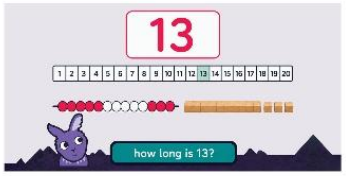


INSTRUCTIONAL GUIDANCE: MAGNITUDE ESTIMATION

Teaching guidance & background

What it looks like

Estimating the approximate size, position, or distance of numbers using a linear representation

- ___ goes about here.
- ___ is closer to ___ than to ___.

Placing numbers in approximate locations on bounded number lines

- ___ is between ___ and ___.
- ___ is close to halfway.

Estimating where numbers such as 7 or 15 belong on a 0–20 number line

- ___ is closer to ___ than to ___.
- ___ is just before/after ___.

Estimating where numbers such as 42 or 78 belong on a 0–100 number line

- ___ is just past ___.
- ___ is close to ___ tens.

Using benchmark numbers, endpoints, and halfway points to estimate

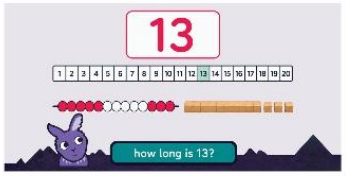
- I used ___ to help me estimate.
- Halfway between ___ and ___ is ___.

Judging relative size and numerical distance

- ___ is much larger than ___.
- ___ and ___ are close together.
- ___ is far away from ___.

Why does it matter?

- Patterns of performance on number line estimation are consistently associated with broader mathematics achievement.
- Bounded number line tasks require students to understand both number order and the relative spacing between numbers on a line.
- Research shows that younger children often give too much space to smaller numbers and bunch larger numbers together, before gradually developing more accurate proportional spacing.
- Students increasingly use proportional reasoning, benchmark numbers, and halfway points to estimate numerical locations more accurately.
- These linear number understandings matter because students use them when comparing quantities, interpreting place value, estimating, calculating mentally, and reasoning about numerical distance and relationships.



INSTRUCTIONAL GUIDANCE: MAGNITUDE ESTIMATION

Teaching guidance & background

Goal of instruction

The goal of instruction is to develop students' understanding of numerical magnitude: how numbers are ordered, how large numbers are in relation to other numbers, and how numerical distance can be represented using linear models. Instruction should use developmentally appropriate linear representations of number — beginning with concrete models and progressing to bounded number lines.

Effective instruction in numerical magnitude:

- builds knowledge of an ordered number list as a foundation for later number-line reasoning
- uses linear representations of number to make magnitude, order, and distance visible
- begins with number tracks or number paths for students who are still coordinating counting, order, and quantity
- introduces mathematically accurate number lines only when students are ready to reason about numbers as positions on a line
- progresses from smaller to larger number ranges

Gradually increase difficulty through:

- comparing quantities that can be subitised
- comparing quantities that can be matched, including through the use of linear representations
- comparing quantities when item size may be misleading
- using knowledge of counting to compare small numbers
- using knowledge of number relationships to compare and estimate positions in increasing ranges (0–10, 0–20, 0–100):
  - locating numbers between benchmark numbers
  - estimating numbers on bounded number lines
  - using proportional reasoning, halfway points, and known number relationships
- supports students to move from counting-by-ones towards using benchmark numbers, distance, place value and numerical relationships to reason more efficiently

Teachers explicitly model magnitude reasoning using a Teacher Modelling / Guided Practice / Supported Independent Practice approach. Instruction should include modelling how to identify start and end points, locate benchmark numbers such as 5, 10, 50, and halfway points, and explain where numbers sit in relation to other numbers.

Teacher Modelling

Should make the reasoning visible. Teachers should think aloud while using a linear representation, for example: "I know 10 is at the end of this number path. 5 is halfway to 10, so 7 is past halfway and closer to 10 than to 0."

Guided Practice

Should include multiple opportunities to respond, immediate feedback, and regular checks for understanding to ensure students are considering number size, order, and relative distance rather than simply counting or placing numbers randomly.

Supported Independent Practice

And review activities should provide repeated practice estimating, locating, ordering, comparing, and explaining number positions across increasing number ranges to build fluency, accuracy, flexible reasoning, and long-term retention.

Concrete and visual materials

Such as number tracks, number paths, mathematically accurate number lines, open number lines, hundred charts, and Base-10 materials should be used purposefully. In Foundation and Year 1, number tracks and number paths are often more accessible than complete number lines because students can count spaces or positions while developing the idea of ordered, linear number relationships.

This section supports consistent teacher language and student explanations. Representations are included because they should be paired with precise stem sentences; the goal is for students to see, say, show, and eventually write about number magnitude, order, position, and distance.