Introduction: Fluids & Pressure

Unit: Fluids & Pressure

Topics covered in this chapter:

In this chapter you will learn about pressure and behaviors of fluids.

- *Pressure* explains pressure as a force spread over an area. Pressure is the property that is central to the topic of fluid mechanics.
- *Hydraulic Pressure and Hydrostatic Pressure* describe how pressure acts in two common situations.
- *Buoyancy* descries the upward pressure exerted by a fluid that causes objects to float.
- *Fluid Motion & Bernoulli's Law* describes the relationship between pressure and fluid motion.

This chapter focuses on real-world applications of fluids and pressure, including more demonstrations than most other topics. One of the challenges in this chapter is relating the equations to the behaviors seen in the demonstrations.

Standards addressed in this chapter:

MA Curriculum Frameworks (2016):

HS-PS2-1. Analyze data to support the claim that Newton's second law of motion is a mathematical model describing change in motion (the acceleration) of objects when acted on by a net force.

HS-PS2-10(MA). Use free-body force diagrams, algebraic expressions, and Newton's laws of motion to predict changes to velocity and acceleration for an object moving in one dimension in various situations.

Use this space for summary and/or additional notes:

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AP® Physics 2 Learning Objectives:

1.E.1.1: The student is able to predict the densities, differences in densities, or changes in densities under different conditions for natural phenomena and design an investigation to verify the prediction. [**SP 4.2, 6.4**]

1.E.1.2: The student is able to select from experimental data the information necessary to determine the density of an object and/or compare densities of several objects. [**SP 4.1, 6.4**]

3.C.4.1: The student is able to make claims about various contact forces between objects based on the microscopic cause of those forces. [**SP 6.1**]

3.C.4.2: The student is able to explain contact forces (tension, friction, normal, buoyant, spring) as arising from interatomic electric forces and that they therefore have certain directions. [**SP 6.2**]

5.B.10.1: The student is able to use Bernoulli's equation to make calculations related to a moving fluid. [**SP 2.2**]

5.B.10.2: The student is able to use Bernoulli's equation and/or the relationship between force and pressure to make calculations related to a moving fluid. [**SP 2.2**]

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5.B.10.3: The student is able to use Bernoulli's equation and the continuity equation to make calculations related to a moving fluid. [**SP 2.2**]

5.B.10.4: The student is able to construct an explanation of Bernoulli's equation in terms of the conservation of energy. [**SP 6.2**]

5.F.1.1: The student is able to make calculations of quantities related to flow of a fluid, using mass conservation principles (the continuity equation). [**SP 2.1, 2.2, 7.2**]

Skills learned & applied in this chapter:

- Before & after problems.

Use this space for summary and/or additional notes: