Science Virtual Learning

MPI Physics 240
Thermodynamics 22:
Thermodynamics of a Car Engine
May 21, 2020

Lesson: MPI Thermodynamics 21
Thermodynamics of a Car Engine
May 21, 2020

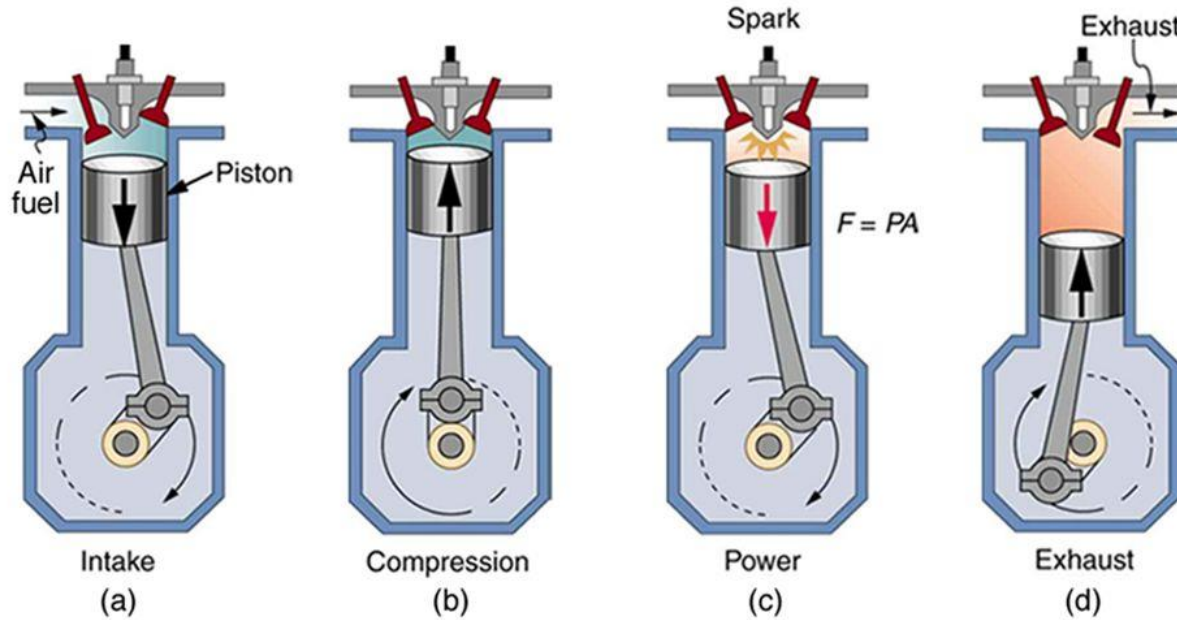**Objective: To apply what we've learned about thermodynamics to understand how a car engine works**

This video discusses the thermodynamics of internal combustion engines

https://youtu.be/E0nsBUWtCno

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Video: Car Engines

4 Stroke Cycle Processes

Ideal Otto Cycle
p-V diagram

Glenn Research Center

V = Volume

p = pressure

constant volume process

adiabatic process

Combustion Process

Power Stroke

Heat Rejection

Work

Compression Stroke

Intake Stroke

Exhaust Stroke

4

3

5

6

1

2

p

V
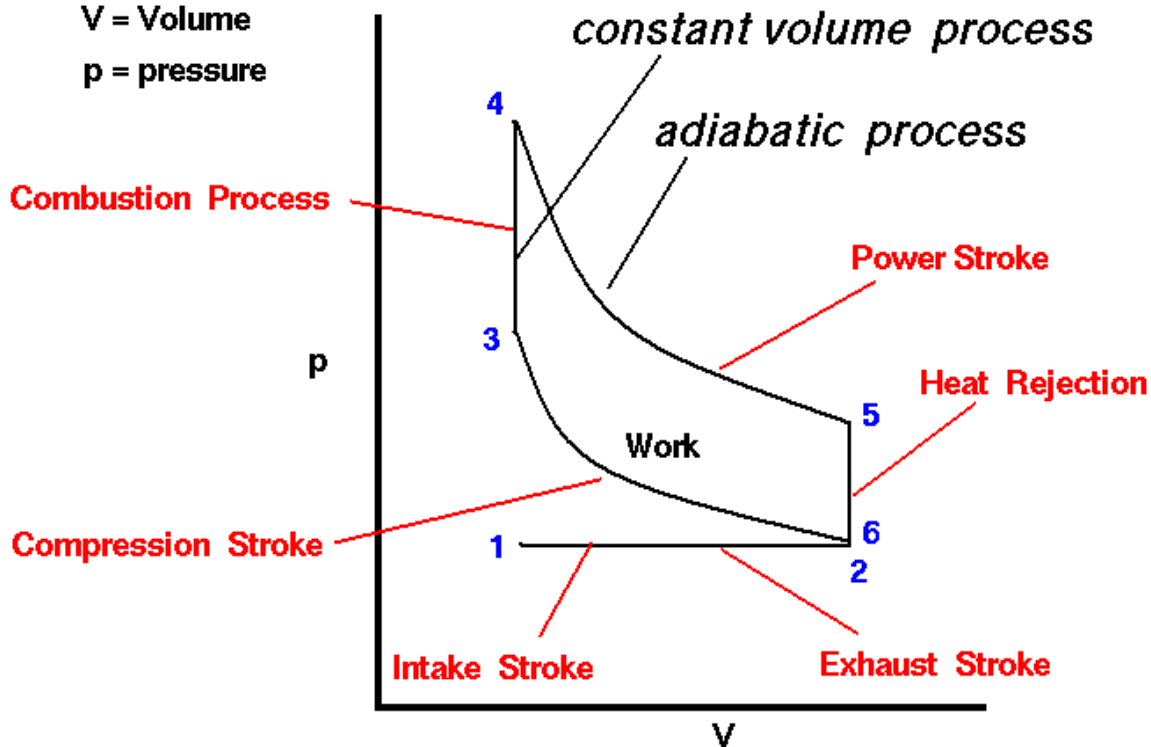
This video goes through the math to analyze the heat flows and work done by a typical internal combustion engine.

It's long.

Video: https://youtu.be/B3m3nKOlLHs

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Example Video

Homework

In the video, I pre-calculated the P, V, and T values for each point in the cycle, to save time. Do the math to fill in the missing values in the table, for the 4 points in the cycle. Remember, A to B is an adiabatic compression, B to C is an isovolumetric change in pressure, C to D is an adiabatic expansion, and D to A is an isovolumetric drop in pressure. Assume the gas is diatomic.

	P (atm)	V (L)	T (K)
A	1.00	2.00	293
B		0.20	
C			2500
D			

- Try to solve the problem yourself, then watch the solution video:
- https://youtu.be/TMJzF2lmkD8

That's it!