show Slide 1 GCF and LCM title and read Share fairly, meet on time, and rewrite sums.
2. Say the hook: I did last night's math in a hurry and I think I messed up. Will you be my teacher?
3. Show Slide 2 on identical packs and repeating buses and Slide 3 on factors vs multiples.
4. Ask students to signal factor or multiple for 4 of 12 and 24 of 6 and fix wording.

STUDENTS DO

1. Listen to hook and read Slides 1-3 with teacher.
2. Answer factor or multiple prompts on mini whiteboards.
3. Preview that they will correct GCF, LCM, and sum work.

Say: I did last night's math in a hurry and I think I messed up. Will you be my teacher? Today you will find the greatest shared divider and the smallest shared times-table number, and then shrink sums without changing their value.

Ask: What is the difference between a factor and a multiple? (A factor divides evenly with no remainder, a multiple lives in that number's times table [7][8].) · Why do any two numbers always share at least one factor? (1 is a factor of every whole number, so 1 is always common [8].)

Check understanding: Hold up whiteboards for factor or multiple sort; reteach Slide 3 definitions if more than a few mix them.

Support: Give a multiplication chart so students can point to times-table entries for multiples. **Stretch:** Ask students to name a common factor of 12 and 18 to preview GCF of 6 [3].

Use: Slides 1-3

8–20 min **Teaching: GCF and shrinking sums** 12 min · Whole class

Model finding GCF by listing and rewriting a sum with the GCF outside.

YOU DO

1. Show Slide 4 steps and think aloud listing factors in order without missing pairs.
2. Play Video clip 1 and pause where common factors get circled to name 1, 2, 3, 6.
3. Show Slide 5 mystery with 36 and 8 tiles and Slide 7 steps to divide by the GCF.
4. Model checking by multiplying back out to get the original sum.

STUDENTS DO

1. Copy both factor lists, circle commons, and triangle the GCF of 6 with teacher.
2. Choral respond to divide steps for 36 and 8 and check by multiplying out.

Say: We list every factor in order, circle the matches, and pick the biggest match. Then we divide both parts of the sum by that biggest match and write it outside parentheses. The inside pair should share nothing but 1.

Worked example: GCF of 12 and 18: factors of 12 are 1, 2, 3, 4, 6, 12 [3] and factors of 18 are 1, 2, 3, 6, 9, 18 [3]. Common factors are 1, 2, 3, 6, so GCF is 6 [3]. For 36 + 8: both share 4, 36 ÷ 4 = 9 and 8 ÷ 4 = 2, so 36 + 8 = 4 (9 + 2) [1]. Check: 4 x 9 + 4 x 2 = 36 + 8.

Ask: How do you know you listed every factor of 12? (List factor pairs in order 1x12, 2x6, 3x4 until pairs repeat.) · How do you know 4 (9 + 2) is finished? (9 and 2 have no common factor besides 1, so 4 was the greatest common factor [1].)

Check understanding: All show GCF on whiteboards; if lists are incomplete, model missing pair before moving on.

Support: Give starter lists with 1 and the number filled in, then students find middle factor pairs for 12 and 18 [3]. **Stretch:** Ask students to try GCF of 30 and 20 and explain why it is 10, the highest common factor of 30 and 20 [7].

Use: Slides 4-7, Video clip 1 (0:00–4:26)

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20–30 min **Teaching: LCM** 10 min · Whole class

Model finding LCM by listing multiples and spotting the first match.

YOU DO

1. Show Slide 8 and ask students to predict where jumps of 6 and 8 first land together.
2. Play Video clip 2 and have students track how multiples keep counting up.
3. Think aloud writing both lists in order and starring the first shared number.
4. Contrast with GCF: GCF splits into biggest equal groups, LCM finds the next shared time.

STUDENTS DO

1. Skip-count aloud with teacher while tracking multiples on paper.
2. Star 24 as the first match and state the LCM in a full sentence.

Say: Multiples keep counting up by the same jump. We write both lists in order and stop at the first number in both lists. That first match is the least common multiple, the smallest number both numbers go into.

Worked example: First few multiples of 6 are 6, 12, 18, 24, 30, 36 [3] and first few multiples of 8 are 8, 16, 24, 32, 40 [3]. The first shared number is 24, so the least common multiple of 6 and 8 is 24 [3].

Ask: Why is 24 the LCM and not 48? (48 is common but 24 comes first, and LCM is the smallest common multiple [5].) · When would you need LCM in real life? (When repeats must meet again, like buses meeting [13].)

Check understanding: Fist-to-five confidence on LCM steps; re-list on board if many show 1-2.

Support: Let students use a multiplication chart to skip-count and highlight each multiple before comparing lists [3]. **Stretch:** Have students predict the second shared multiple of 6 and 8 and explain the pattern.

Use: Slide 8, Video clip 2 (0:00–4:29)

30–50 min **Main activity: Fix My Mistake** 20 min · Pairs

Correct errors in GCF, LCM, and distributive work to secure the methods.

YOU DO

1. Hand out error cards and correction slips and assign Worksheet Tasks B and C.
2. Direct pairs to first prove each error with ordered lists, then rewrite correctly.
3. Circulate, prompt for underlining the proving line, and push for no-common-factor check inside.
4. Stop at 15 minutes for two pairs to model a fixed LCM card and a fixed sum card.

STUDENTS DO

1. In pairs, list factors and multiples to test each error card and complete Worksheet Tasks B and C.
2. Write corrections on slips, underline the proving line, and check sums by multiplying out.

Say: Your job is to be my teacher. Find the wrong line, prove it with a factor or multiple list, and rewrite it correctly on a correction slip. For sums, the outside number must be the greatest common factor and the inside pair must share only 1.

Worked example: Card says LCM of 4 and 12 is 24. List: multiples of 4 are 4, 8, 12, 16 [4] and multiples of 12 are 12, 24 [4], so first match is 12, not 24 [4]. Card says 36 + 8 = 2 (18 + 4). Fix to 4 (9 + 2) because the final inside pair should have no common factor [1].

Ask: How does your list prove the LCM fix? (Both lists are in order and the starred first match is smaller than the error, such as 12 for 4 and 12 [4].) · How do you know your rewritten sum is finished? (Outside is the GCF and inside numbers cannot be divided by the same number greater than 1 [1].)

Check understanding: Collect one correction slip per pair and scan for ordered lists and correct GCF, LCM, and factored sums; pull small group if lists are out of order.

Support: Highlight the multiples of 4 as 4, 8, 12, 16, 20, 24 and the multiples of 12 as 12, 24 so the first match stands out [4]. **Stretch:** Have students write their own tricky error card for another group to solve.

Use: Worksheet Tasks B-C

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50–60 min **Plenary** 10 min · Whole class

Check GCF, LCM, and distributive skill against success criteria.

YOU DO

1. Show Slide 10 fact that 1 is always a common factor and link to pairs like 5 and 7.
2. Run Slide 12 quick quiz one question at a time with whiteboard answers.
3. Narrate why 36 + 8 must be 4 (9 + 2) and not a smaller factor outside.
4. Have students self-rate success criteria and name which tool helped most.

STUDENTS DO

1. Answer four quiz prompts on whiteboards and explain lists to a partner.
2. Vote on preferred method and set one personal fix-it target.

Say: Any two numbers always have at least one common factor because 1 goes into everything. Show me each quiz answer and be ready to prove it with a list. If you can name the GCF, the LCM, and the shrunken sum, you met today's goals.

Ask: What is GCF of 12 and 18 and LCM of 6 and 8? (GCF is 6 [3] and LCM is 24 [3].) · Why is GCF of 5 and 7 equal to 1? (1 is the GCF of 5 and 7 because they share no larger factor [3].)

Check understanding: Whiteboard quiz: expect 6, 24, 4 (9 + 2), 10; reteach any item below 80% correct tomorrow.

Support: Display ordered factor and multiple lists while quizzing so students match rather than recall cold.
Stretch: Ask for GCF of 24 and 36 and proof that overlap product gives 12 [3].

Use: Slides 10-12

Common mistakes

Mistake	How to spot it	How to fix it
Mixing up GCF and LCM and picking a large multiple for GCF.	Student circles 24 for GCF of 6 and 8 or lists multiples when asked for factors.	Ask: do we split into groups or wait for a shared time? Use factors for biggest divider and multiples in times tables for smallest shared multiple [5][7].
Stopping at any common factor when rewriting a sum, like 36 + 8 as 2 (18 + 4).	Inside numbers still share a factor greater than 1.	Require outside to be the GCF and check inside has no common factor, so correct to 4 (9 + 2) [1].
Missing factors or skipping multiples so first match is wrong.	Lists out of order or gaps, such as missing 12 in multiples of 4.	Rewrite lists in order: multiples of 4 are 4, 8, 12, 16 [4] and check factor pairs until they repeat.

Support

- Provide factor-pair starters, highlighted multiplication charts, and pre-listed multiples for 4 and 12 [4].
- Allow oral explanation on correction slips with LSE scribing lists in order.

Stretch

- Challenge students to write new error cards and to find GCFs up to 100 with proof of complete lists.
- Ask for explanation of prime overlap for 24 and 36 to show GCF of 12 [3].

For the LSE or teaching assistant

Sit with target pairs during main activity; prompt ordered listing, highlight first LCM match, and check inside pair shares only 1.

Check for understanding

Question	Answer
What is the GCF of 30 and 20?	10
What is the LCM of 4 and 5?	20
Rewrite 24 + 16 using the GCF.	8 (3 + 2)

Homework

Find GCF of 18 and 24, LCM of 6 and 10, and rewrite 18 + 24 with its GCF.

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