

Mastery questions



- Practice makes perfect... (well, eventually)
- We aim to build competence and confidence at the same time.
- We start with questions without the 'noise' and just the thing to practise.
- Then we can make things more complicated and noisy as we go.
- Make sure that your 'pass mark' is not lower than 75%.

Practice & confidence-building questions



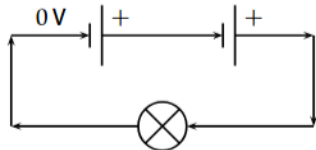
- Choose an equation your students need practice with
- Write 6-10 practice questions involving this equation.
 - First questions just involve 'plugging numbers'
 - Later ones involve more complex re-arrangement
 - One or two can involve a challenge
 - Make the contexts of some questions relevant to applications
 - Make a question or two have visual impact
 - Ensure it is easy to mark!
- GCSE: $E = qV$
- Write 6-10 practice questions involving this equation.
 - How much energy is given to a 0.002C charge by a 9V battery?
 - Calculate the potential difference needed to give 50J to 0.25C of charge.
 - How much energy does a 240V supply give to 9nC?
 - Calculate the kinetic energy of an electron accelerated across 10kV in an X-ray machine.
 - A cat stands on a carpet and rubs itself against a sofa gaining 5μJ of electrostatically stored energy and 10nC of charge. What is its potential difference?

Electrical competence



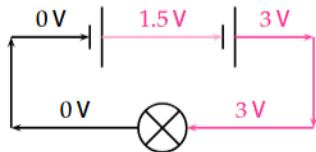
- Singling out individual skills enables good modelling
- Sometimes the boundary between not understanding and understanding is not sharp but fuzzy.

We label the negative terminal of the battery 0 V. Next, we draw arrows to show the direction of charge flow. This is round the circuit from the + of the battery.



We follow the arrows, starting at the 0 V mark. Each cell **adds** +1.5 V. We label each wire with its potential. We use a colour code, here black means 0 V.

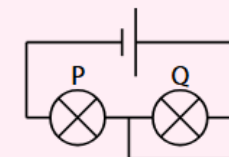
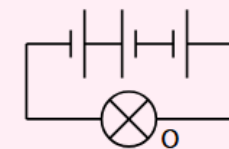
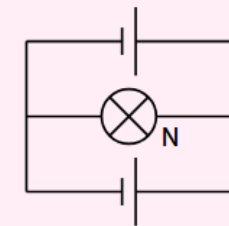
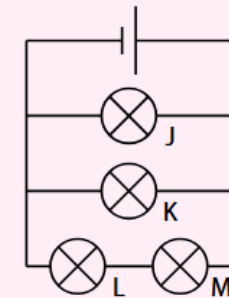
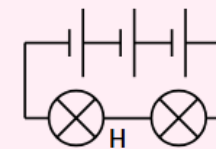
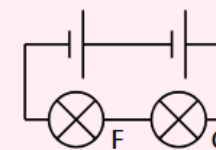
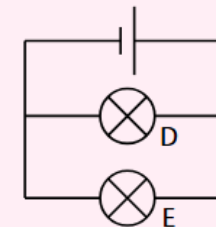
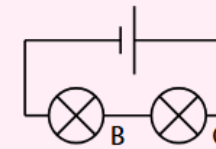
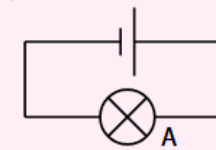
All points on a wire have the same potential. This is because charge loses very little energy while flowing down a wire.



The bulb connects a 3 V wire to a 0 V wire. The drop in potential as the charge goes through it is 3 V. For this lamp, 1.5 V means 'normal' brightness, so the lamp will be **brighter** than normal.

Label the circuits below with the potential of each wire. Then write down the potential drop for each lamp. All bulbs are identical.

Hint: if the charge goes through a cell the wrong way, then the potential will **drop** by 1.5 V.

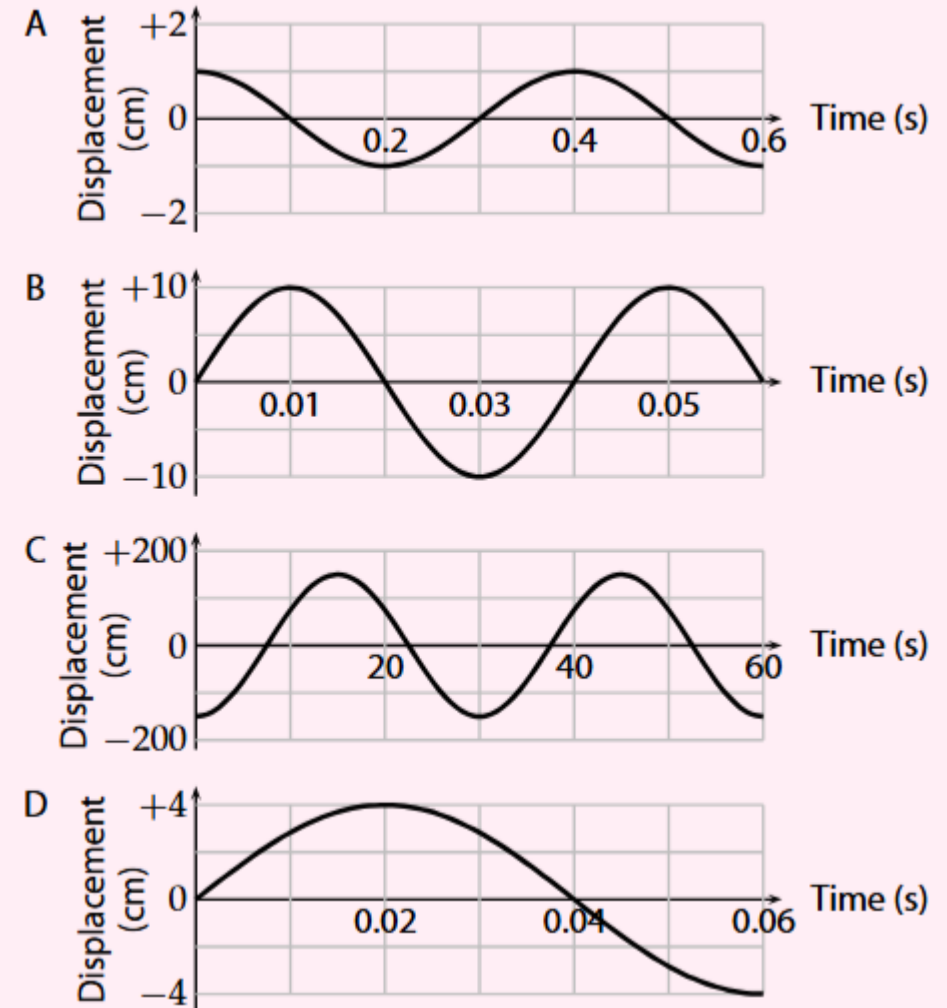


Wave practice



- If you wish to create motion in your lesson, different practice cards can be in different places around the room (also saves on printing).
- Students fill in a grid, self mark, then hand in. Quick AfL.

	Amplitude (cm)	Time period (s)	Frequency (Hz)
A			
B			
C			
D			



Practical skills (digression)



- Consider a 'practical passport' with 'visas' (or places for a stamp to be applied) when individual practical skills are learned (e.g. connecting a simple circuit from the diagram).
- What tasks would demonstrate that those individual skills are secure?
- When the passport is complete, it can be handed in to be exchanged for a certificate or licence.

Year 7 Electrical Licence

To gain your Wiring Licence, you need to build the circuits, and then write down how bright the bulbs are. If there is a T by the circuit, you need to have your teacher give you a stamp once you have built it. Your Wiring Licence (once you have it) entitles you to a recognition.

Circuit 1 - T

