

Answers

Task1

1)

Substance	Distance (m)	Time (s)	Speed of sound (m/s)
iron	1000	0.17	5882
sea water	1000	0.65	1538
wood	1000	0.26	3846
water	1000	0.67	1492
glass	1000	0.18	5556
air at 0 °C	1000	2.92	331

2)

and

3)

fastest

slowest

iron

glass

wood

sea water

water

air at 0 °C

4) Solids.

5) Particles closer together in liquids so sound energy is passed on more quickly.

6) Cork has lots of air spaces whereas iron particles more densely packed.

7) Particles in warm air have more kinetic energy so are moving faster therefore sound energy passed on more quickly.

Answers: Task 2

1) arrows from car in all directions

2) the bridge

3) first the fish, then the worm, finally the bird

4) **fish:** $75 \text{ m} \div 1500 \text{ m/s} = 0.05 \text{ s}$. **worm:** $500 \text{ m} \div 5000 \text{ m/s} = 0.1 \text{ s}$. **bird:** $170 \text{ m} \div 340 \text{ m/s} = 0.5 \text{ s}$.

5) a) The birdwatcher could put their ear to the ground.

b) Sound travels faster through solids than gases.

Time taken for birdwatcher to hear the sound with an ear to the ground: $550 \text{ m} \div 5000 \text{ m/s} = 0.11 \text{ s}$.

This is 0.39 s ($0.5 \text{ s} - 0.11 \text{ s}$) faster than the bird would hear it.