Reading scales

Mana Maths

Te reo Māori terms

tauine
scale
Open in Te Aka

āputa
interval
Open in Te Aka

whakatau tata
estimate
Open in Te Aka

inenga
measurement
Open in Te Aka

Notes & Steps

Key idea

Reading a scale means finding the value where the pointer, liquid level, or mark falls between the labelled divisions on a measuring instrument.

Steps

1. Identify the two labelled marks the pointer sits between.
2. Count the number of unlabelled gaps between them to find each division's value.
3. Start at the lower labelled value and add the correct number of divisions.

Scale types

- **Linear scales**: thermometer (-30 to 30), ruler (0 to 15), measuring jug (0 to 500)
- **Circular scales**: dial (0 to 30), speedometer (0 to 100 km/h), weighing scale (0 to 15 kg)
- **Compound scales**: gas meter (multiple alternating dials, each 0 to 9)

Common mistake

Miscounting the gaps. If the scale goes from 20 to 30 with 5 gaps, each gap is worth 2, not 1.

Example: thermometer

The thermometer below shows a reading between 10 and 20. There are 10 unlabelled divisions in that range. Each division = 1. The red liquid reaches 5 divisions above 10, so the reading is **15**.

Try these

1. A ruler has marks at 4 and 5 with 10 equal gaps. Where is the 6th gap?
2. A jug shows 200 mL and 300 mL with 4 gaps. What is each division worth?
3. A speedometer reads between 60 and 80 with 4 gaps. What speed is 3 gaps above 60?

Notes & Steps

Example 1: ruler

A ruler has 0 at the left and two labelled marks at 4 and 6. Between 4 and 6 there are 10 equal gaps. The red mark is 7 gaps past 4. Each gap = (6 - 4) ÷ 10 = 0.2. The reading is $4 + 7 \times 0.2 = 5.4$.

Example 2: speedometer

A speedometer arc shows 0, 20, 40, 60, 80, 100. Between 20 and 40 there are 5 gaps. The needle sits 2 gaps past 20. Each gap = (40 - 20) ÷ 5 = 4. Speed = $20 + 2 \times 4 = 28$ km/h.

Example 3: dial (0 to 30)

A round dial has 0 at top, 10 at right, 20 at bottom, 30 at left. Between 10 and 20 there are 5 gaps. The needle points 3 gaps past 10. Each gap = (20 - 10) ÷ 5 = 2. Reading = $10 + 3 \times 2 = 16$.

Example 4: gas meter

Four dials labelled 1M, 100K, 10K, 1K, each 0–9, alternating direction. Read left to right: for each dial, record the lower digit when the needle is between two digits. 3 - 8 - 2 - 5 = **3,825** (units).

Notes & Steps

Key idea

A gas meter uses multiple dials that alternate direction. Each dial shows one digit of the reading (0–9), and neighbouring dials spin in opposite directions.

How to read a gas meter

1. Start at the leftmost dial (1M) and move right.
2. If the needle is *between* two digits, record the **lower** digit.
3. If the needle is *exactly on* a digit, check the next dial to the right: if that needle has passed 0, record the higher digit; otherwise record the digit shown.
4. Write the digits in order: they form the total reading in cubic metres.

Example

A gas meter shows:

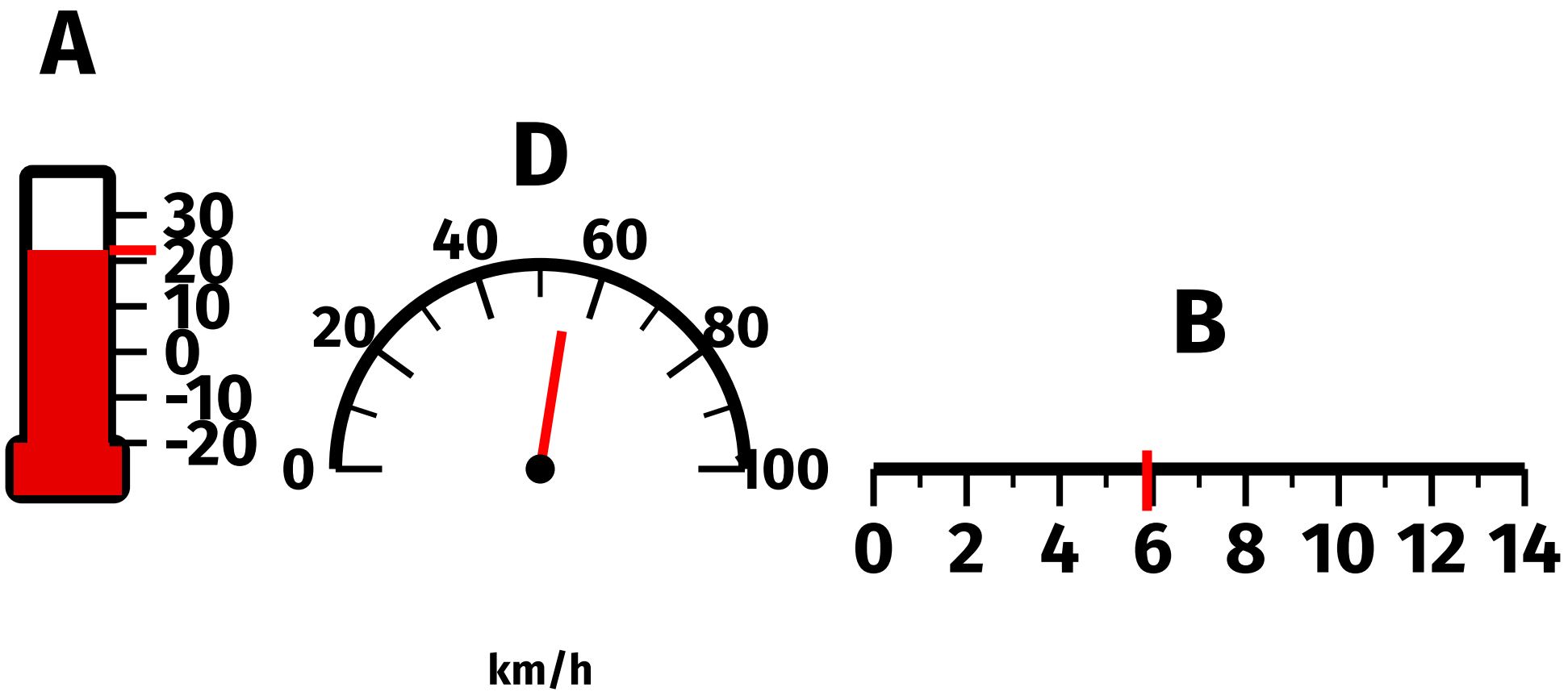
- 1M dial: needle between 3 and 4 $\rightarrow$ 3
- 100K dial: needle between 8 and 9 $\rightarrow$ 8
- 10K dial: needle between 2 and 3 $\rightarrow$ 2
- 1K dial: needle between 5 and 6 $\rightarrow$ 5

Reading = **3,825** m^3.

Common mistake

On a CCW dial, "between 8 and 9" means the needle is moving counterclockwise — so 8 appears to the *left* of 9. Always record the lower digit regardless of direction.

Start Tasks

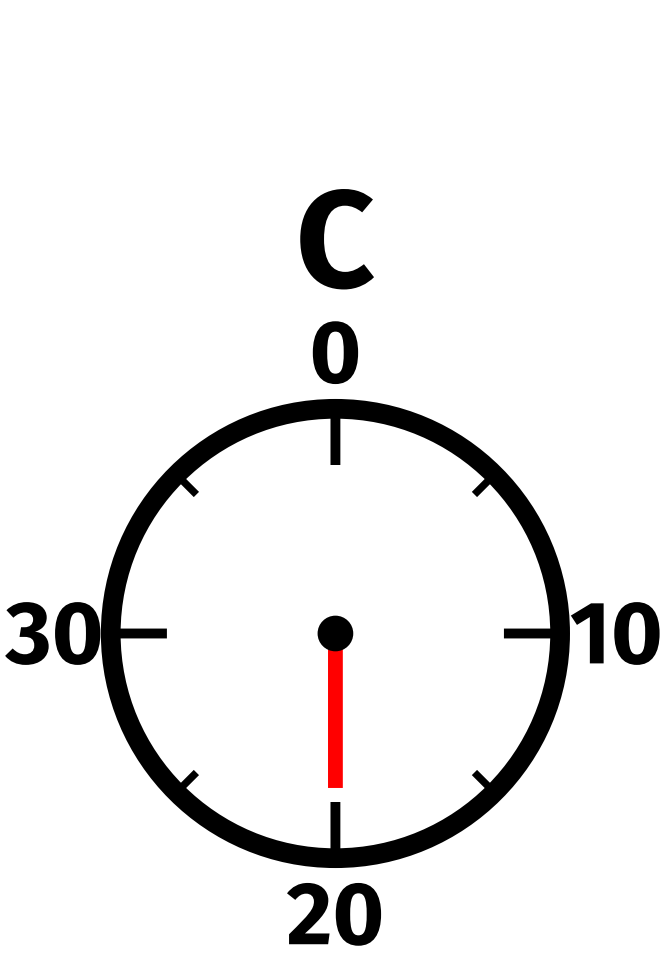


1. Temp at A?

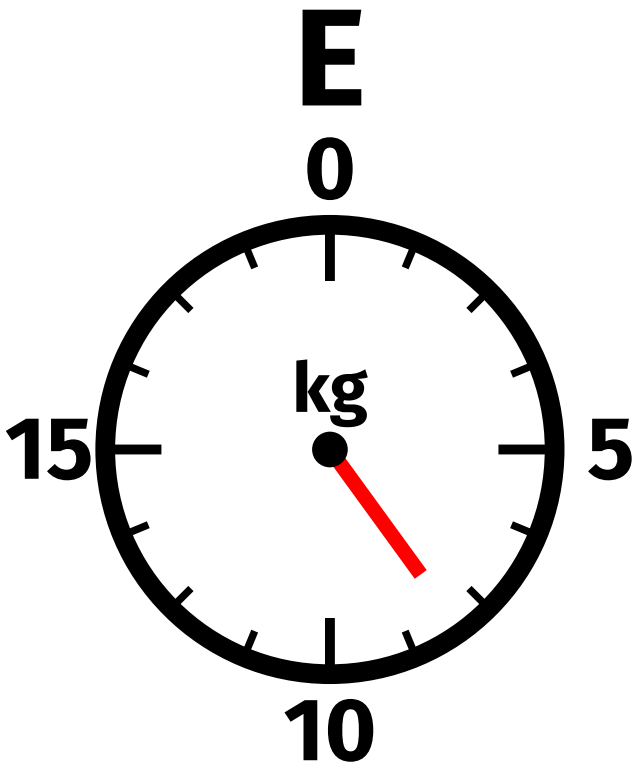
2. Speed at D?

3. Length at B?

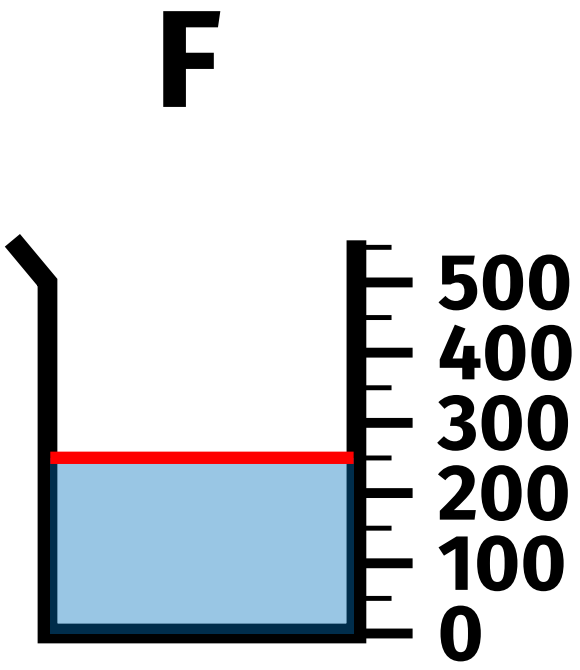
Start Tasks



4. Dial at C?

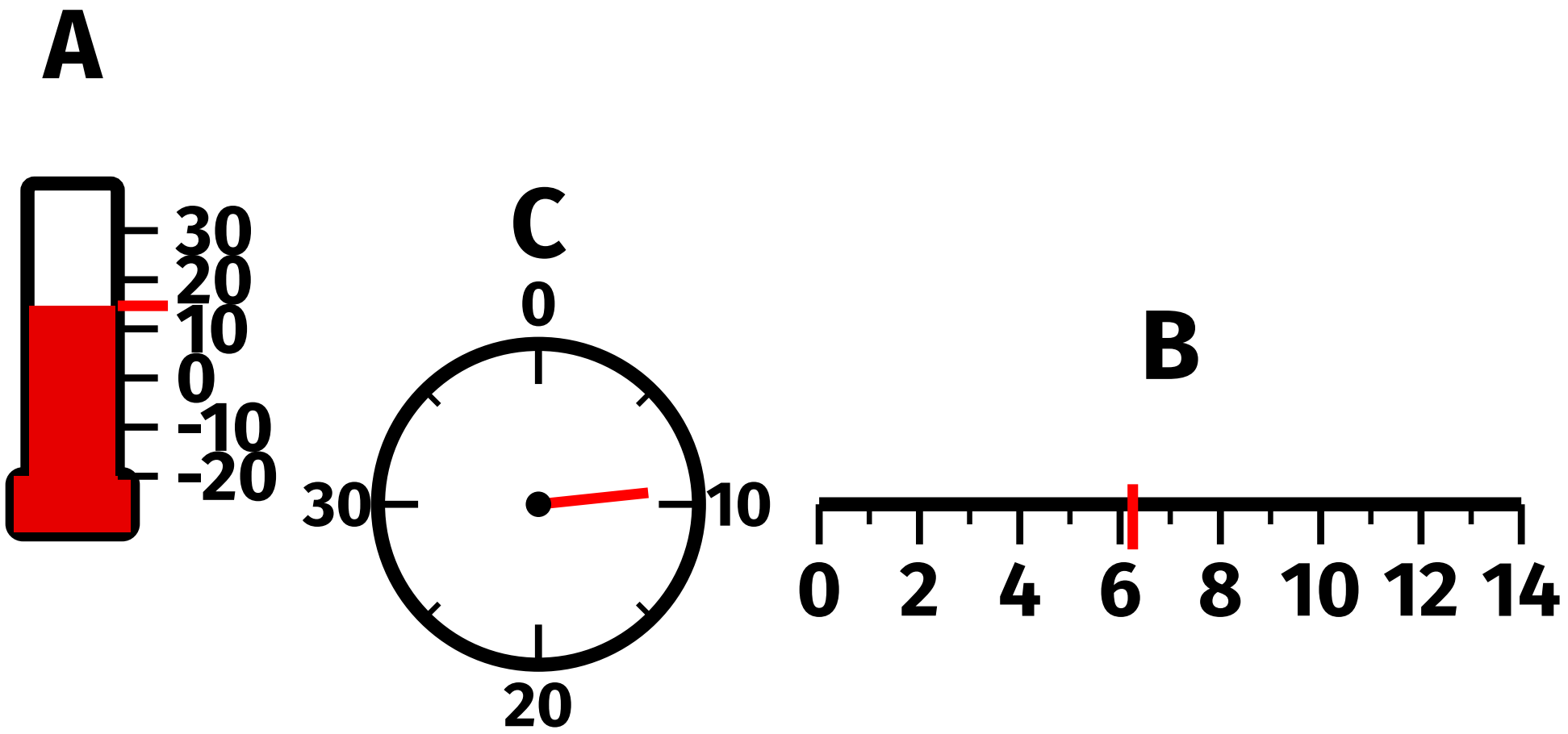


5. Weight at E?



6. Volume at F?

Start Tasks

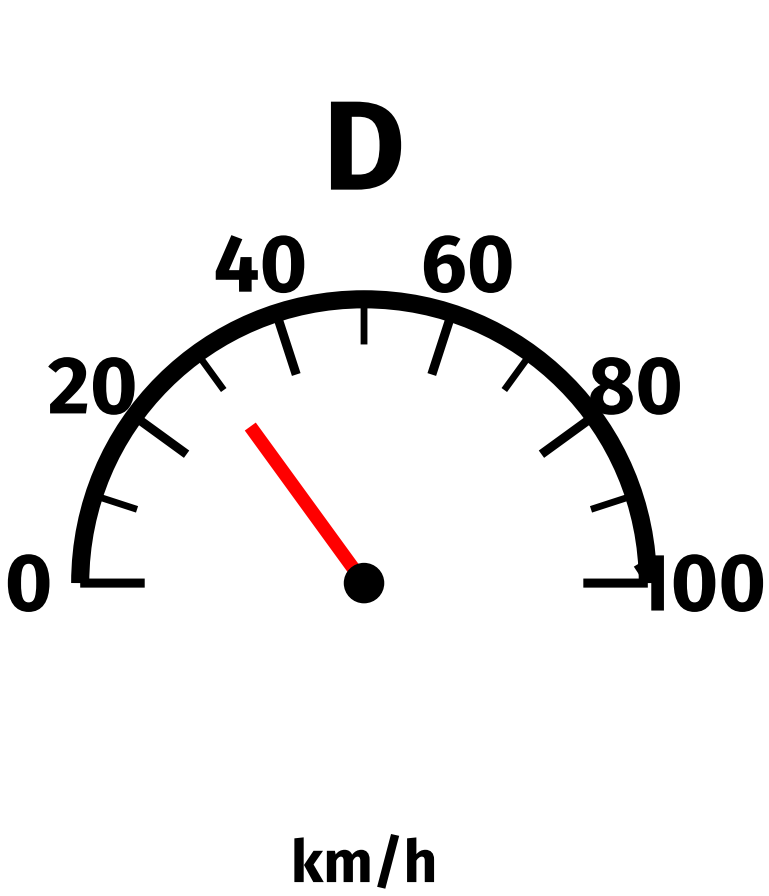


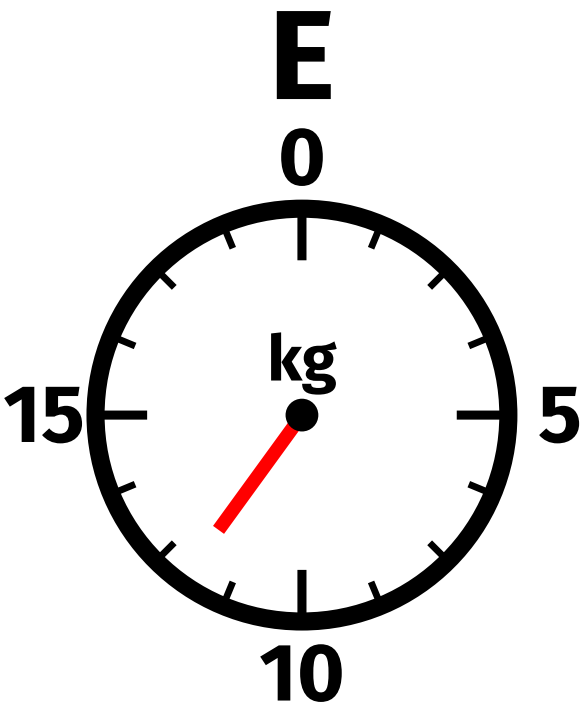
7. A: temp?

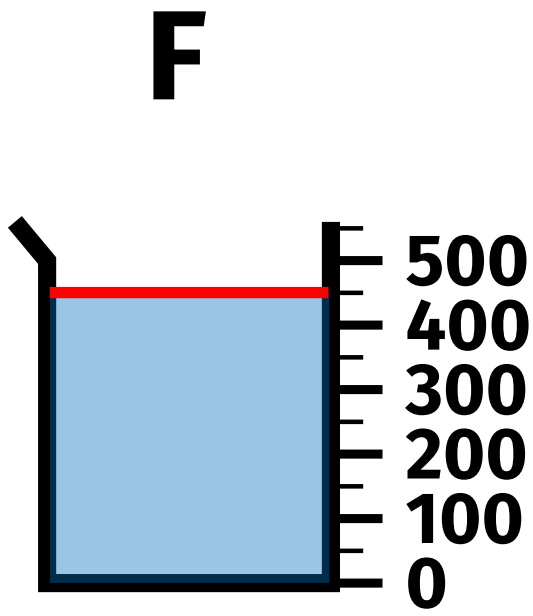
8. C: dial?

9. B: length?

Start Tasks





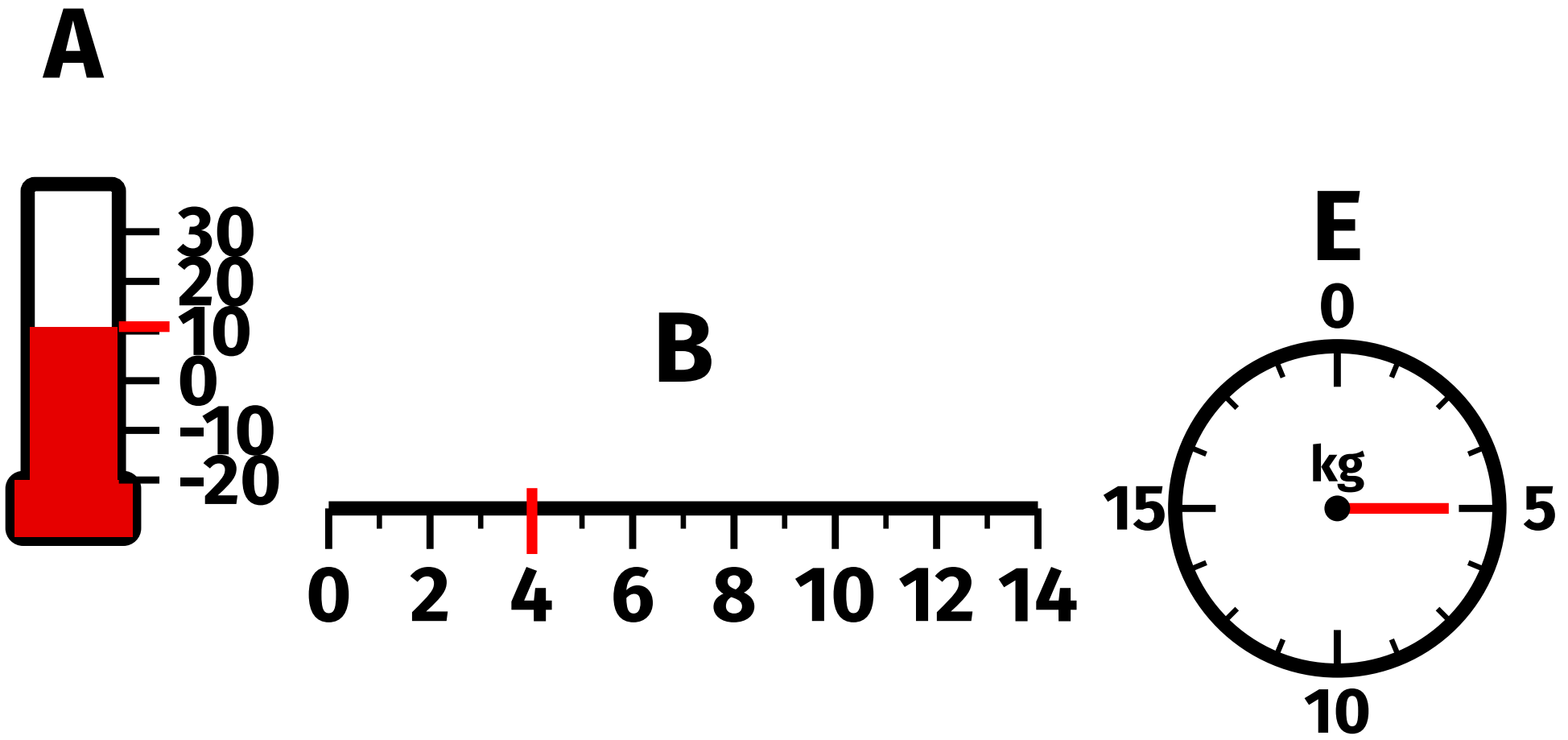


10. D: speed?

11. E: weight?

12. F: volume?

Start Tasks

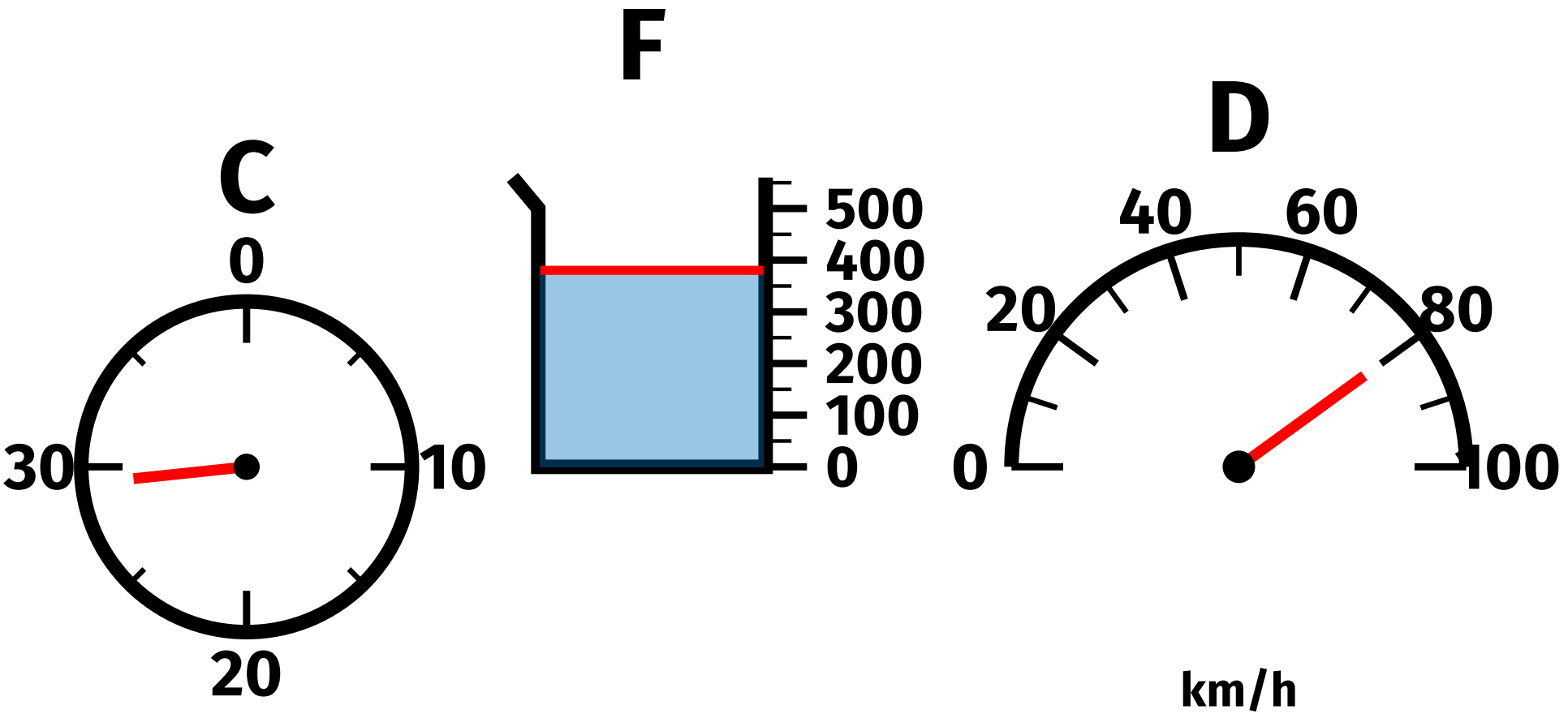


13. A: approx?

14. B: length?

15. E: weight?

Start Tasks

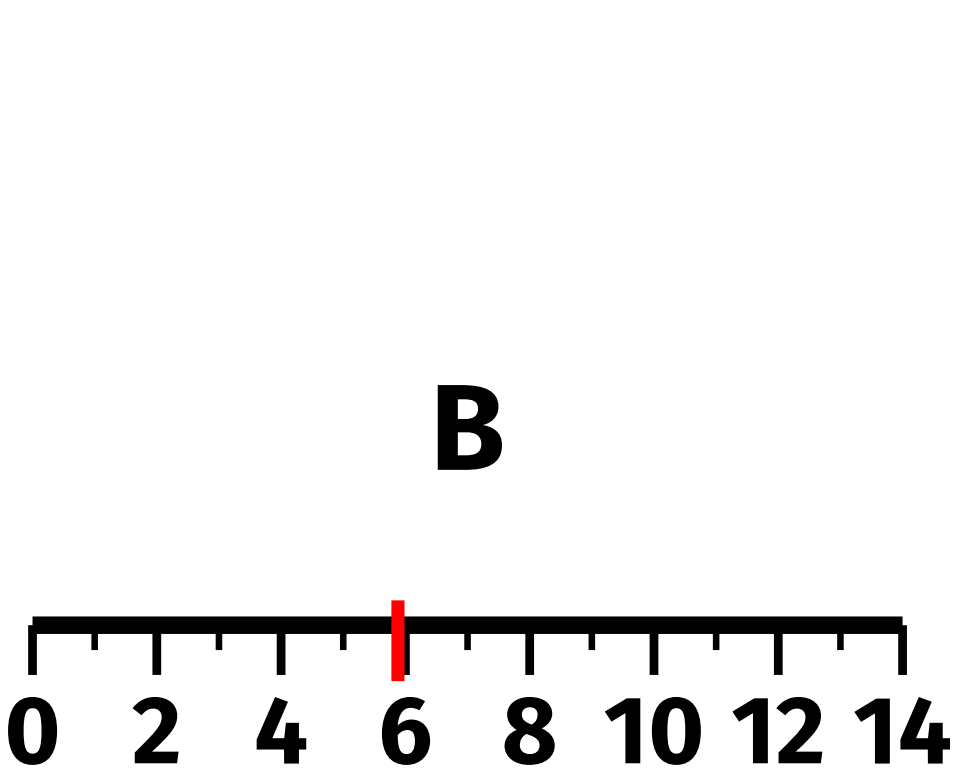


16. C: dial?

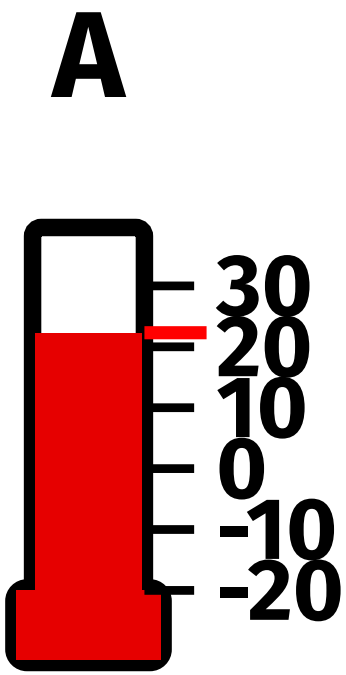
17. F: volume?

18. D: speed?

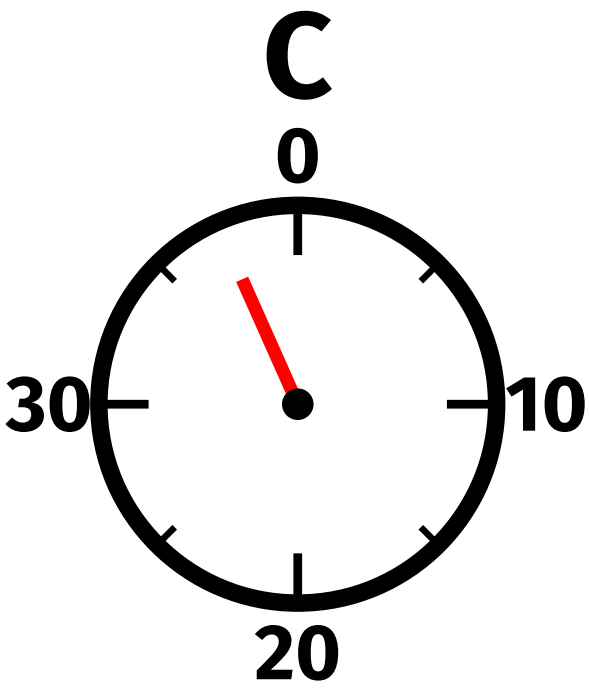
Start Tasks



19. B: mark?

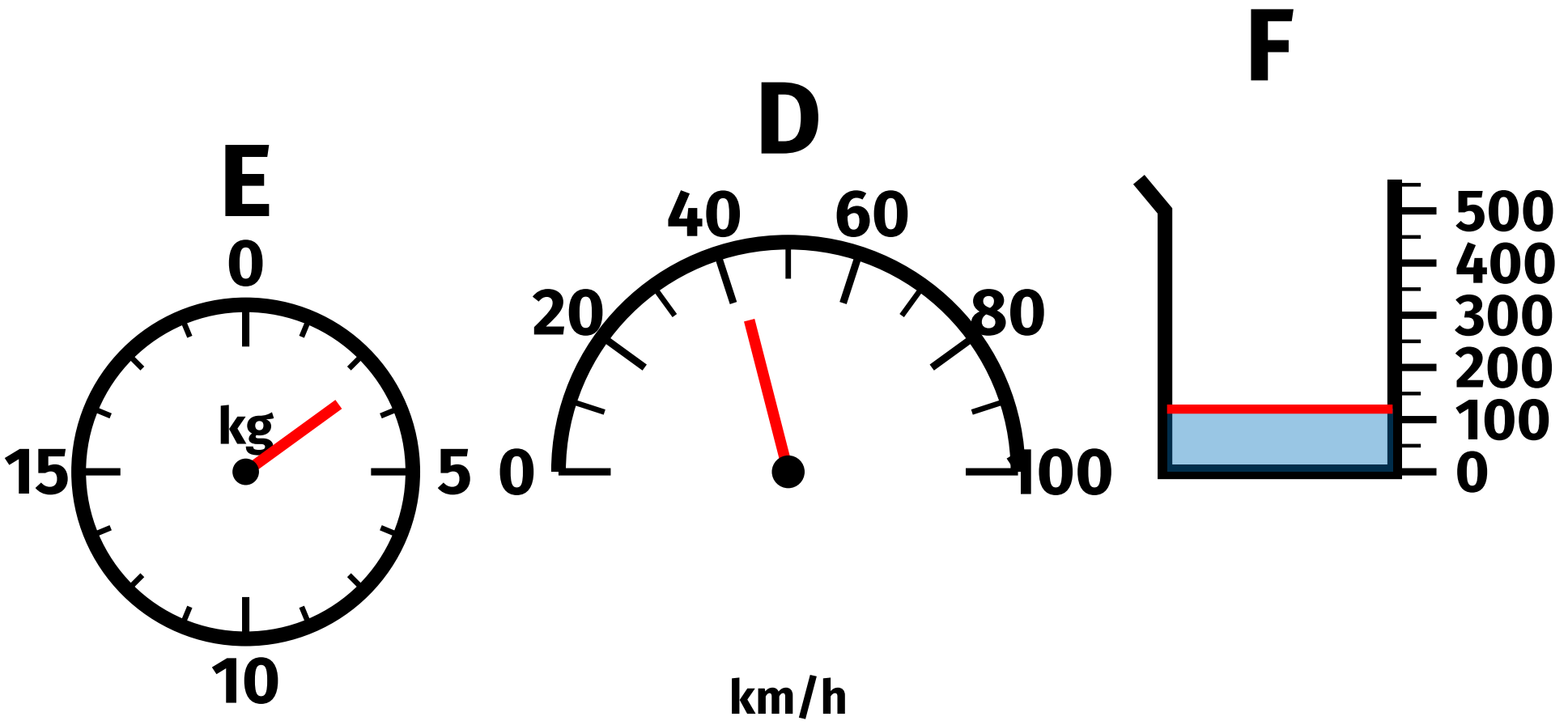


20. A: reading?



21. C: dial?

Start Tasks

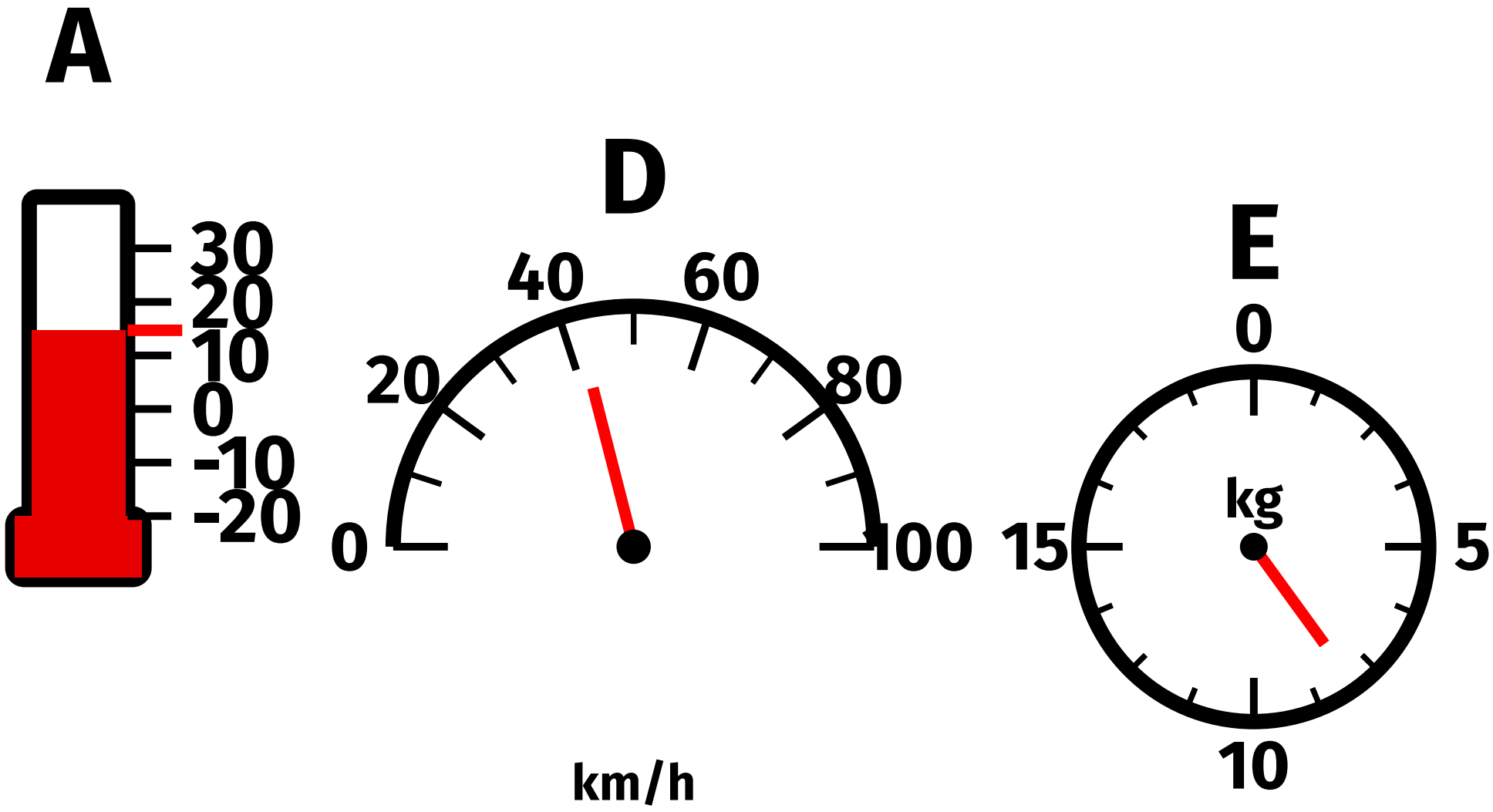


22. E: weight?

23. D: speed?

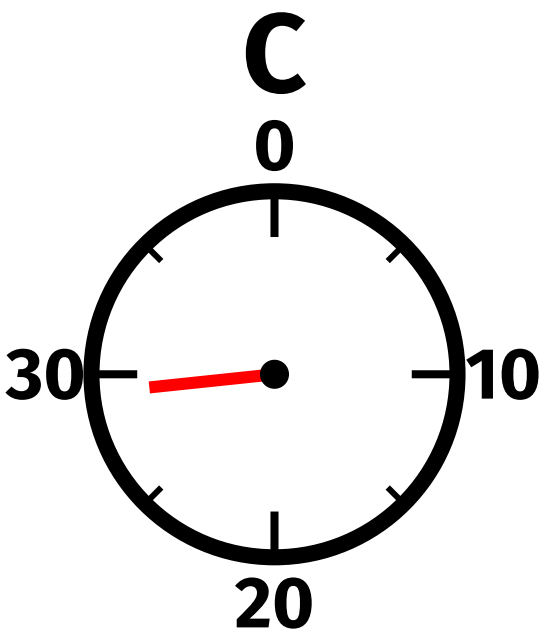
24. F: volume?

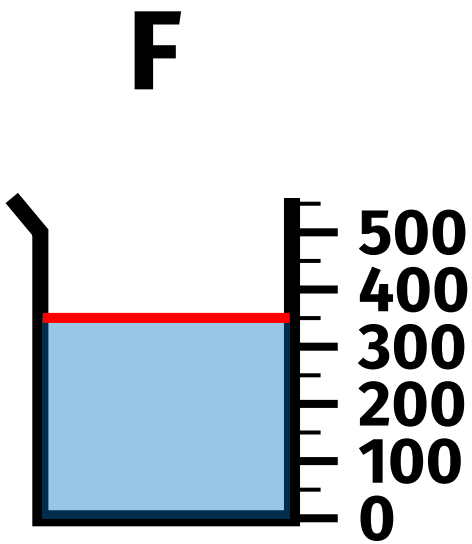
Build Tasks

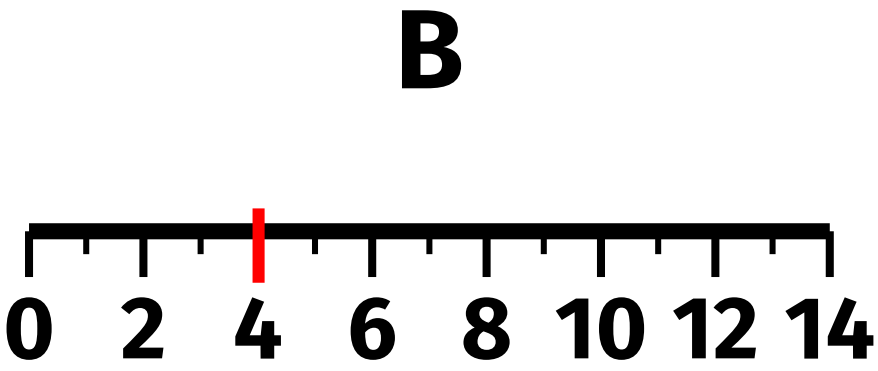


1. A: nearest 5?
2. D: nearest 10?
3. E: nearest kg?

Build Tasks





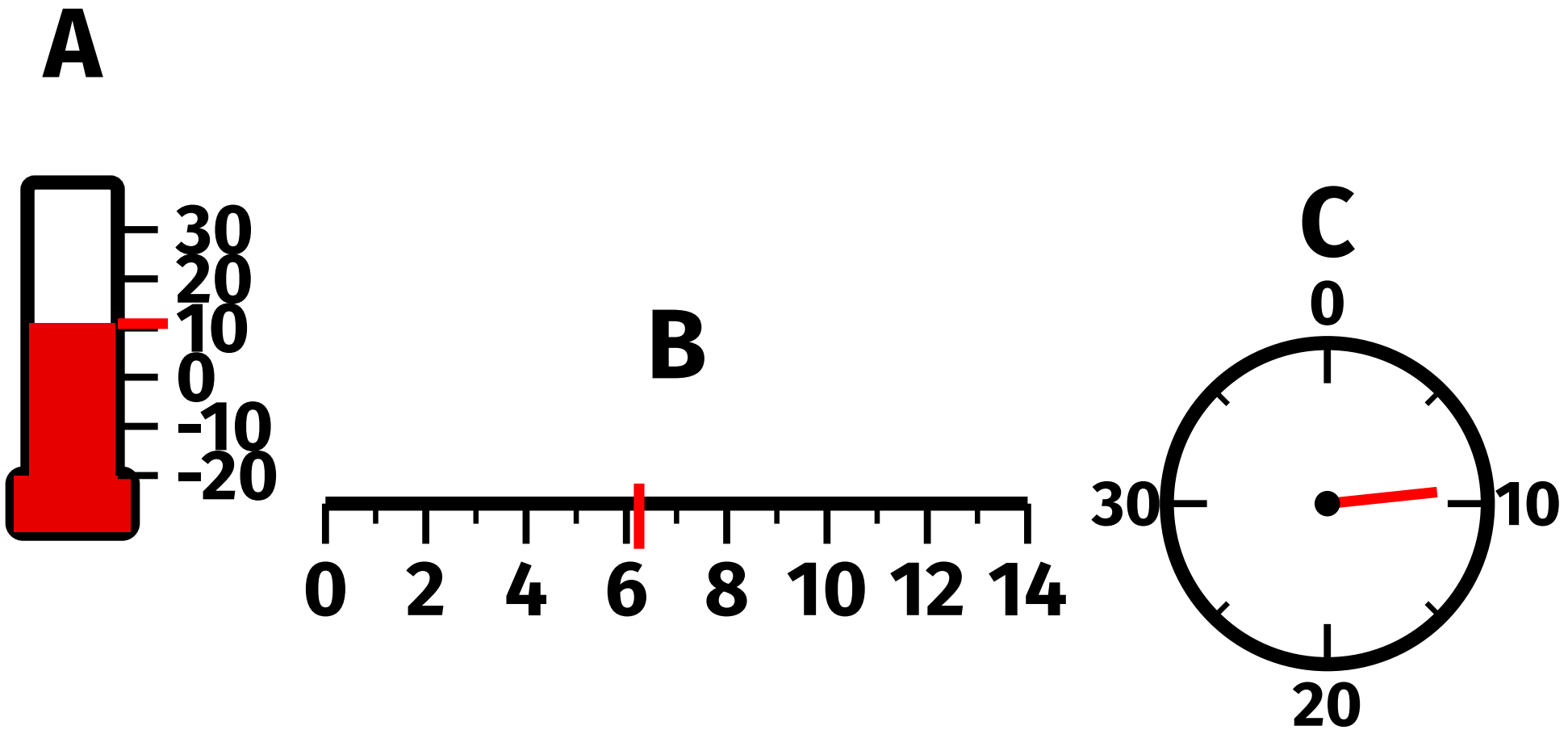


4. C: estimate?

5. F: nearest 100?

6. B: nearest mm?

Build Tasks

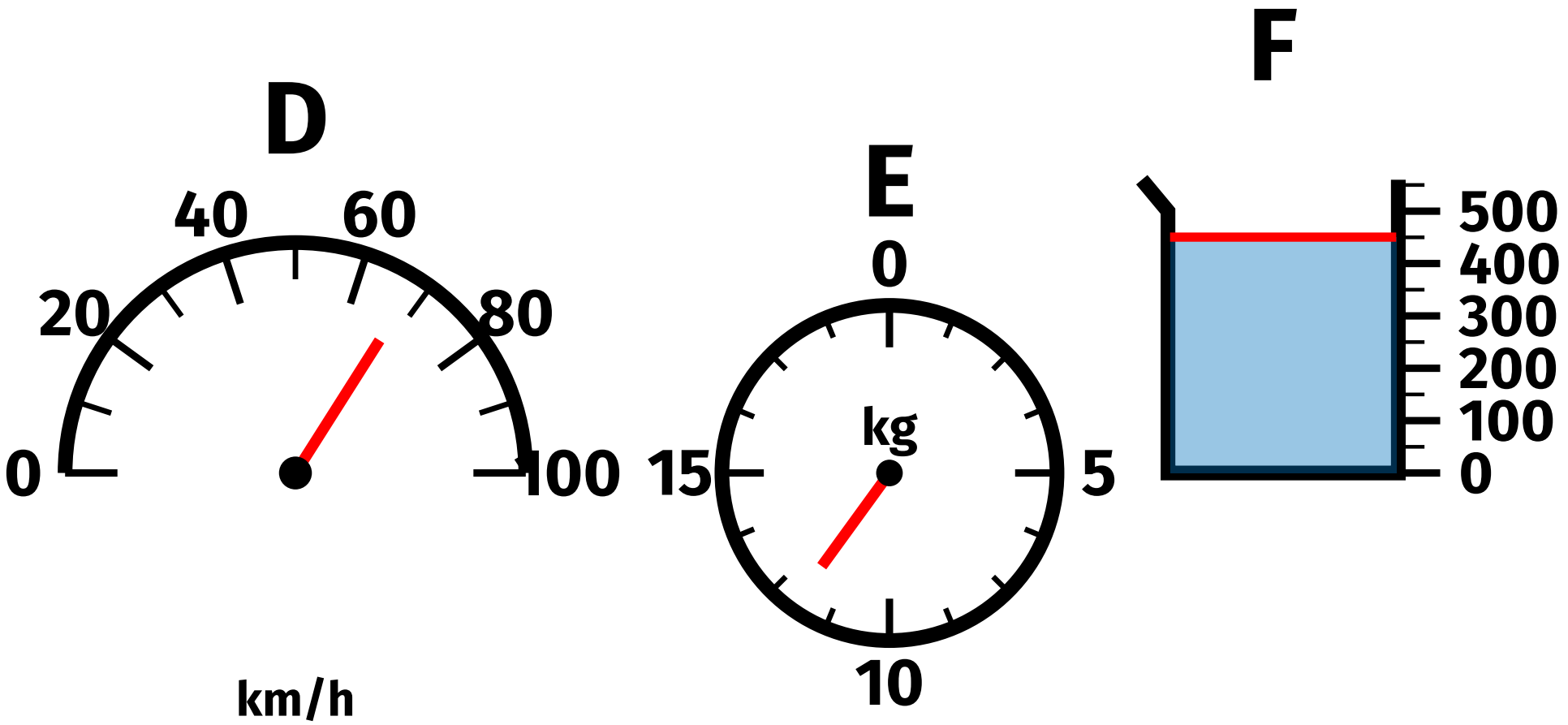


7. A: 22 to 16?

8. B: dist?

9. C: 15 to 7?

Build Tasks

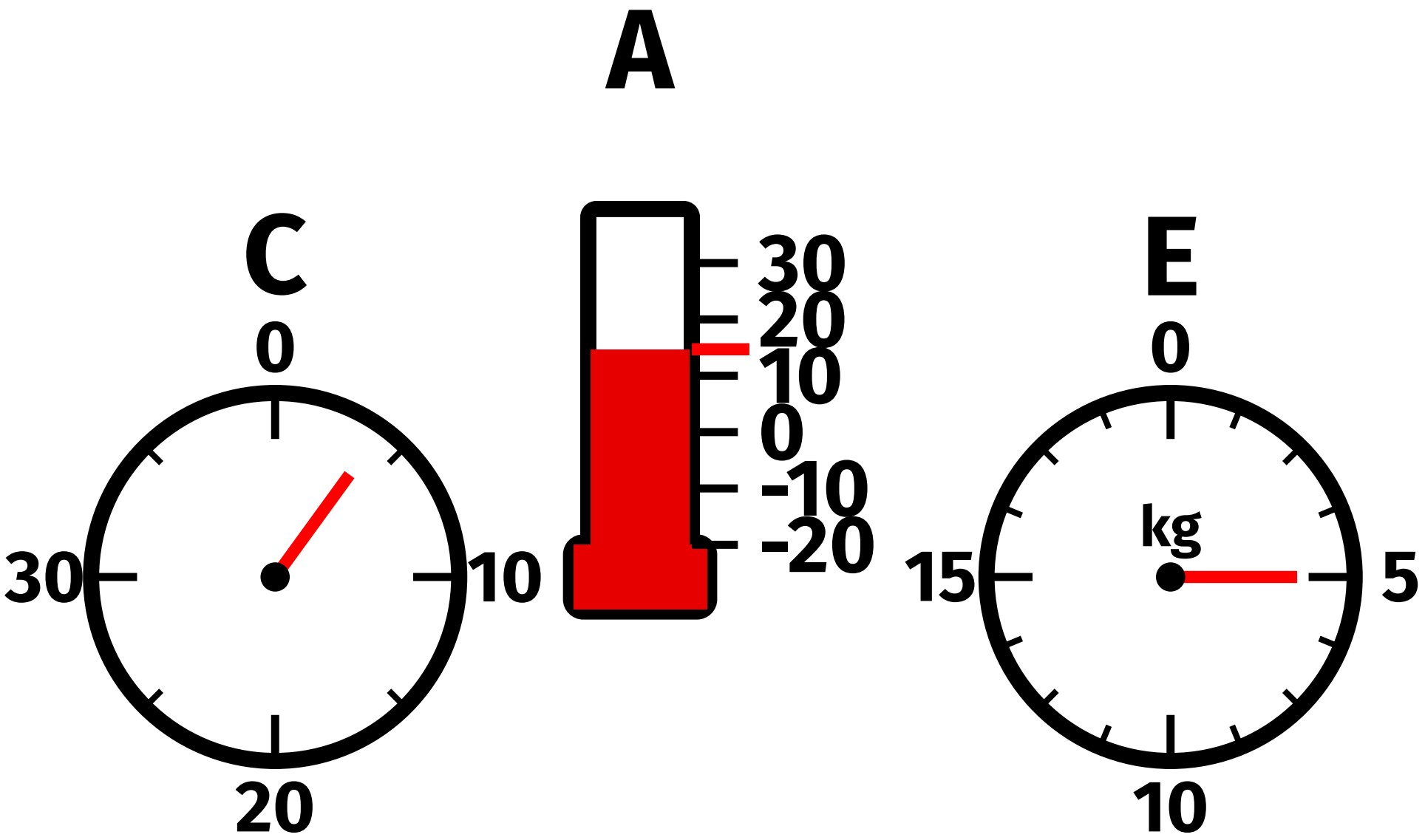


10. D: between?

11. E: rough?

12. F: 350 to 450?

Build Tasks

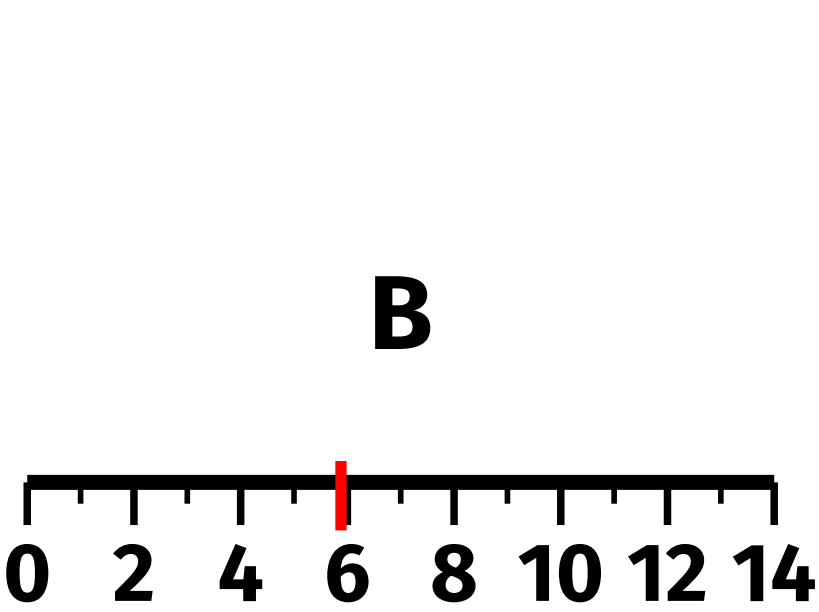


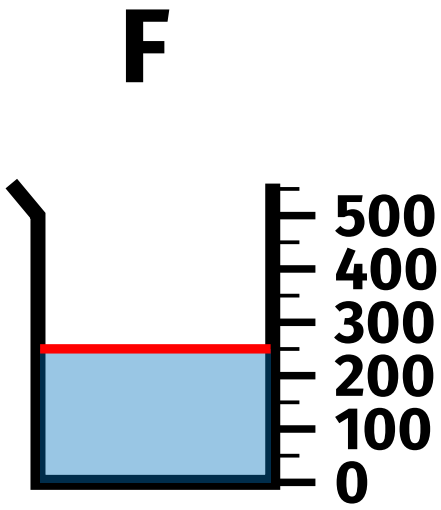
13. C: 7 to 22?

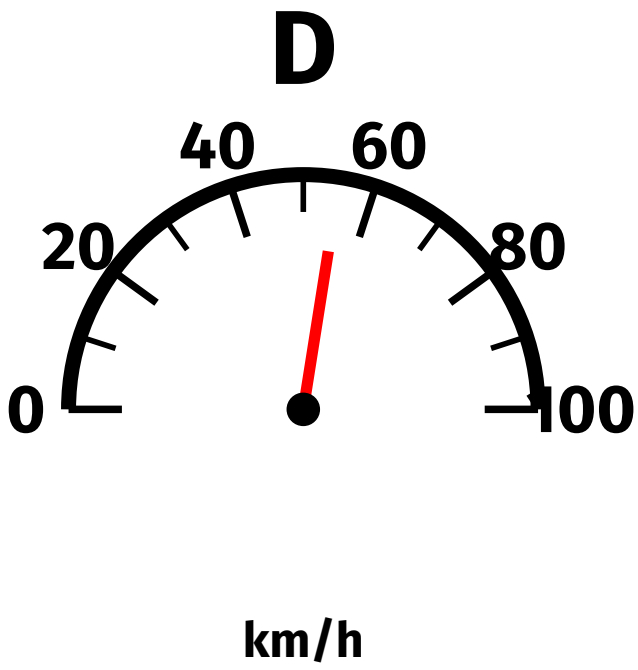
14. A: 16 to 18?

15. E: 8 to 5?

Build Tasks





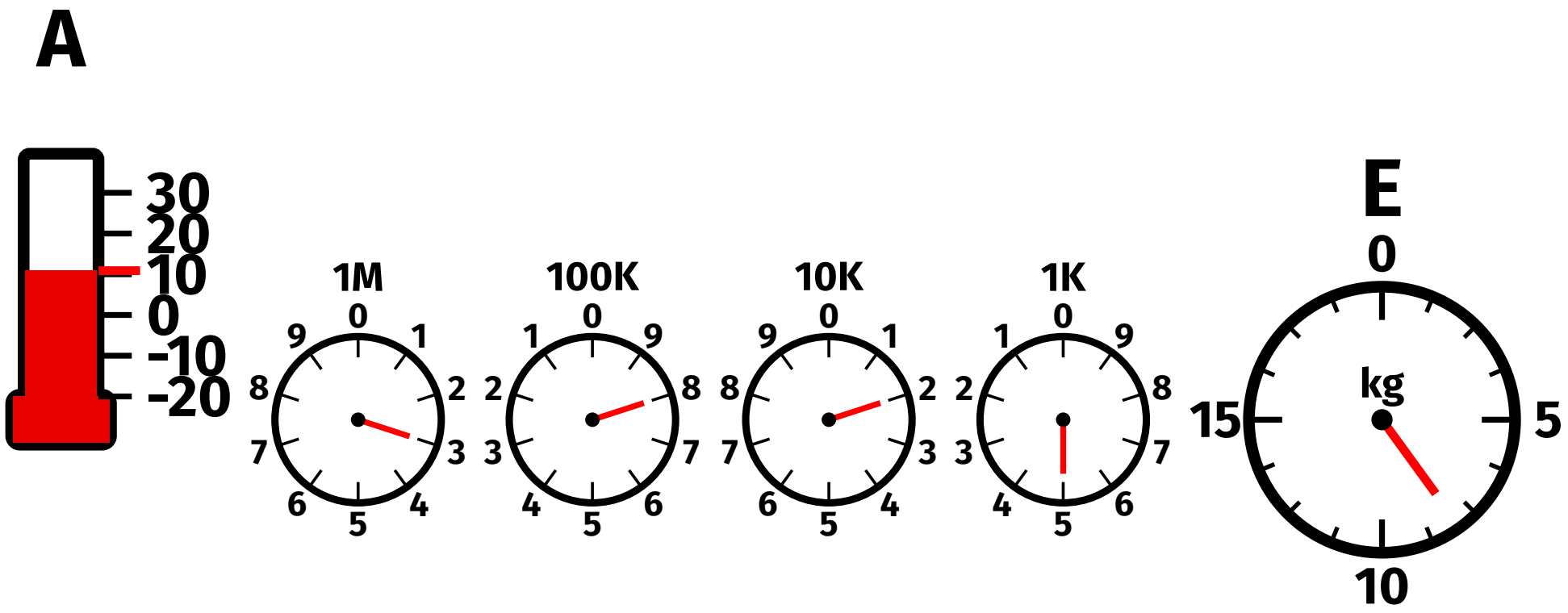


16. B: precision?

17. F: parallax?

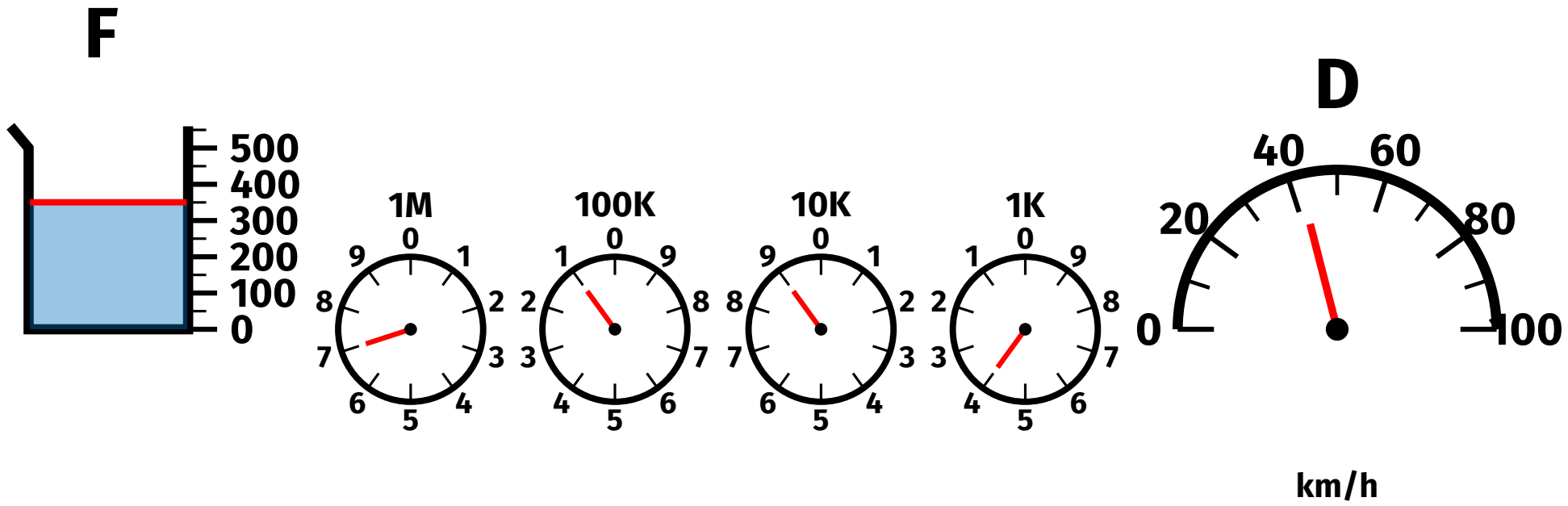
18. D: 42 to 68?

Push Tasks



1. A: reading?
2. G: gas reading?
3. E: weight?

Push Tasks

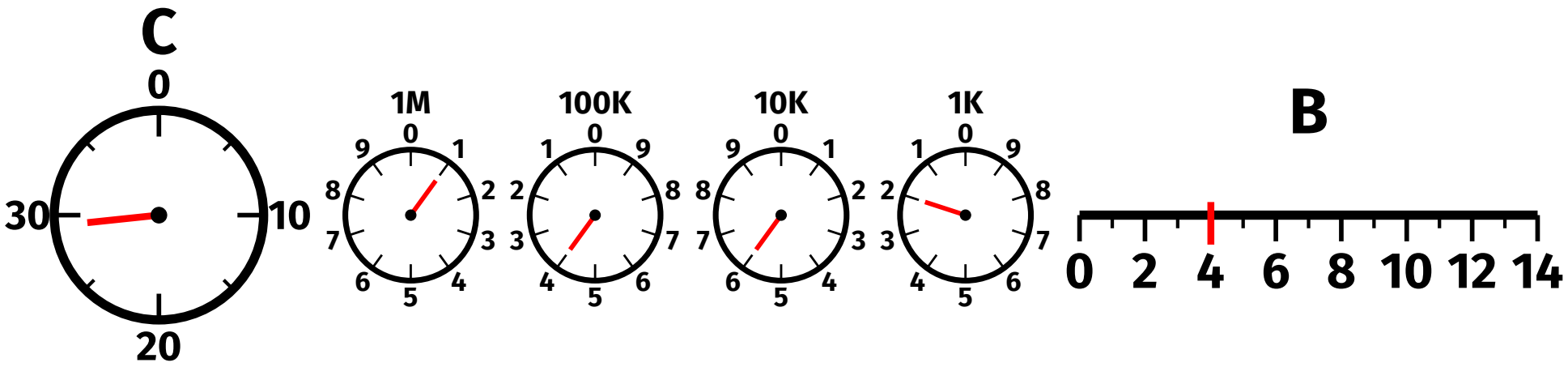


4. F: volume?

5. G: gas meter?

6. D: speed?

Push Tasks

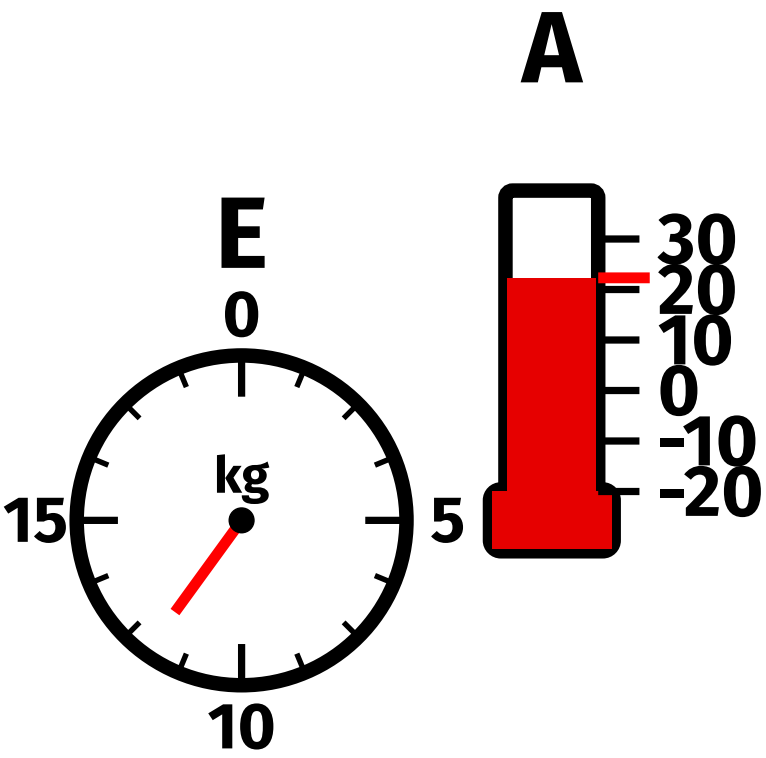


7. C: dial?

8. G: gas read?

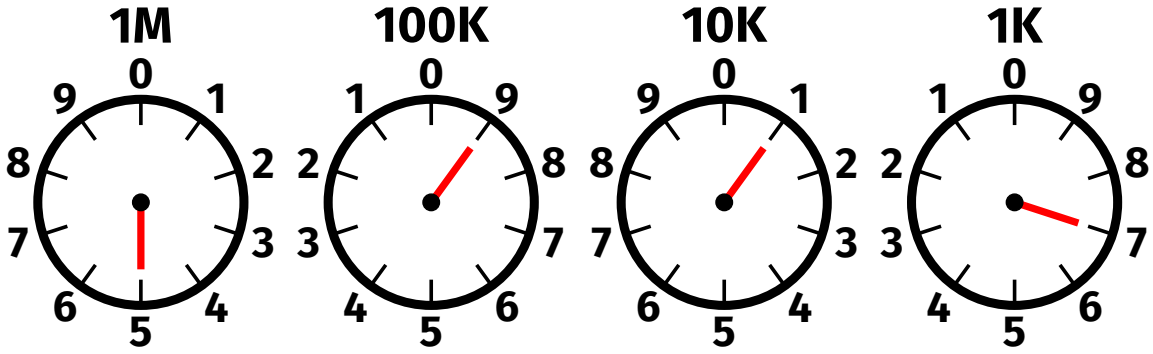
9. B: length?

Push Tasks



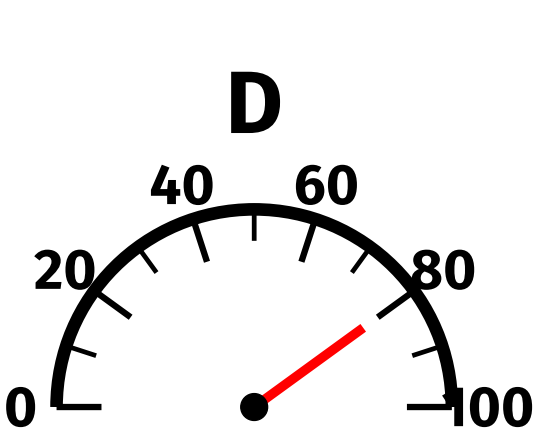
10. E: weight?

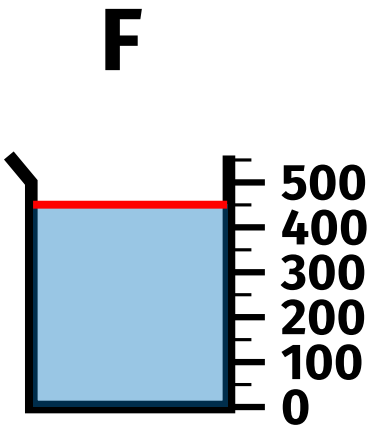
11. A: temp?

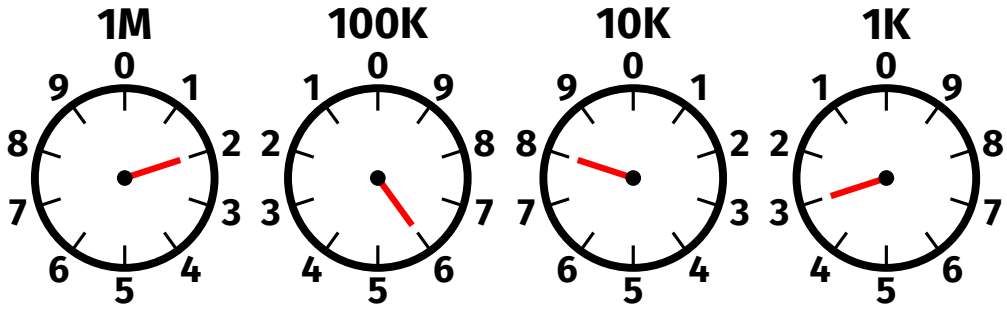


12. G: gas?

Push Tasks







13. D: speed?

14. F: volume?

15. G: gas?