

INSTRUCTIONAL GUIDANCE: MAGNITUDE ESTIMATION

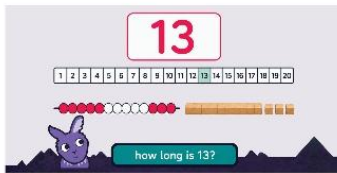
Vocabulary, representations & stem sentences

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Relevant mathematical vocabulary

The purpose of this vocabulary list is to support teachers to model precise mathematical language and help students use simple, high-utility language during instruction.

Vocabulary	Simple Definition	Questions / Stem Sentences
number line	A line showing numbers in order	Where does the number belong on the number line?
estimate	To make a careful guess	Can you estimate where the number goes?
position	The place where something belongs	What position should the number be in?
more	A larger number	___ is more than ___ because the line is longer / because it is further along the path/line
less	A smaller number	___ is less than ___ because the line is shorter / because it is not as far along the path/line
between	In the middle of two numbers	Which numbers is it between?
halfway	The middle point	Is the number close to halfway?
benchmark	An important number used to help estimate	Can a benchmark number help you?
closer	Nearer to a number	Is it closer to 20 or 30?
further	More distant from a number	Which number is further along the line?
tens	Groups of ten	Which ten is the number closest to?
ones	Single units	How many ones are there?
before	A number that comes earlier	Which number comes before it?
after	A number that comes later	Which number comes after it?
explain	Tell how you worked it out	How did you decide where the number goes?



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Using stem sentences

Stem sentences should be used throughout instruction. They help all students participate, rehearse mathematical language, and explain their thinking.

Stem sentences can be used in three ways:

1. Choral response

The whole class says the sentence together.

2. Partner rehearsal

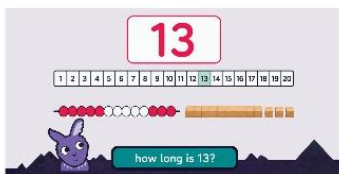
Students turn to a partner and complete the sentence before sharing.

3. Individual response after rehearsal

The teacher selects one or two students to share after all students have practised. This is preferable to relying on hands-up responses from only a few students.

Examples:

- ▶ ___ goes about here.
- ▶ ___ is closer to ___ than to ___.
- ▶ ___ is between ___ and ___.
- ▶ ___ is close to halfway.
- ▶ I used ___ to help me place ___.
- ▶ ___ is larger than ___ because the train/stack is longer.
- ▶ ___ belongs here because it is between ___ and ___.
- ▶ I started at ___ and jumped ___ spaces to land on ___.
- ▶ ___ is ___ tens away from ___.
- ▶ When I move ___, the number changes by ___.

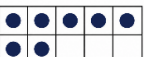


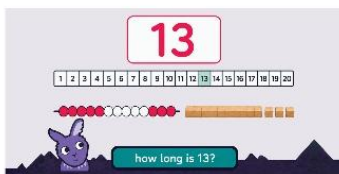
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Representations and stem sentences for magnitude estimation

Choose representations that make linear magnitude visible. Larger numbers should be shown as physically longer or further along than smaller numbers. Move from concrete linear models to more abstract linear representations over time.

	Representation	Purpose	Example teacher prompt	Stem sentence
 Concrete quantities in a line e.g., counters, blocks, objects	Concrete quantities in a line e.g., counters, blocks, objects	Connect number words and numerals to visible quantities; show that larger numbers represent more	"Which line has more? How can you tell?"	"___ is more than ___ because ___."
 Connecting-cube trains or stacks	Connecting-cube trains or stacks	Make magnitude physically visible; larger numbers are longer or taller	"Build 6 and 9. Which number is larger? How do you know?"	"___ is larger than ___ because the train/stack is longer."
 Ten-frames in sequence	Ten-frames in sequence	Support magnitude, benchmarks of 5 and 10, and part-whole thinking	"Is 8 closer to 5 or 10? How do you know?"	"___ is close to ___ because ___."
 Bead strings	Bead strings	Show counting, grouping, order, and distance along a continuous line	"Find 12. Is it closer to 10 or 20?"	"___ is closer to ___ than to ___."
 Number tracks	Number tracks	Support counting, order, and one-to-one correspondence before moving to number lines	"Start at 7. Add 3. How many now?"	"I started at ___ and added ___ to get to ___."
 Number paths	Number paths	Link each count to a visible space; bridge from counting spaces to reasoning about linear order	"Where is 14? What number comes before it? What number comes after it?" "What number would go here? How do you know?"	"___ belongs here because it is between ___ and ___."
 Physical number track or floor number path	Physical number track or floor number path	Support students to physically experience counting, order, movement, and distance along a linear representation	"Start on 6. Jump forward 3 spaces. Where do you land? How many spaces did you jump?"	"I started at ___ and jumped ___ spaces to land on ___."



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Hundreds charts	Hundreds charts	Support number order, place-value patterns, and relative size within 100	"What happens when we move down one row? What happens when we move across?"	"When I move ___, the number changes by ___."
Partially marked and 'bounded' number lines	Partially marked and 'bounded' number lines	Encourage use of endpoints, benchmarks, and halfway points rather than counting every mark	"The ends are 0 and 20. Where would 10 go? Where would 15 go?"	"I used ___ to help me place ___."
Base-10 materials arranged linearly	Base-10 materials arranged linearly	Connect magnitude, place value, and distance by showing tens as equal-length units	"Show 30 and 50 with tens. How many tens apart are they?"	"___ is ___ tens away from ___."