

Exercise walk-through

Properties of Wave Pulses and Waves ■ 14.1

eXercise

You must be able to

- describe a **wave** 波 as a disturbance that transfers energy without transferring matter
- distinguish **transverse** 横波 from **longitudinal** 纵波 waves
- define amplitude and wavelength

Method — What a wave carries

A wave transfers **energy** through a medium **without** transferring matter — the particles just vibrate about fixed positions.

Method — Transverse vs longitudinal

- **Transverse** — vibration is perpendicular to the direction of travel (waves on a string, light).
- **Longitudinal** — vibration is along the direction of travel (sound).

Method — Amplitude and wavelength

Amplitude is the maximum displacement from rest; **wavelength** is the distance between two matching points on the wave.

Practice 2.1 ■ 2 marks

State what a wave transfers and what it does **not** transfer.

Solution 2.1

Method: What a wave carries

Worked steps

it transfers energy **B1**; it does not transfer matter **B1**.

Practice 2.2 ■ 2 marks

Give one example each of a transverse and a longitudinal wave.

Solution 2.2

Method: Transverse vs longitudinal

Worked steps

transverse: a wave on a string (or light); longitudinal: sound **B1** **B1**.

Practice 2.3 ■ 1 mark

Define the amplitude of a wave.

Solution 2.3

Method: Amplitude and wavelength

Worked steps

the maximum displacement of a particle from its rest position **B1**.

Exam-style 3.1 ■ 1 mark

A wave transfers

- A** matter only
- B** energy without matter
- C** both matter and energy equally
- D** neither

Solution 3.1

Method: What a wave carries

- A matter only
- B energy without matter
- C both matter and energy equally
- D neither



Worked steps

B.

Exam-style 3.2 ■ 1 mark

Sound is an example of a

- A** transverse wave
- B** longitudinal wave
- C** electromagnetic wave
- D** standing wave

Solution 3.2

- A transverse wave
- B longitudinal wave**
- C electromagnetic wave
- D standing wave



Worked steps

B.

Exam-style 3.3 ■ 1 mark

A wave travels along a rope, with the rope moving up and down as the wave moves sideways.

- (a) Name this type of wave.
- (b) State the direction of vibration relative to the direction of travel.
- (c) Name the quantity equal to the maximum displacement.

Solution 3.3

Method: Transverse vs longitudinal

Worked steps

(a) a transverse wave **B1**. (b) perpendicular to the direction of travel **B1**. (c) the amplitude **B1**.