

# Understanding Number: Integers, Place Value, Primes & Fractions

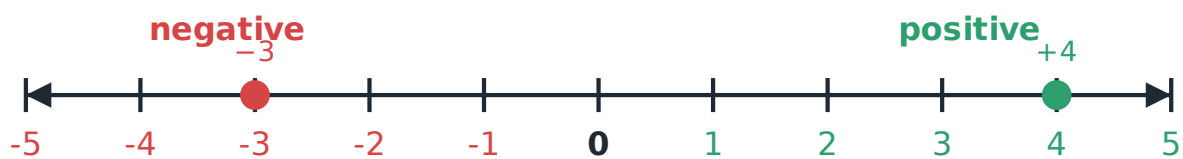
## Explicit teaching — I Do (~15 min)

This opening lesson surveys the five strands of *Understanding Number*. Teach each idea with a concrete representation first, then the symbolic form. Keep the human number line and a place-value chart visible throughout.

### 1. Integers on a number line [WA6MNAUN1](#)

Draw a horizontal number line and connect it to real contexts: temperatures below zero, basement floors (B1, B2), and money owed. Show that  $-3$  and  $+3$  are the same distance from zero but in opposite directions.

### Integers on a Number Line



*Integers increase left to right; the number furthest left is the smallest.*

**Worked example.** Order 3,  $-2$ , 0,  $-5$ , 1.

Reading left to right along the line gives  $-5$ ,  $-2$ , 0, 1, 3. The point furthest left,  $-5$ , is the smallest.

### 2. Multiplicative place value [WA6MNAUN2](#)

On a place-value chart, establish that each place is **10 times** the place to its right and **one-tenth** of the place to its left, extending into tenths and hundredths.

**Worked example.** In 4.56, the 5 is 5 tenths, which is the same as 50 hundredths.

Multiplying by 10 shifts every digit one column left:  $4.56 \times 10 = 45.6$ .

### 3. Square, prime & composite numbers [WA6MNAUN3](#)

Build arrays with counters:  $9 = 3 \times 3$  forms a square; 7 can only be a single row of seven (prime); 12 forms several rectangles (composite).

### 4. Ordering fractions & 5. Connecting percentages [WA6MNAUN4–UN5](#)

On a 0–1 number line, place  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$  and label the matching decimals and percentages.

Establish the key conversions  $10\% = \frac{1}{10} = 0.1$ ,  $25\% = \frac{1}{4} = 0.25$  and  $50\% = \frac{1}{2} = 0.5$ .

Say decimals as their place value — "twenty-five hundredths", not "zero point twenty-five" — so the link to  $\frac{25}{100}$  and 25% stays visible.

### Guided practice — We Do (~20 min)

Move around the five ideas with short, active tasks. Ask students to justify every placement aloud.

- 1. Integer ordering.** As a class, order  $-5, 2, -1, 4, 0, -8$  on a large number line. Prompt justification: " $-8$  is furthest left because it is the smallest."
- 2. Place-value partner talk.** Display 23.7. Pairs state the value of the 7, the 3 and the 2, then predict what happens when the number is multiplied by 10.
- 3. Array hunt.** Pairs build arrays for the numbers 1–20 and sort them into squares, primes and composites on a shared anchor chart.
- 4. Fraction & percentage match.** Hand out cards ( $\frac{1}{4}$ , 0.25, 25%, ...). Students order themselves along a 0–1 "washing line".

Listen for the language students use. Reasoning such as "it's closer to one whole" shows stronger fraction sense than counting on fingers.

### Independent practice — You Do (~15 min)

Students complete the lesson worksheet. It covers:

- placing and ordering a set of integers on a number line;
- stating the value of nominated digits and multiplying or dividing decimals by 10;
- classifying eight numbers as square, prime or composite with a supporting array sketch;
- ordering related fractions and matching three common percentages to fraction and decimal forms.

**Exit ticket.** Write one integer, one prime number, and one fraction equal to 50%.

## Teacher notes

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**Curriculum links:** WA6MNAUN1–UN5 (Number and algebra — Understanding number).

**Materials:** counters or tiles, individual number lines (–10 to 10), place-value charts, fraction and percentage cards, a washing line and pegs.

### Common misconceptions

- Thinking  $-8 > -5$  because  $8 > 5$  — reinforce direction on the number line.
- Believing 1 is prime — clarify that a prime has **exactly two** distinct factors.
- Reading  $0.25$  as "zero point twenty-five" rather than 25 hundredths.

**Assessment for learning:** circulate during We Do; the exit ticket quickly flags students confusing prime and composite numbers.

## Approaches

### KINESTHETIC · HANDS-ON / KINESTHETIC APPROACH

#### Hands-on / kinesthetic approach

Use physical, large-scale representations so that abstract number relationships become bodily and visual. Each activity gives students something to move, build or hold.

**Human number line.** Lay a rope along the floor with a "0" card in the middle. Students hold integer cards and stand in position; the class checks the order by walking the line from left to right.

**Counter arrays for primes.** Students build rectangles with tiles. If a number can *only* form a single row, it is prime — the "stuck in one line" feeling is memorable and concrete.

**Percentage washing line.** Peg fraction, decimal and percentage cards onto a string stretched across the room so equivalent values hang together.

**Place-value flip.** Use a sliding place-value chart; physically slide each digit one column left when multiplying by 10, and one column right when dividing.

These activities suit kinesthetic and visual learners and give the teacher a fast read of the whole class — misplacements on the human number line are visible at a glance.

## Game-Based: Number-Line Tug-of-War & Place-Value Bingo

This approach turns the abstract ideas of integers and place value into two fast, competitive games. It suits learners who engage most when there is a challenge, a score and a little friendly rivalry.

**Game 1 — Number-Line Tug-of-War (integers).** Draw a large number line on the floor with tape, from  $-10$  to  $10$ , with  $0$  in the middle. A counter (or volunteer) starts on  $0$ . Two teams take turns drawing a card: positive cards pull the counter right, negative cards pull it left. First team to drag the counter to their end ( $+10$  or  $-10$ ) wins. Students must say the new position aloud each turn.

**Game 2 — Place-Value Bingo (decimals).** Each student draws a  $3 \times 3$  grid and fills it with decimals to hundredths (e.g.  $4.56$ ,  $0.07$ ,  $12.30$ ). The caller reads clues such as "a number with 6 hundredths" or "the digit 5 is in the tenths place". Students cross off any matching number. First to a full line calls "Bingo!" and must justify each cross-off.

**Game 3 — Prime Hunt (number theory).** Display the numbers  $2-50$  on the board. In pairs, students race to colour every prime. The catch: for each number they leave uncoloured they must name a factor pair to prove it is composite.

**Why it works.** Movement and competition give immediate feedback and keep the whole class active. Requiring students to *justify* each move (say the position, prove the factor pair) keeps the mathematics visible rather than letting the game take over.