Science Virtual Learning

MPI Physics 240
Thermodynamics 9: Properties of Gases 1
May 4, 2020

Lesson: MPI Thermodynamics 9 – Properties of Gases 1
May 4, 2020

Objective: To understand the volume and pressure of gases

This video discusses the concepts of gas volume and pressure, and the units for them.

https://youtu.be/dhnYF8rblJc

Video: Gas Properties 1

Ex 1: An empty oil barrel is filled with air. The radius of the barrel is 0.300 m, and it is 1.20 m high. Find the volume of the barrel in m^3, L, and mL.

Ex 2: A table top is 1.40 m wide and 2.60 long, and is immersed in air at 1.00 atm of pressure. How much force does the air exert on the table top? Why does that force not crush the table?

Video: https://youtu.be/GXsZeqTG_L4

Video: Gas Properties 1 - Examples

Homework 1

- Try to solve the problem yourself, then watch the solution video:

- https://youtu.be/q_m0lRnOodY

1. A spherical balloon of radius 0.0451 m is filled with air, which has a density of 1.29 kg/m^3. What is the volume of the balloon in m^3? What is the mass of the air inside?

Homework 2

- Try to solve the problem yourself, then watch the solution video:

- https://youtu.be/BHUw-5Rb_M4

2. A bottle cap on a 2L soda bottle has a radius of 0.0150 m. The air inside the bottle is at 1.50 atm, and the air outside the bottle is at 1.00 atm.

a) How much force does the inside air exert on the bottle cap?

b) How much force does the outside air exert on the bottle cap?

c) What is the net force on the bottle cap?

That's it!