

# OCR (A) Physics A-level

## PAG 09.3 - Investigating Capacitance

### Practical Flashcards

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What equation links the area and separation of a capacitor's plates to its capacitance?



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$$C = \frac{\epsilon_0 A}{d}$$



What is  $\epsilon_0$  and what are its units?



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$\epsilon_0$  is the permittivity of free space and is measured in Farads per metre.

$$\epsilon_0 = 8.85 \times 10^{-12} \text{ F/m}$$



If the area of the plates of a capacitor is increased, how will the capacitance change?



If the area of the plates of a capacitor is increased, how will the capacitance change?

The area of the plates and the capacitance are directly proportional to each other and so if the area increases, so does the capacitance.



If the separation of the plates of a capacitor is increased, how will the capacitance change?





If the separation of the plates of a capacitor is increased, how will the capacitance change?

The separation of the plates and the capacitance are inversely proportional to each other and so if the separation increases, the capacitance will decrease.



How can the area of the plates be altered in this experiment?



How can the area of the plates be altered in this experiment?

The area we measure in this experiment is the area over which the plates overlap. This means that to change this area, we can slide one of the plates to the side causing the overlap area to change.



How can the overlap area be obtained from the length over which the plates overlap?



How can the overlap area be obtained from the length over which the plates overlap?

The length over which the plates overlap can be multiplied by the width of the plates (which should be constant across both plates) to obtain the overlap area.



How can the capacitance of each arrangement be measured?



How can the capacitance of each arrangement be measured?

The capacitance can be measured using a multimeter.



How can a multimeter be connected to the aluminium plates?





How can a multimeter be connected to the aluminium plates?

Crocodile clips can be clipped onto the aluminum plates, and these leads can then be plugged into the multimeter.



How could a systematic error in your overlapping area measurements occur?



How could a systematic error in your overlapping area measurements occur?

A systematic error in your overlapping area measurements may occur if the widths of the plates are not perfectly aligned. A straight edge could be used to align the edges of plates and reduce the likelihood of this error.



# What is capacitance?



## What is capacitance?

Capacitance is a measure of how much electrical charge a capacitor can store per unit potential difference across it.

