

AP[®]

Fluids

Unit: Fluids & Pressure

NGSS Standards/MA Curriculum Frameworks (2016): HS-PS2-10(MA), HS-PS2-1

AP[®] Physics 1 Learning Objectives/Essential Knowledge (2024): 8.1A, 8.1.A.1, 8.1.A.2, 8.1.A.3, 8.1.A.4

Mastery Objective(s): (Students will be able to...)

- Describe the characteristics of a fluid

Success Criteria:

- Fluids are described in terms of properties of the particles and density.

Language Objectives:

- Understand and correctly use the terms “fluid” and “density” as they apply in physics.

Tier 2 Vocabulary: fluid

Notes:

fluid: a substance that has no fixed (definite) shape; a substance that can flow

flow: the process of the individual particles of a fluid moving from one place to another.

When a fluid is flowing, particles of the fluid are in every location that is occupied by the fluid.

density (ρ): the mass of a given volume of a substance.

$$\rho = \frac{m}{V}$$

The density of water varies with temperature (see *Table W. Properties of Water and Air* on page 581). Unless otherwise stated, we will assume that the density of fresh water is $1000 \frac{\text{kg}}{\text{m}^3}$ (which equals $1 \frac{\text{g}}{\text{cm}^3}$). This approximation is within 1 %, up to a temperature of 50 °C.

specific gravity: the ratio of the density of a fluid to the density of water. Water has a specific gravity of 1.

viscosity: a fluid’s resistance to flow. A low-viscosity fluid, such as water, flows easily. A high-viscosity fluid, such as honey, does not flow readily.

ideal fluid: an imaginary fluid that is incompressible and has no viscosity.

In this course we will consider fluids to be ideal unless stated otherwise, in order to simplify the calculations.