UNIT 1 · STANDARD 6.NS.4

Prime Factorization Flagship

Lesson 1-1-flagship

Name: Type your name **Date:** Today's date **Class:** Class period

ORBITAL LOGISTICS MISSION

Cargo Codebreak

You are the logistics officer aboard Station Helios. A shipment of 60 supply crates just docked, and the sorting robots can only distribute cargo once it is broken into its prime building blocks. Master prime factorization and the station eats this week.

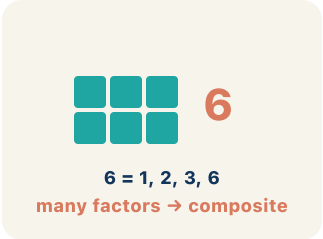
Key Vocabulary Level 2 Standard

Picture first, then the word, then a plain-language meaning. Say each word out loud.

7 has only two factors: 1 × 7. So 7 is prime.

Prime number

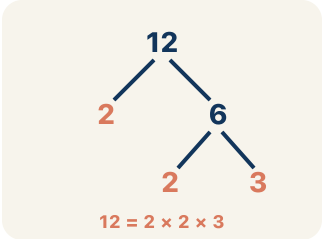
Write the definition:



12 = 1 × 12, 2 × 6, 3 × 4 — six factors, so 12 is composite

Composite number

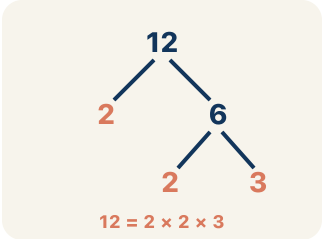
Write the definition:



36 = 2 × 2 × 3 × 3 = $2^2 \times 3^2$

Prime factorization

Write the definition:



24 → 4 × 6 → (2 × 2) × (2 × 3) → 2 × 2 × 2 × 3

Factor tree

Write the definition:

2^3 means 2 × 2 × 2 = 8

Exponent

Write the definition:

Guided Notes Level 2 Standard

🎯 **WHAT WE'RE LEARNING TODAY**

I can write a number as a product of its prime factors using a factor tree.

✏️ **Fill in each blank as we go. Use the Word Bank to help you.**

📚 **WORD BANK — FILL EACH BLANK WITH THE BEST WORD**

Prime number | Composite number | Prime factorization | Factor tree | Exponent

🤟 *Tap any word to see what it means and a picture.*

1 A whole number greater than 1 with exactly two factors, 1 and itself, is a _____ number.

2 A whole number greater than 1 that has more than two factors is a _____ number.

3 _____ — Writing a number as prime numbers multiplied together.

4 I can break a number into its prime factors step by step using a _____.

5 In 2^3, the small number 3 is the _____ and it shows 2 is multiplied 3 times.

🧱 Watch & Try — Worked Examples

See the notes in action: watch one worked all the way through, then try the next with the same steps.

👀 I do — watch

Follow each step as your teacher solves it.

Problem: Which of the following is a prime number?

A. 17

B. 15

C. 21

D. 9

Step 1 17 has exactly two factors: 1 and 17.

Step 2 15 = 3 × 5, 21 = 3 × 7, and 9 = 3 × 3, so they are all composite.

✅ **Answer:** A. 17

🧩 Try — put the steps in order

Drag the cards (or use the ▲▼ buttons) to put the solution steps in the right order, then press **Check**.

15 = 3 × 5, 21 = 3 × 7, and 9 = 3 × 3, so they are all composite.

17 has exactly two factors: 1 and 17.

🤝 We do — together

Solve this one with your class using the same steps.

Problem: What is the prime factorization of 30?

A. 2 × 3 × 5

B. 5 × 6

C. 2 × 15

D. 3 × 10

Step 1 _____

Step 2 _____

Answer: _____

✏️ **You do — your turn**

Now try one on your own. Show every step.

Problem: What is the prime factorization of 18?

A. 2 × 3 × 3

B. 2 × 9

C. 3 × 6

D. 6 × 3

Show your work:

Try It

Solve on your own. Check the answer key when you are done.

1. Lock 3 — Rewrite the prime factorization of 72 in exponent form.

A. $2^3 \times 3^2$

B. $2^2 \times 3^3$

C. 2×3^5

D. 6^2

Show your work:

2. Final Vault — The vault code is the prime factorization of 84 with all prime factors listed. Which code opens it?

A. $2 \times 2 \times 3 \times 7$

B. 2×42

C. 4×21

D. $2 \times 2 \times 21$

Show your work:

Stretch Your Thinking

Level 2 enrichment

Challenge task — explain your reasoning in full sentences.

Choose any two-digit composite number. Show TWO different factor trees that both lead to the same prime factorization. Explain why every composite number has only one prime factorization.

Sentence starter: I chose the number ____. My first factor tree starts with ____ × ____, and my second starts with ____ × ____. Both give the same prime factorization: ____. This happens because ____.

Show your work:

Reflect — Exit Ticket

What is the prime factorization of 40?

A. 2 × 2 × 2 × 5

B. 4 × 10

C. 5 × 8

D. 2 × 20

Your answer: