TEACHER GUIDE

Teaching Understanding Size & Scale

This guide matches the six live web tasks one-for-one.

Age / level	Approximately 10-16; adaptable across upper primary and secondary.
Time	20-30 minutes.
Set-up	One connected device per pair. Ask students to write estimates before opening the comparison links.
Core ideas	Measurement; ratio and proportion; estimation; unit conversion; powers of ten; scientific notation; orders of magnitude.

Suggested flow

- 2-3 min: model one estimate without opening the answer.
- 12-15 min: pairs work through all six tasks.
- 5 min: compare the most surprising ratios.
- 3-5 min: reflection or student-written challenge question.

What to mark

- A stated prediction before checking.
- Consistent units and the correct measurement property.
- A ratio or order-of-magnitude statement, not only a ranking.
- Working shown where conversions or scientific notation are used.

TASK-BY-TASK NOTES

1. A4 vs smartphone	Expected relationship: the selected A4 paper length should exceed the selected smartphone length. The point is to insist on a shared measurement basis before calculating a ratio.
2. Car - bus - blue whale	Expected order: family car < double-decker bus < blue whale by selected length. Students should use the two linked comparisons to decide which adjacent pair is closer.
3. Eiffel - Burj	Students estimate how many Eiffel Tower heights fit into Burj Khalifa's selected architectural height, then calculate the live ratio from the values shown on the site.
4. Microscopic ladder	Expected order: DNA double helix < virus < 2 um bacterium < red blood cell. Mark scientific notation and unit conversion as part of the reasoning, not as decoration.
5. Moon - Earth - Jupiter	Expected order by mean diameter: Moon < Earth < Jupiter. Use the current live values for the two diameter ratios; the key idea is multiplicative comparison.
6. Honeybee - Earth	Using the worksheet values: 0.015 m vs 12,740,000 m. Earth / bee is about 8.49 x 10^8, so the nearest power of ten is 10^9.

Differentiate

Younger learners: focus on ordering, choosing sensible units and simple ratios. **Older learners:** require SI conversion, scientific notation, order-of-magnitude reasoning and a short critique of measurement choices.

Extension

Ask each pair to design one new comparison using two real things from Just How Big?. They must record the answer privately, challenge another pair, then explain the result with a ratio or power-of-ten statement.

Licence and attribution. This worksheet and teacher guide may be shared and adapted under CC BY-NC-SA 4.0 with attribution to Alexander Chalmers / Just How Big?. Website content, data and illustrations remain subject to their own site terms.