



# CAROUSEL

LEARNING

## Lesson phase codes

- E** Explanation
- C** Check for understanding
- P** Practice task

# Welcome to A-Level Physics

Date: Wednesday, 17 July 2024

**Last lesson we...Finished our GCSEs.**

**Next lesson we will...Have another introduction in Sept.**

To give an overview of the A-Level Physics course.

To evaluate the benefits of taking A-Level Physics.

To introduce ourselves to some quantum phenomena.

# Year 12 (AS Physics)

Quarks and Leptons

Waves

Optics

Matter and Radiation

Quantum Phenomena

Stationary Waves [RP1]

Lasers [RP2]

Force and Momentum

Determination of  $g$  by free-fall [RP3]

Forces in Equilibrium

Materials

Newton's Laws of Motion

On the Move

Young's Modulus [RP4]

Work, Energy and Power

DC Circuits

Electric Current

Resistivity of a Wire [RP5]

EMF and Internal Resistance [RP6]

# Year 13 (A-Level Physics)

Simple Harmonic Motion [RP7]

Thermal Physics

Boyle's and Charles' Law [RP8]

Gravitational Fields

Simple Harmonic Motion

Gases

Electric Fields

Magnetic Fields

Capacitors [RP9]

Force on a Wire [RP10]

Capacitors

Electromagnetic Induction

Radioactivity

Nuclear Energy

Option Topic

Magnetic Flux Linkage [RP11]

Gamma Decay & Inverse-Square Law [RP12]

# You've Made a Great Choice!



- Earnings increase by 27.4% by taking 2 STEM subjects at A-Level, rather than just GCSE (London Economics, 2015).
  - For physics in particular, sectors include:
    - Actuary
    - Applications developer
    - Clinical technologist
    - Data analyst
    - Nuclear engineer
    - Operational researcher
    - Software engineer
    - Banking/finance
    - Aerospace/piloting
- The list goes on....

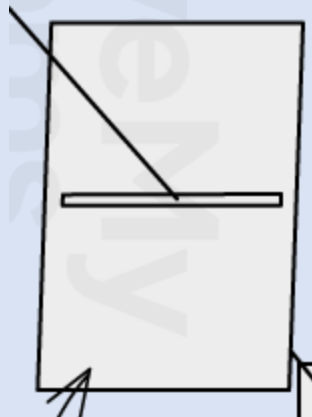
# Think Intuitively...



## Think, Pair, Share:

If I pour a bucket of sand over a board with one slit, how will the sand pile up underneath?

18. The Forced Relationship



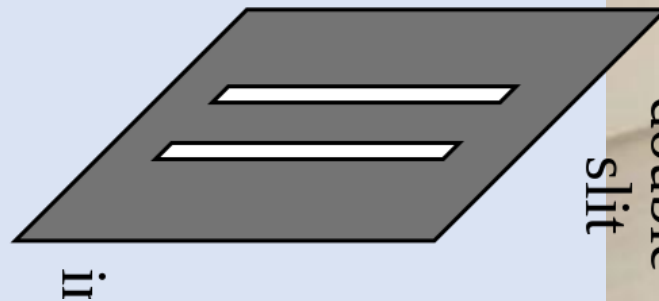
# Think Intuitively...



## Think, Pair, Share:

If I pour a bucket of sand over a board with two slits, how will the sand pile up underneath?

18. The Forced Relationship



double-  
slit

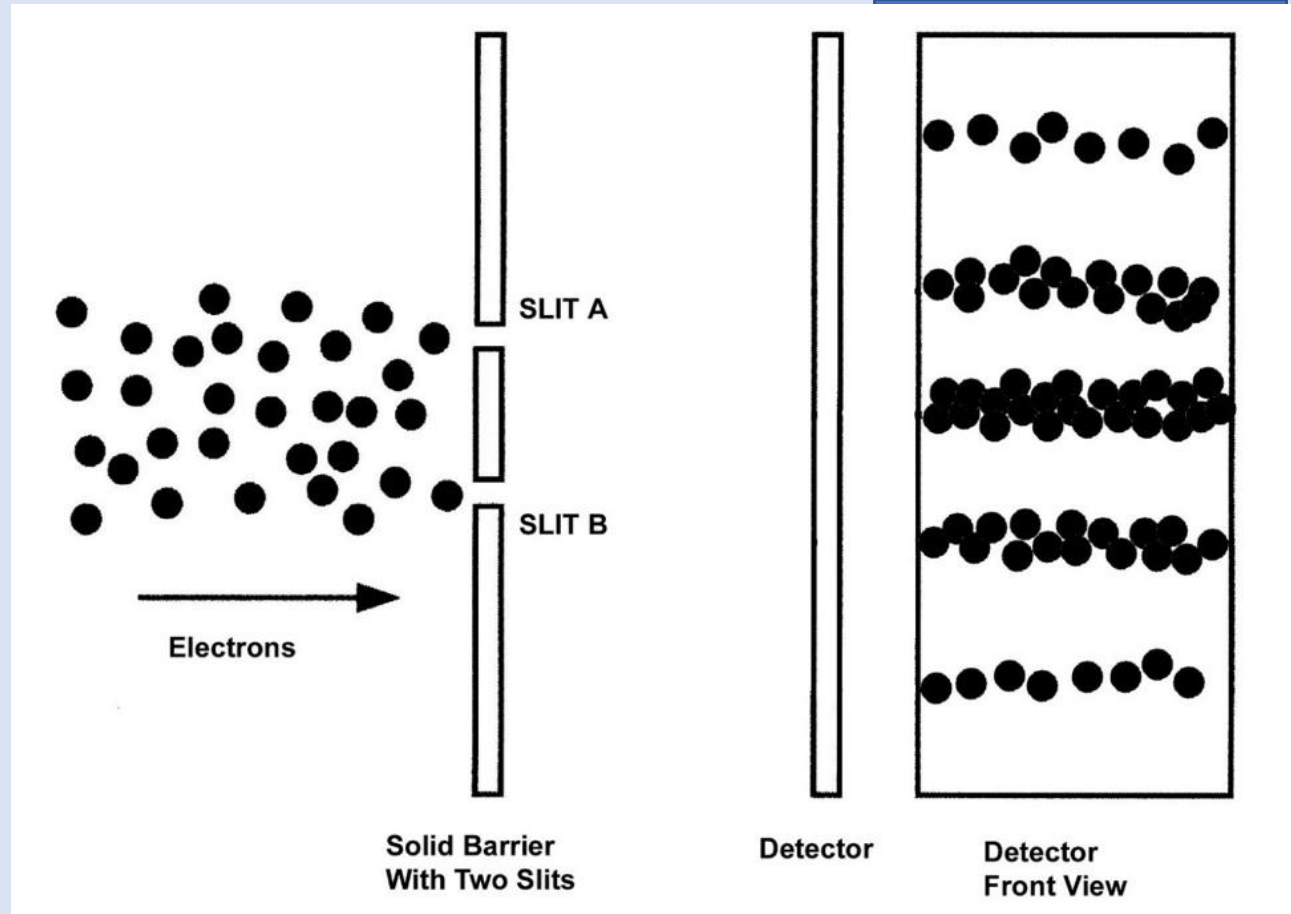
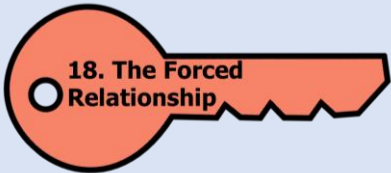


# The same, but with electrons.



## Think, Pair, Share:

If I shoot electrons at a screen with two slits, where would you expect them to land?





# Wave-Particle Duality



Electrons are just as much waves as they are particles!

Even molecules can show wave-like behaviour.

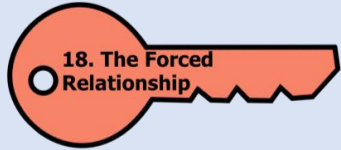


de Broglie Wavelength:

$$\lambda = \frac{h}{mv}$$



$$6.62607015 \times 10^{-34} \text{ m}^2 \text{ kg} / \text{ s}$$



$$h = \frac{2\pi m_P l_P^2}{t_P}$$

$$h = \frac{32\pi \rho K_e^{11} A_l^7 c O_e}{9\lambda_l^3} g_\lambda$$

$$h = \frac{\mu_0 q_P^2 c}{2}$$



A question to research over the summer:

What would happen to the universe if Planck's constant was bigger?



$$6.62607015 \times 10^{-34} \text{ m}^2 \text{ kg} / \text{s}$$