

# Powers and Exponents

Flagship

Lesson 6-1-flagship

**Name:** \_\_\_\_\_  
Type your name

**Date:** \_\_\_\_\_  
Today's date

**Class:** \_\_\_\_\_  
Class period

## SOUND STUDIO MISSION

### **| The Doubling Mixboard**

You are the lead sound engineer at Amplitude Studios. Every time you flip a switch on the new mixboard, the volume doubles — that is the power of exponents. The headline act goes on in one hour, and you must master powers before the speakers can be safely dialed in.

# Key Vocabulary Level 2 Standard

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



*In  $2^3$ , the small 3 means multiply 2 by itself 3 times:  $2 \times 2 \times 2 = 8$*

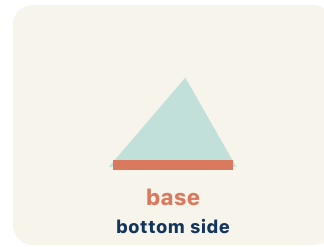
## Exponent

Write the definition:

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*In  $5^2$ , the base is 5 — it is the number being multiplied:  $5 \times 5 = 25$*

## Base

Write the definition:

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*$10^3 = 10 \times 10 \times 10 = 1,000$  — read as '10 to the third power' or '10 cubed'*

## Power

Write the definition:

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*Evaluate  $3^4$ : write  $3 \times 3 \times 3 \times 3$ , then multiply step by step:  $9 \times 9 = 81$*

## Evaluate

Write the definition:

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In  $3x$ , the 3 is the coefficient — if  $x = 4$ , then  $3x = 3 \times 4 = 12$

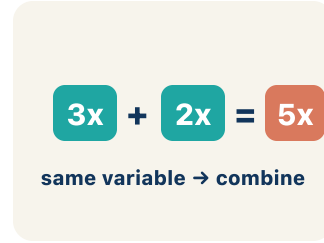
### Coefficient

Write the definition:

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$4x$  and  $2x$  are like terms (both have  $x$ );  $4x$  and  $4x^2$  are NOT like terms (different powers)

### Like terms

Write the definition:

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## Guided Notes Level 2 Standard



### WHAT WE'RE LEARNING TODAY

I can write and evaluate numbers in exponent form using a base and a power.



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



### WORD BANK – FILL EACH BLANK WITH THE BEST WORD

Exponent

Base

Power

Evaluate

Coefficient

Like terms



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

1 The small raised number that shows how many times the base is multiplied is the

2 The number being multiplied repeatedly in a power, like the 3 in  $3^4$ , is the

3 A number written with a base and an exponent, like  $3^4$ , is a

4 To find the value of an expression, like  $2^3 = 8$ , is to  it.

5 A number multiplied by a variable, like the 5 in  $5x$ , is a .

6 Terms with the same variable raised to the same power, like  $3x$  and  $7x$ , are



### 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:** What is the value of  $4^3$ ?

- A. 64
- B. 12
- C. 43
- D. 7

**Step 1**  $4^3 = 4 \times 4 \times 4 = 64.$

 **Answer:** A. 64

 **We do – together**

Solve this one with your class using the same steps.

**Problem:** What is the value of  $6^2$ ?

- A. 36
- B. 12
- C. 62
- D. 8

**Step 1** \_\_\_\_\_

**Step 2** \_\_\_\_\_

**Answer:** \_\_\_\_\_

 **You do — your turn**

Now try one on your own. Show every step.

**Problem:** Which expression shows  $5^3$  as repeated multiplication?

A.  $5 \times 5 \times 5$

B.  $5 \times 3$

C.  $5 + 5 + 5$

D.  $3 \times 3 \times 3 \times 3 \times 3$

Show your work:

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## Try It

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

**1. Track 2 needs the value of  $5^2$ . Which number opens the door?**

- A. 25
- B. 10
- C.  $5^2$
- D. 7

Show your work:

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**2. The vault display reads  $10^4$ . In the power  $10^4$ , which number is the base?**

- A. 10
- B. 4
- C. 40
- D. 14

Show your work:

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## Stretch Your Thinking

Level 2 enrichment

Challenge task — explain your reasoning in full sentences.

**A bacteria colony doubles every hour. Starting with 1 bacterium, write a power expression for the number after 6 hours. Explain why exponential growth is so much faster than adding the same number each hour.**

*Sentence starter: After 6 hours there are \_\_\_ bacteria because  $2^6 = \underline{\quad}$ . If it grew by adding 2 each hour instead, there would only be \_\_\_ bacteria. Exponential growth is faster because \_\_\_.*

Show your work:

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## Reflect — Exit Ticket

**What is the value of  $3^4$ ?**

- A. 81
- B. 12
- C. 34
- D. 64

Your answer:

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