7La Making sounds

1 **a** B – high volume

b C – the amplitude of the vibrations

c A – the number of vibrations per second

d C – hitting a long bell gently

2 Students' own answers

3 **a** 500 Hz

b The sound will have a higher pitch.

4 **a** Lower sounds are made when larger objects vibrate, so the one making the lower sound is likely to be bigger than the other one.

b It can hit its chest harder.

5 Go to a zoo/listen to animal sounds and make a list.

7Lb Moving sounds

1 **a** Arrow drawn pointing to the right.

b Arrow drawn similar to one of the red arrows on diagram C in 7Lb Moving Sounds in the Student Book.

2 X, because the amplitude is greater/the particles are moving further as the wave passes.

3 **a** There is no air in space to pass the vibrations on.

b The sound passes through the air in one helmet then through the solid helmets to the air in the second helmet.

c Students' own answers.

7Le Comparing waves

1 **a** Labels, anticlockwise from top: crest, particle movement, trough, direction of travel, amplitude.

b Students' own answers

2 Up and down.

3 **a** Some of it is transferred to the water and it spreads out across the surface as waves.

b Drop a heavier stone (as it will have more energy).

4 Correct words are: more, spread out, smaller.

7Lc Detecting sounds

1 eardrum, bones, cochlea

2 **a** bones

b cochlea

c eardrum

d eardrum

e auditory nerve

f ear canal

3 Loud sounds can damage hearing.

4 Put an object such as a bell inside a box. Measure the sound intensity outside the box with different materials wrapped around the box/stuffed inside the box. Students may also explain how to make fair comparisons or suggest repeating the measurements.

5 **a**, **b** Students' own answers.

7Lc Microphones and hearing ranges

1 **a** Sound waves make a diaphragm inside the microphone vibrate. Electrical circuits detect the vibrations and convert them into changes in an electrical current.

b Students' own answers.

2 Infrasounds are too low for human ears to hear; ultrasounds are too high.

3 **a** dolphins

b humans

4 Sound waves enter the ear canal and make the eardrum vibrate. These vibrations are amplified by the ear bones and passed to the cochlea. Tiny hairs in the cochlea detect the vibrations and create impulses which travel to the cat's brain along the auditory nerve.

7Ld Using sound

1 absorb – the energy stays inside the material; transmit – the energy passes through the material; reflect – the energy bounces off the material

2 **a** Finding their way around; finding their prey.

b The distance and direction of an object.

3 So they only use their own sounds to help them to navigate/find prey; if they detected another bat's calls by mistake, they could not use it to locate objects.

4 **a** (In part A, the sonar equipment on the ship) sends a pulse of ultrasound downwards.

(In B, the) ultrasound is reflected by the sea bed.

(In C, the) ship/sonar equipment detects the ultrasound echo.

(The sonar equipment works out the depth using) the time it takes for the sound to return.

b Some of the ultrasound will be reflected by fish beneath the ship. The sonar will detect two echoes. The first one will be from the fish.

c Student's own answers

Oscilloscope

3 **a** **i** B

ii B

b Correct words are: lowest, lower; largest, louder.