

Name:

Date:

Class:

Speed of Sound Data

| Altitude (m above sea level) | Temperature (°C) | Measured Speed of Sound (m/s) | Theoretical Speed of Sound (m/s) |
|---------------------------------|---------------------|-------------------------------------|--|
| 2,200 | 15 | 340 | |
| 3,000 | 8 | 337 | |
| 4,000 | 2 | 331 | |
| 5,000 | -4 | 326 | |
| 6,000 | -12 | 314 | |
| 7,000 | -17 | 296 | |
| 8,000 | -23 | 261 | |
| 9,000 | -31 | No data | |
| 10,000 | -40 | No data | |

To calculate theoretical speed of sound:

$$\text{Speed of sound} = \sqrt{\gamma RT}$$

γ = ratio of specific heats for air = 1.4

R = gas constant of air = $287 \text{ m}^2/\text{s}^2/\text{K}$

T = absolute temperature of air = $T(^{\circ}\text{C}) + 273.15$