

THE OTTO CYCLE (ENGINE)

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Vice Principal



- **1876** - Nikolaus August Otto invented and later patented a successful four-stroke engine, known as the "Otto cycle".
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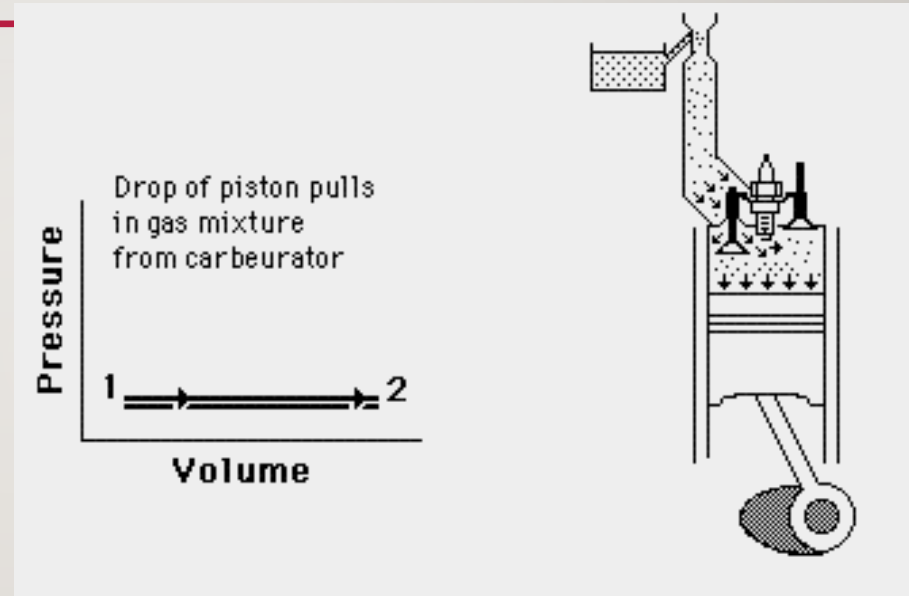


THE OTTO CYCLE

Intake Stroke:

- Intake valve open
- Piston moving down
- Volume increases
- Constant pressure (atmospheric)

Temperature decreases

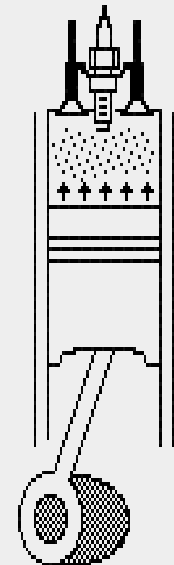
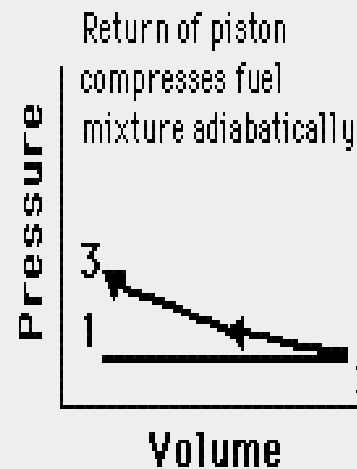




THE OTTO CYCLE

Compression Stroke:

- Both valves closed
- Piston moving up
- Volume decreases
- Pressure increases
- Temperature increases

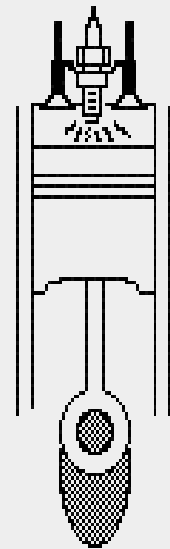
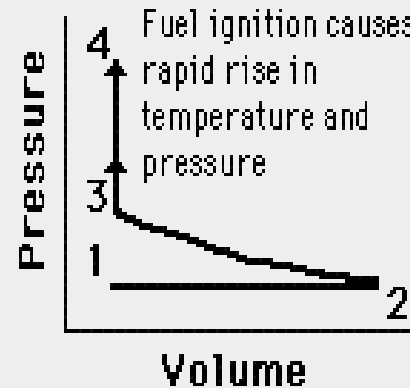




THE OTTO CYCLE

Ignition :

- Both valves closed
- Piston at topmost position
- Pressure increases
- Constant volume
- Temperature increases



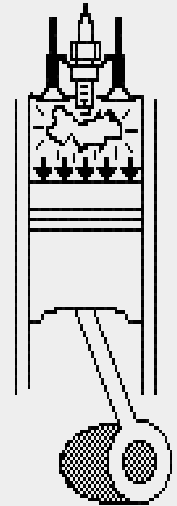
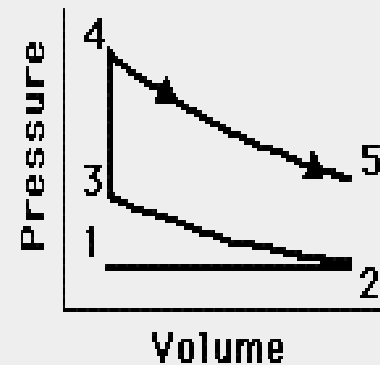


THE OTTO CYCLE

Power Stroke:

- Both valves closed
- Piston moving down
- Pressure decreases
- Volume increases
- Temperature decreases

The power stroke: the adiabatically expanding gases do work on the piston



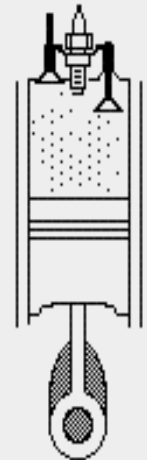
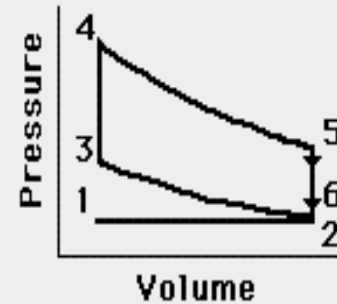


THE OTTO CYCLE

Exhaust Stroke:

- exhaust valve open
- piston moving up
- constant pressure (atmospheric)
- volume decreases
- temperature increases

The exhaust valve opens as the piston reaches the bottom of its travel, dropping the pressure to atmospheric pressure.

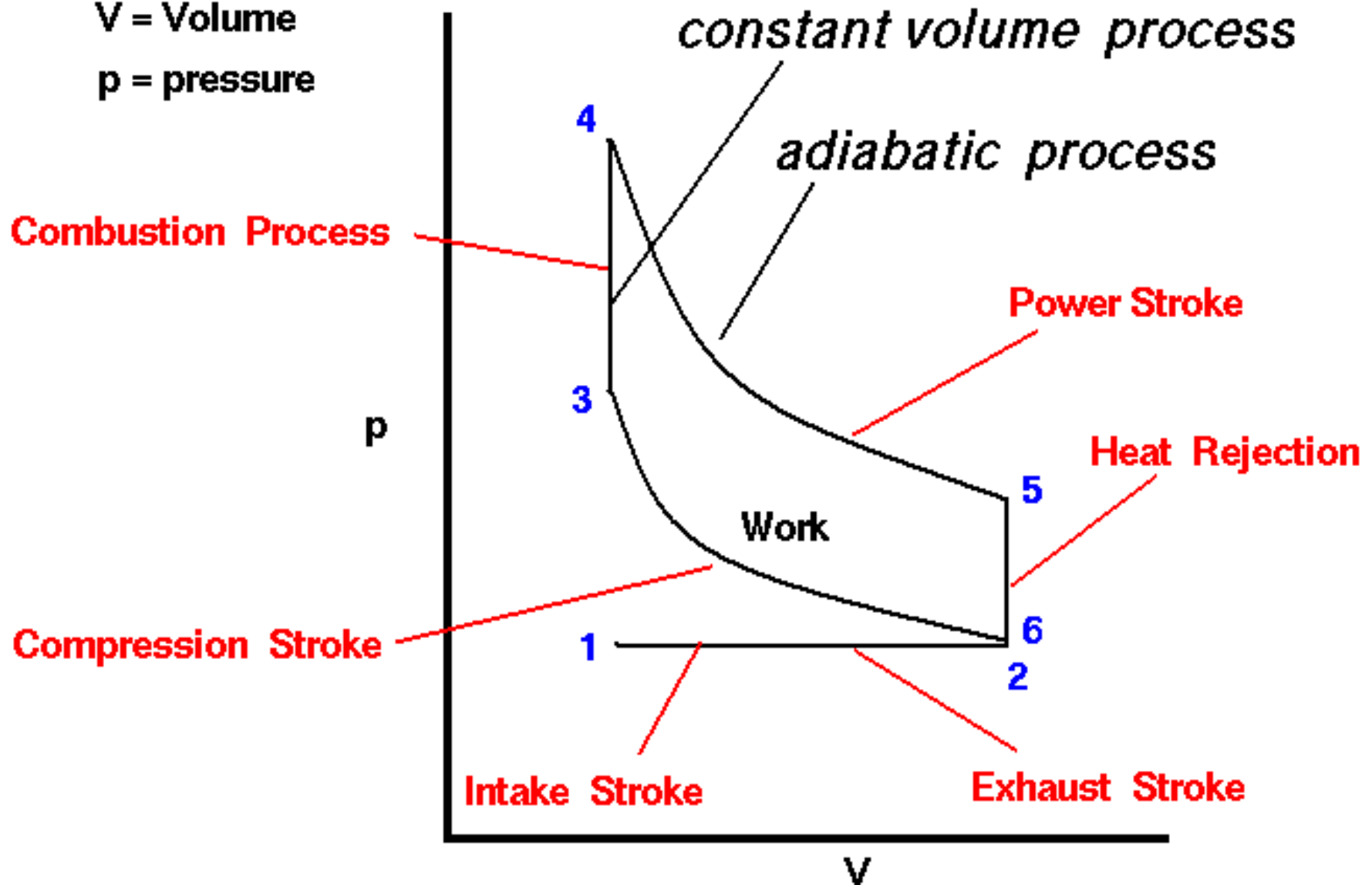




Ideal Otto Cycle

p - V diagram

V = Volume
 p = pressure





EFFICIENCY

- Thermal Efficiency
- Compression Ratio