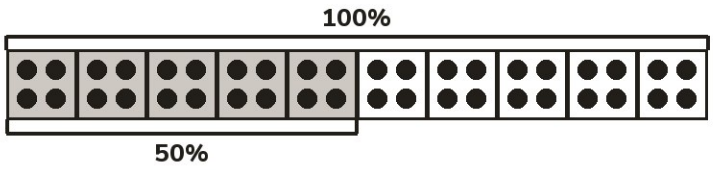
Is 50% always 50? Helping your child see that it depends on the whole

Parent page · ages 11–12 · goes with the video "Understand the concept"

A logical idea

Does your child say 50% is always 50? In everyday life, a percentage often shows up on its own, without the whole (50% battery), and with a whole of 100, 50% really is 50. It isn't carelessness: this rule has worked before.

The key idea



Whole (100%): 40 buttons
10 boxes of 4 buttons: each box is worth 10%
50% = 5 boxes = 20 buttons

"Percent" means "per hundred": a percentage tells you how many parts you take out of 100 equal parts of the whole, and the whole is always 100%. On a strip of 40 buttons in 10 boxes, each box holds 10 of the 100 parts: it's worth 10%; 50% is 5 boxes, which is 20 buttons. With 20 buttons, 50% is 10; with a whole of 100, it is 50.

Always true, two traps, one limit

100% is the whole, whatever its number, and 50% is half of the whole. Two traps: a percentage can equal the number (50% of 100 is 50), but only when the whole is 100; neither the bigger percentage nor the bigger whole decides alone (10% of 40 is 4, and so is 20% of 20). One limit: a percentage on its own doesn't tell you how many, in the whole or in the part.

Questions instead of corrections

- "50% of what?"
- "How many buttons in each box?"
- "If the whole changes, does the number change?"

When they say "always," suggest looking for a counterexample: just one is enough. Then: "Tell me how you know."

The activities

Forty buttons or dry pasta, and a strip of 10 boxes wide enough for 4 buttons each, drawn on a large sheet of paper; on page 2, strips A and B are for drawing dots, and the hundred grid is for coloring. Keep small objects out of reach of toddlers. Give your child only page 2: keep this page out of sight while they work.

A few days later, without warning (cut out)





In each bag, 50% of the beads are red. Are there the same number of red beads in both bags? How do you know?

My answer: _____

Read after your child has worked it out

- 40 buttons, 10 boxes of 4: 50% = 5 boxes = 20 buttons; 20 is not 50.
- 20 buttons, 10 boxes of 2: 50% = 10 buttons. Hundred grid: 50% = 50 boxes.
- 10% of 40 = 4 and 20% of 20 = 4 (the same). Video, activity 2: 20% of 40 = 8; 30% of 30 = 9.
- Challenge (wholes from 10 to 40): for example 20% of 10 and 10% of 20 (2 and 2), 30% of 20 and 20% of 30 (6 and 6), 60% of 20 and 30% of 40 (12 and 12).
- Cut-out: 50% of 30 = 15; 50% of 80 = 40; not the same number.

A good sign: they talk about the whole, the half, or the parts. If not, do the strip again with other numbers: it often takes several tries.

Is 50% always 50?



50% is always 50.

Do you agree with Margot?

1. I predict

A strip of 40 buttons, in 10 boxes. If we keep 50%:
we keep ..... buttons.
Is it 50?

☐ yes ☐ no

Why? _____

_____

2. I color

a. On a large sheet of paper, draw a strip of 10 boxes, big enough for 4 buttons each.
b. This strip is the whole: 100%.
c. Color 50% of the strip.
d. Put 4 buttons in each box. No buttons? Draw 4 dots in each box.
e. Count the buttons in the colored boxes.

3. I check

Colored boxes: ..... Buttons: .....
One box is worth ..... %.
My prediction: ☐ was right ☐ needs changing

Changed your prediction? Great: you checked it yourself.

4. What if there are 20 buttons?

Start again with 2 buttons in each box: the same colored half holds ..... buttons. Now color 50% of the hundred grid: ..... boxes. Is it 50 this time?

Hundred grid (10 by 10)

5. Which one is more?

Card A: 10% of 40 buttons. Card B: 20% of 20 buttons. Predict: A, B, or the same? ..... Test card A on strip A, then card B on strip B (dots or buttons). Card A: ..... buttons. Card B: ..... buttons.

Strip A

Strip B

One box of the strip = 10%. One box of the grid = 1%.

6. I explain

Why isn't 50% always 50? Explain to an adult.

_____

_____

7. Family challenge

Find another pair of cards that give the same number. The percentages must be different, and so must the wholes (10, 20, 30, or 40 buttons).
My cards: ..... and .....