Part, Whole, and Percent

Three tiles, about 7 minutes each with its Let me try a few, then the exit ticket. Students name the whole, the part, and the percent, meet the percent bar, and find whichever piece is missing.

TIME	25 minutes: three tiles at about 7 minutes each, then the exit ticket
WHO	7th grade, about age 12. Follows Lesson 1, What Percent Means.
MATERIALS	The Deep Dive 5 lesson hub and its three tiles (percent bar, sorting activity), the worksheet (PDF), pencil.
PRIOR KNOWLEDGE	Percent as out of 100 and the benchmarks (Lesson 1); unit rates (Unit 1).
STANDARDS	NC.7.RP.3.
KEEP OUT	A percent formula to memorize. The proportion is fine when it comes from reasoning, not as a chant.

Learning goals

1. Name the whole, the part, and the percent in a sentence, and say which is missing.
2. Find the part by building from 10 percent or multiplying by the percent as a decimal.
3. Find the percent from part over whole.
4. Find the whole by building from 10 percent to 100 percent.

Vocabulary: say both, every time

The rule for the whole lesson: whenever the adult or the student says a math word, they follow it with the plain-English version. Proper term first, plain English second, until the student does it without being asked.

TERM	LOOKS LIKE	PLAIN ENGLISH
Whole	35 in 40% of 35	All of it.
Part	14	Some of it.
Percent of	35 times 0.40	Multiply by the decimal.

> THE ONE SENTENCE TO SAY OUT LOUD
>
> Which piece is missing?

Lesson timeline (25 minutes)

0:00 to 0:07	**Tile 1, The Three Pieces.** Finn's hook, the class of 20 with 5 in glasses, the percent bar at 25%. The naming sort. Let me try a few: naming only.
0:07 to 0:14	**Tile 2, Find the Part.** 40% of 35 from 10%, then as 35 times 0.40. The bar tasks. Let me try a few.
0:14 to 0:21	**Tile 3, Find the Percent or the Whole.** 18 of 24 on the bar; $45 is 30% built up to $150; the proportion as a record of the reasoning. Let me try a few: mixed, the student decides which piece is missing.
0:21 to 0:25	**Exit ticket.** Back on the hub. Success looks like 9, 75 percent, and $150 with the pieces named.

Misconceptions to listen for

- **Always multiply.** When the whole is missing, multiplying makes it smaller. Build up from 10 percent instead.
- **Whole over part.** The part goes on top.
- **Using 40 instead of 0.40.** The percent has to become a decimal before it multiplies.
- **Guessing which piece is missing.** Name all three first.

Support and stretch

Support

Keep the percent bar on screen for every problem and point to where the known pieces sit before solving.

Stretch

Ask for 12.5 percent of 80 from the benchmarks (half of 25 percent). Ask the student to write a problem where the whole is missing and trade with you.

Where this goes next

Lesson 3: tax, tips, and fees. The percent is added on top of the price, so the total is more than 100 percent.

> THE HABIT TO BUILD
>
> Name the three pieces before you touch a number.