

Lesson 38 **NUMBER****Problem-solving with discounts and increases**

## CURRICULUM ALIGNMENT

NUM.FRC.4a

explore (model, compare and convert) the relationships between fractions, decimals and percentages.

MEA.MON.4

solve and pose practical tasks to investigate and make informed judgements about transactions and financial plans.

## WHAT THIS LESSON TEACHES

An amount taken off the original price, usually written as a percentage. A 30% discount means you take 30% off and pay the rest. The same idea works for increases like service added.

→ A €50 coat with 30% off: the saving is 30% of €50 = €15, so you pay €35.

→ A €200 bill with 10% added: the extra is 10% of €200 = €20, so you pay €220.

## MODEL THIS ON THE BOARD

**WORK OUT THE SALE PRICE**

- 1 Start with the original price of €60.
- 2 Find 20% of €60: first 10% is €6, so 20% is €12.
- 3 Subtract the saving from the original: €60 minus €12.

## LESSON ARC

Open with a shop tag — 30% off €50 — and take three hands-up guesses before working it out. Build the price-bar on the IWB, finding 10% by dividing by ten, then halving and building up to reach any percentage. Model discount then increase across three items, flagging the direction switch. Pupils build four-column rows in their copybooks, then the class works a harder shopping bank at the board, ending on a better-deal comparison. Student Activity Book carries the solo practice.

## TEACHING MOVES

1. **Getting Started.** Display the 30%-off €50 tag as pupils settle and take only three hands-up answers. Listen for the split between whoever names the €15 saving and whoever names the €35 to pay — you'll revoice both when you build the bar.
2. **Watch and Notice.** On the price-bar interactive, find 10% of €50 (€5) by dividing by ten, halve it for 5% (€2.50), then build 30% as three tens. Point at the saving first, then the price-to-pay, and say them adding back to €50 every time — 'the whole bar is always the original.' Introduce the 1% move (divide 10% by ten) once here so it's ready for the VAT problem.
3. **Try It Together.** Pupils take turns at the board through the four items; the class agrees or corrects out loud, no writing yet. On the €120 bill, stop and flag it: this is the only add-on in the round — ask 'are we taking off or putting on?' before anyone calculates. Keep it brisk.
4. **Build the Four-Column Row in Your Copy.** Pupils rule four columns per item — original price, percentage change, amount of change, final price — and box the final price. Walk the room watching the €120 row specifically for anyone taking off when they should be adding on. This is practice, not marking.
5. **Class Challenge.** Pupils take turns at the board, check each answer, class confirms before moving on. Two things to police: on the €150 coat ask for the saving, not the final price; on the better-deal question head off pupils comparing the percentages (30% vs 10%) instead of the two final prices (€63 vs €77). If time is short, hold the two-offer comparison as the item to return to.

6. **What Did We Notice?** Pose the €100 coat claim — 20% off then 20% back on. Listen for who reaches for the numbers to test it rather than arguing in the abstract, and revoice: €100 → €80 → €96, because the second 20% is worked from the smaller €80. Display-only talk, no written answers.

### COMMON MISCONCEPTIONS

⚠ A pupil finds 30% of €50 as €15 and stops there, handing €15 to the till — they've given the saving as the price to pay.

Point at both parts of the price bar: the €15 the shop keeps back and the €35 you actually hand over. Ask 'which bit goes in the till?' and have the pupil say €15 + €35 = €50 aloud so the whole bar reads as the original.

⚠ On the €100 coat, pupils say 20% off then 20% on returns you to €100 — 'you took the same amount off and put it back.'

Make them test it on the numbers, not argue it. Draw both changes on the bar: 20% of €100 is €20, but 20% of €80 is only €16. The second percentage is worked from the smaller price, so you land on €96, not €100.

⚠ In the two-offer question pupils pick '30% off' as the better deal because 30 is bigger than 10, comparing percentages instead of prices.

Refuse the percentage comparison — insist on both final prices. Work €63 against €77 on the board and ask 'which one leaves more money in your pocket?' The cheaper final price wins, and here the two happen to point the same way; swap the numbers once to show percentages alone can mislead.

### DIFFERENTIATION

#### EMERGING

- Keep these pupils on find-10%-then-build for the round numbers (€60, €80, €120) where the 10% is a whole euro, and support them one-to-one on the €30 top where the cent appears.
- Pre-rule the four copybook columns with headings so they place figures rather than invent the layout, and mark the change column with a small – or + before they start each row.

#### DEVELOPING

- After the copybook rows, ask them to add a fifth column: 'what fraction of the original did you save?' — turning 25% off into a quarter.
- Give them the VAT item to lead at the board, building 23% as 20% + 3% with the 1% move, and have them narrate each lit step to the class.

#### PROFICIENT

- Hand them the better-deal question with the numbers changed so the bigger percentage is NOT the better deal, and ask them to explain why comparing percentages fails.
- Pose: 'what single percentage change turns €80 into €100?' — an open inverse problem they work from the bar, then pull them ahead into the Student Activity Book page.

✚ **Cross-curricular:** Tie to SPHE and real spending — pupils bring a genuine sale tag or ad from home and work out the true saving and final price.

### ANSWER KEY

a) €68

b) €22.50

c) €132

Q1: save €9.75, pay €55.25

Q2: save €2.25, pay €42.75

Q3: save €10.50, sale €24.50

a) **Always** — 20% of 80 is always 16.

b) **Never** — The 10% added is on a larger amount so it does not cancel.

c) **Always** — Discounts are always calculated on the starting price.

d) **Sometimes** — Only if the discount is more than 0%.

### EXTENSION SHEET · STRETCH ANSWERS

S1: €217.59 (discount: €38.40)

S2: €295.09 (discount: €158.90)

S3: €161.70 (discount: €69.30)

S4: €78.60 (discount: €52.40)

**S5:** €112.20 (discount: €19.80)

**Investigation:** Hunt for the best deal — open-ended; scan pupils' working for valid solution paths rather than a single answer.