



How to Do Long Division

Video: 4:13 · Episode 008**Grades:** 4–6 · Math**Time:** 35–50 min (video + worksheet + quiz)**Key term:** quotient (the answer to a division)**Connects to Common Core:** 4.NBT.B.6 (dividing with place value and models) · 6.NS.B.2 (fluency with the standard division algorithm). Two-digit divisors (5.NBT.B.6) are left for later. Pairs with episode 002 (dividing fractions).

The big idea

Long division is fair sharing, one size of piece at a time. In the video, 745 stickers come as 7 sheets of 100, 4 strips of 10 and 5 singles, shared by 5 friends. Each friend gets 1 sheet. The 2 leftover sheets are cut into 20 strips and join the 4 strips already there: that is what "bring down" means. Each written step is one step of the sharing; we start on the left because leftovers can only be cut into *smaller* pieces.

One-line recap students should be able to say: "Share the biggest pieces first, and cut the leftovers into the next size down."

Learning goals

- Explain each step of long division as part of sharing hundreds, tens and ones.
- Explain what "bring down" stands for (regrouping leftovers into the next place).
- Check a quotient by multiplying, and say what a remainder means.

How to use it

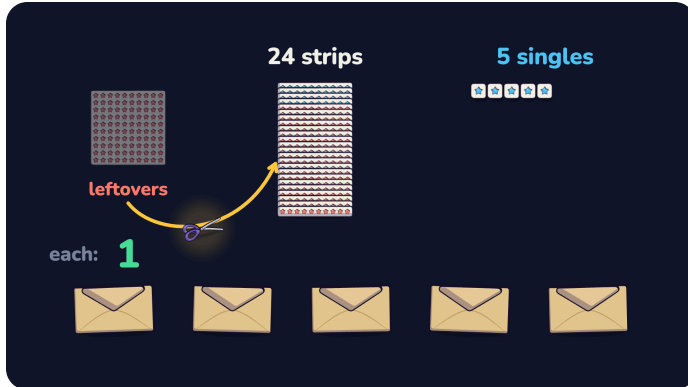
1. **Before watching (3 min):** students answer the prediction on the worksheet. Don't correct them yet.
2. **Watch (5 min):** play it straight through. Optional pause after the bring-down arrow lands on the strips (about 1:37).
3. **Hands-on (10–15 min, optional):** share paper "stickers" (next page).
4. **Worksheet (10 min):** four problems, each solved with pieces first, then written.
5. **Discuss and quiz (10 min):** pick two or three questions; seven quiz questions, answer key on the last page.

What the video simplifies: stickers stand in for base-ten blocks (a sheet is exactly 10×10). Only one-digit divisors are shown. "Cut into the next size" is regrouping (one hundred = ten tens); the words "regroup" and "decompose" are never used. Remainders are shown as "R 1" only. The video never hits a zero in the quotient: the worksheet challenge ($412 \div 4$) does.



Share It Like the Stickers

Students build a number out of paper "stickers," share it fairly, and write down each step as they go. The cutting is the whole point: it's what "bring down" means.



From the video: leftovers get cut and join the next pile



Partial quotients: the same sharing, in chunks

You need (per group of 2–4)

- Centimeter graph paper, scissors, 4 paper plates or envelopes ("friends")
- Cut 10 × 10 squares ("sheets," 100), 1 × 10 strips ("strips," 10) and single squares ("singles," 1)
- Base-ten blocks work too (with a rule: you may trade 1 flat for 10 rods, 1 rod for 10 units)

Steps (try $532 \div 4$)

1. Build 532: 5 sheets, 3 strips, 2 singles.
2. Share the sheets first. How many does each friend get? How many are left? Write it down.
3. Cut each leftover sheet into strips. Add them to the strip pile. How many strips now?
4. Share the strips. Cut the leftovers into singles, add them, and share the singles.
5. Count one plate. Then write the same problem the long division way, next to your plates.

Answer: 133 each (1 sheet, 3 strips, 3 singles). Leftovers: 1 sheet → 13 strips; 1 strip → 12 singles.

Talk about it

- Which written step matched cutting with scissors?
- What would happen if you shared the singles first?
- How can you check your answer without dividing again?



How to Do Long Division

Name: _____

Date: _____

Before you watch

When you add, you start with the ones, on the right. Long division starts on the left. Why do you think that is?

While you watch

1. A sheet has _____ stickers, a strip has _____, a single has 1.
2. 7 sheets shared by 5 friends: each gets _____, and _____ are left.
3. 2 leftover sheets are cut into _____ strips.
4. "Bring down" means the leftovers get _____ into the next size and join the next pile.
5. The four steps: divide, _____, _____, bring down.
6. The answer to a division is called the _____.

Try it

For each one, say what each friend gets in sheets, strips and singles, then write it the long division way. Check by multiplying.

a. $96 \div 4$

b. $576 \div 3$

c. $845 \div 5$

d. $467 \div 4$ (there's a remainder!)

Challenge

$412 \div 4$. After you share the sheets, there is only 1 strip for 4 friends. What do you write on top? What happens to that strip?



Talk It Over, Then Check Yourself

Discussion questions

1. Why does long division start with the biggest place, when adding starts with the ones?
2. In $412 \div 4$, the tens can't be shared. Why do we still write a 0 on top?
3. Your friend splits 745 as "100 each, then 40, then 9." Another friend does "50 each, then 99." Who is right?
4. A \$84 pizza bill split 4 ways comes out even. A \$85 bill doesn't. What could you do with the leftover dollar that you can't do with a leftover sticker?
5. How would you share 8,745 stickers? What new size would you need?

Quiz

Name: _____

1. Where does long division start? (Circle one.)
A. The ones
B. The biggest place, on the left
C. The middle
D. Anywhere
2. 7 sheets are shared by 5 friends. How many sheets are left over?
A. 0
B. 1
C. 2
D. 5
3. 2 leftover hundreds are the same as how many tens? _____
4. What does "bring down" stand for?
A. Copying a digit for no reason
B. Leftovers cut into the next size, joining the next pile
C. Subtracting again
D. Starting over
5. $156 \div 6 =$ _____
6. $746 \div 5 = 149 \text{ R}$ _____
7. The answer to a division is called the _____



Answer Key

Worksheet: while you watch

1. 100; $10 \cdot 2$. 1; $2 \cdot 3$. 20 · 4. cut · 5. multiply, subtract · 6. quotient

Worksheet: try it

a. $96 \div 4 = 24$: 9 strips → 2 each, 1 left → 10 singles + 6 = 16 → 4 each. Check: $24 \times 4 = 96$.

b. $576 \div 3 = 192$: 5 sheets → 1 each, 2 left → $20 + 7 = 27$ strips → 9 each, 0 left; 6 singles → 2 each. Check: $192 \times 3 = 576$.

c. $845 \div 5 = 169$: 8 → 1 each, 3 left → 34 strips → 6 each, 4 left → 45 singles → 9 each. Check: $169 \times 5 = 845$.

d. $467 \div 4 = 116 \text{ R } 3$: 4 → 1 each, 0 left; 6 strips → 1 each, 2 left → 27 singles → 6 each, 3 left. Check: $116 \times 4 + 3 = 467$.

Challenge: $412 \div 4 = 103$. Each friend gets 0 strips, so write 0 in the tens place; the 1 strip is cut into 10 singles: $10 + 2 = 12 \rightarrow 3$ each. Check: $103 \times 4 = 412$.

Quiz

1. **B.** Share the biggest pieces first.
2. **C.** 2 (5 are used, one for each friend).
3. **20.** Each hundred is ten tens.
4. **B.** The leftovers are cut into the next size down and join that pile.
5. **26.** (15 tens → 2 each, 3 left → 36 ones → 6 each.)
6. **1.** One single is left that can't be split five ways.
7. **quotient**

Discussion: points to listen for

1. Leftover big pieces can be cut into smaller ones, so each size gets shared once. Starting with the ones means re-sharing new ones later. (Adding starts on the right because extra ones get grouped up into tens.)
2. The 0 holds the tens place: each friend got no strips. Without it, 103 would read as 13.
3. Both: any chunks that add up to the full share work ($50 + 99 = 149$). Place-value chunks are just tidy.
4. A dollar can be cut into 100 cents (\$21.25 each); a sticker can't be cut, so it stays a remainder. What you do with a remainder depends on the problem.
5. A box of ten sheets (1,000). The same four steps, one more time.