
GCSE Physics required practical activity 9: Waves

Student sheet

Required practical activity	Apparatus and techniques
Make observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid and take appropriate measurements.	AT 4

The activity is split into two parts:

- observing water waves in a ripple tank;
- observing waves on a stretched string or elastic cord.

Your teacher may complete both parts of this activity as a class demonstration.

Activity 1: Observing waves in a ripple tank

Learning outcomes
1
2
Teachers to add these with particular reference to working scientifically

Method

You will use the following:

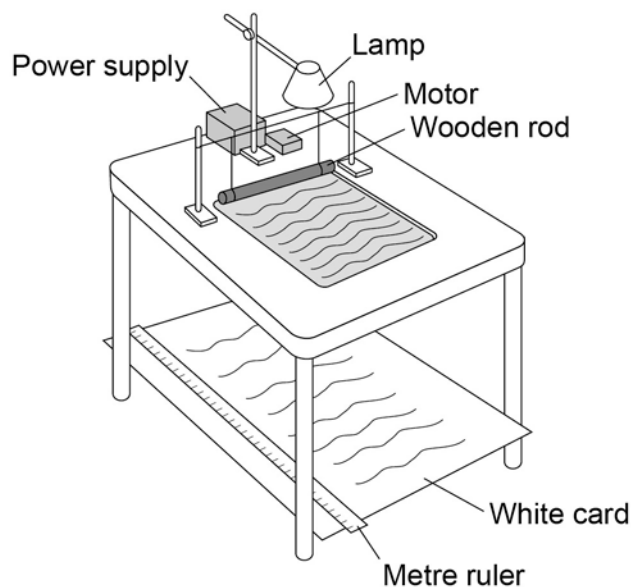
- ripple tank plus accessories
- suitable low voltage power supply
- metre ruler

You should read these instructions carefully before you start work.

1. Set up the ripple tank with a large sheet of white card or paper on the floor under the tank.
2. Pour water to a depth of about 5 mm into the tank.

3. Adjust the height of the wooden rod so that it just touches the surface of the water.
4. Switch on both the overhead lamp and the electric motor.
5. Adjust the speed of the motor so that low frequency water waves are produced.
6. Adjust the height of the lamp so that the pattern can be clearly seen on the card on the floor.
7. Place a metre ruler at right angles to the waves shown in the pattern on the card. Measure across as many waves as possible then divide that length by the number of waves. This gives the wavelength of the waves.
8. Count the number of waves passing a point in the pattern over a given time (say 10 seconds). Then divide the number of waves counted by 10. This gives the frequency of the waves.
9. Calculate the speed of the waves using the equation:

$$\text{wave speed} = \text{frequency} \times \text{wavelength}$$



Activity 2: Observing waves on a stretched string or elastic cord

Learning outcomes
1
2
Teachers to add these with particular reference to working scientifically

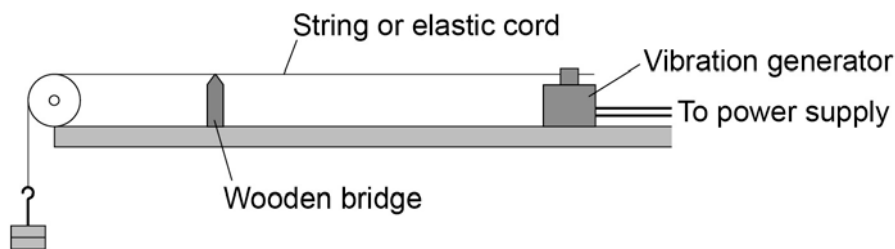
Method

You will use the following:

- vibration generator
- suitable power supply (variable frequency)
- suitable string or elasticated cord
- set of 100 g masses and hanger
- set of 10 g masses and hanger
- wooden bridge
- pulley on a clamp.

You should read these instructions carefully before you start work

1. Set up the apparatus as shown.



2. Switch on the vibration generator. The string (or elasticated cord) should start to vibrate.
3. Adjust the tension in the string or move the wooden bridge to adjust the length of the string until a clear wave pattern can be seen. The waves should look like they are stationary.
4. Use a metre ruler to measure across as many half wavelengths as possible (a half wavelength is one loop). Then divide the total length by the number of half waves. Multiplying this number by two will give the wavelength.
5. The frequency is the frequency of the power supply.
6. Calculate the speed of the wave using the equation:

$$\text{wave speed} = \text{frequency} \times \text{wavelength}$$