

UM PRINTABLES

A DISCOVERY-BASED MATH UNIT

GCF & LCM

Discovery Lab

Plus the Distributive Property Connection

Hands-On

Algorithm

3 Activities

24 Practice Problems

Full Answer Keys

THE BIG IDEA

$$36 + 8 = 4(9 + 2)$$

Use the GCF to rewrite a sum as a multiple of a sum.

A complete, classroom-ready mega unit that helps Grade 6 students **discover** the greatest common factor and least common multiple through two methods each, then connects both ideas to the distributive property using hands-on tile models. Includes teacher scripts, anchor charts, foldables, exit tickets, and a final quiz.

CCSS 6.NS.B.4

Grade 6 | Numbers & the Number System

Welcome, Teacher!

Thank you for choosing the **GCF & LCM Discovery Lab**. This resource is built on a simple but powerful idea: students learn math most deeply when they **discover** the rules themselves, rather than memorize a procedure handed to them. Across three discovery activities, your Grade 6 students will compare two methods for finding the Greatest Common Factor (GCF), compare two methods for finding the Least Common Multiple (LCM), and then use hands-on tile models to connect both ideas to the distributive property — a connection that is required by CCSS 6.NS.B.4 but rarely developed in standard curricula.

This is a **discovery-based** unit, which means your role shifts from lecturer to facilitator. You will pose questions, circulate, listen to student thinking, and orchestrate whole-group discussions. The teacher scripts in each Discovery Activity give you the exact words to use, the questions to ask, and the misconceptions to watch for. You do not need to be a math specialist — every step is scripted and every answer is provided.

What's Inside

This mega unit contains everything you need for a complete 5–7 day unit on 6.NS.B.4. Below is a breakdown of the major components and how they fit together.

Component	Pages	Purpose	Suggested Timing
Teacher Welcome & CCSS Chart	3–5	Unit overview, standards alignment, pacing guide	10 min teacher prep
Vocabulary Reference	7–8	7 key terms with definitions, examples, misconceptions	Teacher reference
Anchor Charts (Birthday Cake + Ladder)	9–10	Printable reference posters for both algorithms	Print & display
Discovery Activity 1: GCF	11–15	Compare listing vs. prime factorization methods	1 class period (~50 min)
Discovery Activity 2: LCM	16–20	Compare listing vs. prime factorization methods	1 class period (~50 min)
Discovery Activity 3: Distributive	21–25	Connect GCF to $36+8 = 4(9+2)$ using tiles	1–2 class periods (~75 min)
Printables: Trees, Tiles, Foldable	26–28	Hands-on materials students cut and use	Print 1 per student
Practice Set (24 mixed problems)	29–32	Independent practice with real-world contexts	30–40 min

Anchor Chart 1: Birthday Cake Method

For Finding GCF

The Birthday Cake Method for GCF

The Birthday Cake method (also called the "Ladder" method for GCF) is a visual algorithm for finding the Greatest Common Factor. Students draw an upside-down "L" (the cake), put the two numbers inside the top, and divide by any common prime factor. They keep dividing until the two remaining numbers share no common factor (they are relatively prime). The GCF is the product of all the divisors on the left side of the cake.

Worked Example: GCF(36, 48)

Step 1: Write 36 and 48 inside the top of the cake, separated by a vertical line.

Step 2: Find a prime that divides both. 2 works: $36 \div 2 = 18$, $48 \div 2 = 24$. Write 2 on the left.

Step 3: Repeat with 18 and 24. 2 works again: $18 \div 2 = 9$, $24 \div 2 = 12$. Write another 2 on the left.

Step 4: Now 9 and 12. 2 does not divide 9, so try 3: $9 \div 3 = 3$, $12 \div 3 = 4$. Write 3 on the left.

Step 5: Now 3 and 4. They share no common factor (relatively prime). Stop.

Step 6: Multiply all divisors on the left: $2 \times 2 \times 3 = 12$. So $\text{GCF}(36, 48) = 12$.

	36	48
2	18	24
2	9	12
3	3	4
$\text{GCF} = 2 \times 2 \times 3 = 12$		

Figure 1. The Birthday Cake for GCF(36, 48). The divisors on the left (2, 2, 3) multiply to give the GCF: $2 \times 2 \times 3 = 12$.

! Why It Works

Every time we divide both numbers by a common prime, we are "removing" that prime from their shared factorization. When we are done, the only thing left that was shared is exactly the product of all the primes we divided out — which is the GCF. The numbers left over (3 and 4) are what remains *after* removing all common factors, so they share nothing. They are relatively prime.

A Second Example: GCF(60, 72)

Discovery 1 — Student Page A

Method 1: GCF by Listing Factors

Method 1: Finding GCF by Listing Factors

The first method for finding the GCF is to **list all the factors** of each number, find the factors they have in common, and pick the greatest one. This method works well for small numbers where you can list factors mentally.

Worked Example: GCF(12, 18)

Step 1: List all factors of 12 in pairs: 1×12 , 2×6 , 3×4 . So factors of 12 are **1, 2, 3, 4, 6, 12**.

Step 2: List all factors of 18 in pairs: 1×18 , 2×9 , 3×6 . So factors of 18 are **1, 2, 3, 6, 9, 18**.

Step 3: Find the common factors (the ones in both lists): **1, 2, 3, 6**.

Step 4: Pick the greatest: **GCF(12, 18) = 6**.

Factors of 12	Factors of 18	Common Factors	GCF
1, 2, 3, 4, 6, 12	1, 2, 3, 6, 9, 18	1, 2, 3, 6	6

Your Turn — Solve by Listing Factors

For each pair, list **ALL** factors of each number, circle the common factors, and write the GCF. Use the workspace provided.

- Find **GCF(8, 12)** by listing all factors.

- Find **GCF(15, 25)** by listing all factors.

- Find **GCF(24, 36)** by listing all factors.

Modeling $36 + 8$ with Tiles

You and your partner have 36 teal tiles and 8 coral tiles. Your goal is to discover how the GCF connects to the distributive property. Follow each step carefully and answer the questions.

Step 1: Make Two Piles

Put your 36 teal tiles in one pile (Pile A) and your 8 coral tiles in another pile (Pile B). Count to make sure you have exactly the right number in each pile.

Question 1

How many teal tiles do you have? _____ How many coral tiles? _____ Total tiles: _____

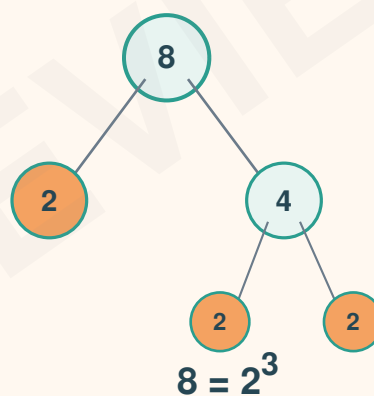
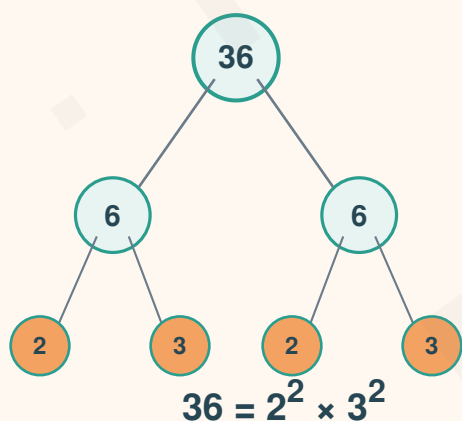
Step 2: Find the Greatest Group Size

You want to arrange BOTH piles into the SAME number of equal groups, with no tiles left over. What is the **greatest** number of groups you can make? (Hint: this is the GCF of 36 and 8.)

Question 2

Find $\text{GCF}(36, 8)$ using either method you learned in Activity 1. Show your work below.

$\text{GCF}(36, 8) = \underline{\hspace{2cm}}$



Shared prime: 2. Smallest exponent: 2 (from $36 = 2^2$). So $\text{GCF}(36, 8) = 2^2 = 4$.

Step 3: Make the Groups

Practice Set — Part 1: GCF

8 Problems (6 computation + 2 real-world)

Part 1: Find the GCF

Find the Greatest Common Factor of each pair. Show your work using either method (listing or prime factorization). Circle your final answer.

1. Find **GCF(24, 60)**.

2. Find **GCF(36, 48)**.

3. Find **GCF(45, 75)**.

4. Find **GCF(28, 42)**.

5. Find **GCF(54, 72)**.

6. Find **GCF(32, 80)**.

Quiz: GCF, LCM, & Distributive Property

10 Questions · 10 Points

End-of-Unit Quiz

Name: _____ Date: _____ Period: _____ Score: _____ / 10

Directions: Answer each question in the workspace provided. Show your work for full credit. Each question is worth 1 point. You may use the GCF/LCM anchor charts as a reference.

Part A: GCF (3 points)

1. Find GCF(20, 30).

2. Find GCF(36, 54).

3. **Real-world:** Mia has 16 red beads and 24 blue beads. She wants to make identical bracelets using all the beads. What is the **greatest number of bracelets** she can make?

Part B: LCM (3 points)

4. Find LCM(4, 7).

5. Find LCM(6, 10).



Answer Key — Discovery Activity 1: GCF

Below are full step-by-step solutions for all six GCF pairs, each shown by **both** methods. Every solution verifies that the two methods produce the same answer.

Problem 1. Find GCF(8, 12).

Listing Method:

Factors of 8: 1, 2, 4, 8

Factors of 12: 1, 2, 3, 4, 6, 12

Common factors: 1, 2, 4

GCF = 4

Prime Factorization Method:

$$8 = 2^3$$

$$12 = 2^2 \times 3$$

Shared primes, smallest exponent: 2 (smallest exp.)

GCF = 4

Both methods agree: GCF(8, 12) = 4.

Answer: GCF(8, 12) = 4

Problem 2. Find GCF(15, 25).

Listing Method:

Factors of 15: 1, 3, 5, 15

Factors of 25: 1, 5, 25

Common factors: 1, 5

GCF = 5

Prime Factorization Method:

$$15 = 3 \times 5$$

$$25 = 5^2$$

Shared primes, smallest exponent: 5 (smallest exp.)

GCF = 5

Both methods agree: GCF(15, 25) = 5.

Answer: GCF(15, 25) = 5

GCF & LCM DISCOVERY LAB

What's Inside

A complete, classroom-ready unit for CCSS 6.NS.B.4 · 85 pages · Grades 5–7

3
Discovery Activities
GCF · LCM · Distributive Property

Hands-on, teacher-scripted lessons with full dialogue and questioning sequences.

2
Anchor Charts
Birthday Cake + Ladder Method

Visual algorithm reference posters students return to again and again.

7
Key Vocabulary Terms
Reference Page + 7-Door Foldable

Misconception tips and teaching cues for every term.

24
Practice Problems
GCF · LCM · Distributive

Mixed computation plus real-world contexts for every sub-skill.

4
Exit Tickets
GCF · LCM · Distributive · Mixed

Five-minute formative checks, two-per-page format.

1
End-of-Unit Quiz
10 Questions · 10 Points

Summative assessment with full grading notes included.

3
Printable Manipulatives
Factor Trees · Ladder · Two-Color Tiles

Cut-out, hands-on learning tools for tactile math discovery.

85
Pages of Content
Full unit · Ready to print

No prep required — just print and teach. Classroom-tested design.

100%
Answer Keys Included
Step-by-step solutions

Full teacher support for every problem, page, and activity.

● **CCSS ALIGNED**
Standard 6.NS.B.4

● **NO PREP**
Print and teach

● **HANDS-ON**
Discovery-based

● **FULL ANSWER KEYS**
Every page supported

The Big Idea: $36 + 8 = 4(9 + 2)$

 Full resource: 85 pages · CCSS 6.NS.B.4 · UM Printables
This preview shows selected pages · Full answer keys in complete resource