

Chapter 13 Forces in Fluids

Section 13.1 Fluid Pressure**(pages 390–393)**

This section defines pressure and describes factors that determine fluid pressure. The atmosphere as a fluid is discussed, including how air pressure changes with altitude.

Reading Strategy (page 390)

Using Prior Knowledge Before reading the section, write a common definition of the word *pressure*. After you have read the section, write the scientific definition of *pressure* and contrast it to your original definition. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

Meanings of <i>Pressure</i>	
Common definition	
Scientific definition	

Pressure (pages 390–391)

- Pressure is the result of a(n) _____ distributed over a(n) _____.
- The same force is exerted by each of the following. Which exerts the most pressure?
 - a foot
 - a large book
 - a fingertip
 - the tip of a ball-point pen
- How is pressure calculated? _____

- A wooden crate that measures 2.0 m long and 0.40 m wide rests on the floor. If the crate has a weight of 600.0 N, what pressure does it exert on the floor?
 - 0.80 m^2
 - 480 Pa
 - $3.0 \times 10^3 \text{ N/m}^2$
 - 750 Pa

Pressure in Fluids (pages 391–392)

- A substance that assumes the shape of its container is called a(n) _____.
- List four examples of fluids.
 - _____
 - _____
 - _____
 - _____

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7. Circle the letter of each sentence that is true about fluid pressure.
- Water pressure decreases as depth decreases.
 - Fluid pressure is exerted only at the base of the container holding the fluid.
 - The pressure in a fluid at any given depth is constant, and it is exerted equally in all directions.
 - The two factors that determine the pressure a fluid exerts are type of the fluid and its depth.
8. Is the following sentence true or false? The pressure at a depth of 2 feet in a large lake is greater than the pressure at the same depth in a swimming pool. _____

Air Pressure and the Atmosphere (pages 392–393)

9. Instead of referring to their depth in the atmosphere, people refer to their _____ above sea level.

For questions 10 through 13, refer to the air pressure table below.

Changes in Air Pressure with Altitude		
Altitude Above Sea Level (m)	Air Pressure (bars)	Air Pressure (kPa)
0	1.000	
200	0.9971	
400		96.68
600		94.42
800	0.9103	92.21
1000	0.8888	
1200	0.8677	87.89

10. Complete the air pressure columns in the table by converting between units of air pressure. *Hint:* 1 bar = 101.3 kPa.
11. How does air pressure change as a function of altitude?

12. Suppose a hiker is on a mountain ridge 1200 meters above sea level. Approximately what air pressure will she experience?

13. By how much does the air pressure decrease, in bars, from sea level to an altitude of 1200 meters? _____
14. Is the following sentence true or false? Air exerts a force of more than 1000 N on top of your head. _____
15. What keeps a person from being crushed by air pressure? _____
