

4-Stroke Engine Simulator

Classroom worksheet · Interactive simulation: <https://lkforge.com/tools/physics/engine-simulator/>

Name: _____ Date: _____

Learning objectives

- Name and order the four strokes of the cycle.
- Relate the strokes to the movement of the piston and valves.
- Identify where work is produced.

Variables to change

- Engine speed (RPM)
- Throttle/load

Procedure

1. Run the engine slowly and identify each of the four strokes.
2. Watch the valves and spark timing relative to the piston.
3. Increase the speed and observe the cycle repeat faster.

Observations

For each stroke, note the piston direction, valve states, and what happens to the gas.

Questions

1. Name the four strokes in order.
2. During which stroke is useful work produced?
3. What happens during the compression stroke?
4. When does the spark fire (gasoline engine)?

5. How many crankshaft revolutions make one full cycle?

Answer key (instructors)

- **1.** Intake, compression, power (combustion), exhaust.
- **2.** The power stroke, when the burning fuel–air mixture expands and pushes the piston down.
- **3.** Both valves close and the piston squeezes the fuel–air mixture, raising its pressure and temperature.
- **4.** Near the top of the compression stroke, igniting the compressed mixture.
- **5.** Two revolutions per four-stroke cycle.

A four-stroke engine repeats intake, compression, power, and exhaust over two crankshaft turns. Work comes from the power stroke, when ignited, compressed fuel–air expands against the piston — converting chemical energy into mechanical work.