



Science Virtual Learning

MPI Physics 240

Thermodynamics 17:

The First Law of Thermodynamics

May 14, 2020



Lesson: MPI Thermodynamics 17
The First Law of Thermodynamics
May 14, 2020

**Objective: To understand how energy conservation applies
to gases**

This video discusses how the internal energy of a gas changes when heat is added or work is done by the gas

<https://youtu.be/ey41Zg61ZQ>

Video: 1st Law of Thermo



Example Video: <https://youtu.be/XxbNcxQU-qQ>

Ex 1: 519 J of heat are added to a gas in a piston, and it does 314 J of Work expanding. How much does the internal energy of the gas change?

Ex 2: 107 J of heat are added to 0.224 moles of a diatomic gas contained in a piston. The piston expands by 0.448 L at a constant pressure of 1.00 atm.

- How much work is done during the expansion?
 - How much does the internal energy of the gas change?
 - How much does the temperature of the gas change?
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Examples from the Video



Homework

- Try to solve the problems yourself, then watch the solution video:
- <https://youtu.be/iJVqJqRcSCo>

HW 1: An enclosed syringe is full of air. The plunger is pushed in, doing 0.491 J of work compressing the gas. As a result, 0.155 J of heat leaks out of the syringe. How much did the internal energy of the gas change?

HW 2: A piston contains 0.111 moles of a diatomic gas. Its temperature is raised from 33.0°C to 244°C. As a result, the piston does 247 J of Work. How much heat was added to the gas?



That's it!

