WJEC England Physics GCSE

SP5.1: Waves

Practical Flashcards

Part 1: Without ripple tank (exam board method).

Outline the basic steps of the practical.

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1. Measure the length of a tray and then pour water into it at a depth of 0.5 cm, recording the volume of water that is used.
2. Lift one end of the tray a small distance above the desk and then gently replace it.
3. Start the stopwatch as the wave produced hits the end of the tray.
4. Time how long it takes to travel 3 lengths of the tray.
5. Repeat 3 times.
6. Repeat with varying depths (0.6 cm, 0.7 cm etc).

Why should you repeat the same depth multiple times?

Why should you repeat the same depth multiple times?

Repeat readings allow you to identify anomalies and calculate average values which help improve the accuracy of the results.

How do you calculate the mean speed of the waves for each depth?

How do you calculate the mean speed of the waves for each depth?

Mean speed = Distance / Mean time

Where distance is 3x the length of the tray, and the time is the time taken to travel 3 lengths.

What safety precaution should be taken when carrying out this experiment?

What safety precaution should be taken when carrying out this experiment?

Be careful to avoid water spillages and wipe up any water that ends up on the floor to prevent slipping.

How should the wave speed change as the depth is increased?

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The speed should increase as the depth is increased.

Part 2: Using a ripple tank.

Outline the basic steps of the practical.

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1. Set up the ripple tank with a lamp above it and white card/paper below it.
2. Switch on the motor attached to the wooden rod.
3. Measure the wavelength of the waves produced.
4. Count the number of waves passing a point in 10 seconds and calculate the frequency.
5. Calculate the wave speed.

What type of waves are the waves at the surface of the water?

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Transverse waves

What would the consequence of too much water in the ripple tank be?

What would the consequence of too much water in the ripple tank be?

If there is too much water the rod won't produce clear waves and they will be less clearly projected onto the card below.

How should the wooden rod be set up in the ripple tank?

How should the wooden rod be set up in the ripple tank?

The wooden rod should be placed into the tank so that it just touches the surface of the water.

How should you measure the wavelengths of the waves on the card?

How should you measure the wavelengths of the waves on the card?

1. Adjust the lamp position so that the waves are clearly projected onto the card.
2. Using a metre rule, measure across as many waves as you can.
3. Divide the distance by the number of waves measured across.

Why should you measure across more than one wave?

Why should you measure across more than one wave?

To reduce the uncertainty in the measurement and improve the accuracy of the value.

Suggest a way to make measuring the wavelength of the waves easier.

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Take a photograph of the waves with the ruler in the picture so that the distances can be measured without the waves moving.

What unit should be used for the wavelength measurements?

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Metres, so that when the speed is calculated it is in metres/second (m/s).

How do you measure the frequency of the waves on the card?

How do you measure the frequency of the waves on the card?

1. Count the number of waves passing a chosen point in 10 seconds.
2. Divide the number by 10, to produce a frequency in Hz.

What equation is used to calculate wave speed?

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Wave speed = Frequency x Wavelength

When the frequency is in hertz and the wavelength is in metres, what is the unit for wave speed?

When the frequency is in hertz and the wavelength is in metres, what is the unit for wave speed?

m/s

Metres per Second

Describe another way of measuring the wave speed.

Describe another way of measuring the wave speed.

Mark two points on the paper that are a fixed distance apart and use a stopwatch to time the time it takes for a wave to travel between them.

Then use speed = distance / time.

If both values for wave speed from the two methods are similar, what does this suggest?

If both values for wave speed from the two methods are similar, what does this suggest?

The equipment and set-up is suitable and the value is accurate.