

Ultrasound Imaging Post-Activity Quiz **Answers**

1. What is the frequency range of an ultrasound?
 (A) less than 20 Hz (B) Between 20 Hz and 20,000 Hz

(C) Greater than 20,000 Hz

2. Define ultrasound imaging.

Use of the reflections of high-frequency sound waves to construct an image

- 3 List some devices that use ultrasound for imaging.

Sonar, sonograph or ultrasonograph or echograph

4. When operating sonar on a pool of water, an ultrasonic wave is emitted at a constant speed S in the water, which is at a temperature of $T = 10^\circ\text{C}$. The wave spent a roundtrip time of $t = 3$ ms before being detected back. How deep is the pool of water? (*Hint: Use the equation for speed = distance / time and use the data in the table to read the appropriate speed of sound into water.*)

This problem is the same as computing the distance travelled by the wave. In relation to speed equaling distance over time, that is, $S = d/t$, we obtain the distance by considering only half of the travelled time, that is, $d = S \times t/2$. We read in the table $S = 1,507$ m/s and we compute $d = 1,507 \times 0.003/2 = 2.26$ m.

<u>Temperature</u> - t ($^\circ\text{C}$)	<u>Speed of Sound</u> - c - (m/s)
0	1,403
5	1,427
10	1,447
20	1,481
30	1,507
40	1,526
50	1,541
60	1,552
70	1,555