Percent Increase and Decrease

Three tiles, about 7 minutes each with its Let me try a few, then the exit ticket. Students see that the same change is a different percent from a different start, find percent change by dividing by the original, and find new amounts with one multiplier.

TIME	25 minutes: three tiles at about 7 minutes each, then the exit ticket
WHO	7th grade, about age 12. Follows Lesson 4, Sales and Markups.
MATERIALS	The Deep Dive 5 lesson hub and its three tiles (compare questions, before-and-after bar, multiplier table), the worksheet (PDF), pencil.
PRIOR KNOWLEDGE	One multiplier up or down (Lessons 3 and 4); part over whole (Lesson 2).
STANDARDS	NC.7.RP.3.
KEEP OUT	Percent error. A formula to chant.

Learning goals

1. Explain Town A and Town B: same amount, different percent.
2. Find a percent increase or decrease by dividing the change by the original.
3. Find a new amount with one multiplier, up or down.
4. Find an original amount from a new amount and a percent change.

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
Percent change	3,000 out of 5,000	The change as a percent of the start.
Original	5,000	Where it started; divide by it.
Multiplier	1.10 or 0.80	More than 1 grows, less than 1 shrinks.

> THE ONE SENTENCE TO SAY OUT LOUD
>
> Divide by where you started.

Lesson timeline (25 minutes)

0:00 to 0:07	Tile 1, Town A and Town B. Finn's hook, the two towns, Brian and Darlene both right. The two compare questions. Let me try a few.
0:07 to 0:14	Tile 2, Find the Percent Change. The $50 game on the before-and-after bar, Elle's divide-by-the-original card, the plant. Let me try a few.
0:14 to 0:21	Tile 3, Find the New Amount. 70 employees up 10 percent, down 20 percent, and backward from 77. The multiplier table. Let me try a few.
0:21 to 0:25	Exit ticket. Back on the hub. Success looks like 25 percent with 10 over 40 shown.

Misconceptions to listen for

- **Dividing by the new amount.** Always the original.
- **Same amount means same percent.** Not when the starts differ.
- **Times 0.10 is the new amount.** That is the change; the new amount is times 1.10.
- **Bigger at the end means grew more.** Compare the change to the start.

Support and stretch

Support

Have the student circle the original in every problem before dividing. Use the before-and-after bar to show the change as a piece of the start.

Stretch

Ask what percent change takes 8,000 back down to 5,000 (it is not 60 percent). Ask for the original when a 25 percent increase gives 50.

Where this goes next

Lesson 6: more than one change. Tax then tip, markup then discount, one step at a time.

> THE HABIT TO BUILD
>
> Find the change, then divide by the original.