

Carburetors

A look at the Physics

What does a carburetor do? How does it do it?



Why so many different types?

Pressure

- ▶ A carburetor operates on a pressure differential
- ▶ Atmospheric pressure at sea level is 14.7 PSI
 - Anything less than that is low pressure or vacuum

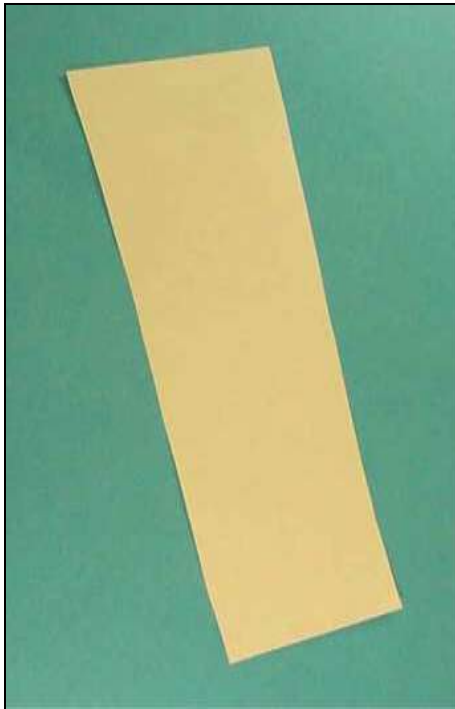
Daniel Bernoulli



- ▶ Swiss physicist
- ▶ **Bernoulli Effect / Principle**
 - As a fluid's velocity increases, the pressure decreases

Pressure Differential Experiments

Paper Strip



Soda Cans



it rises up

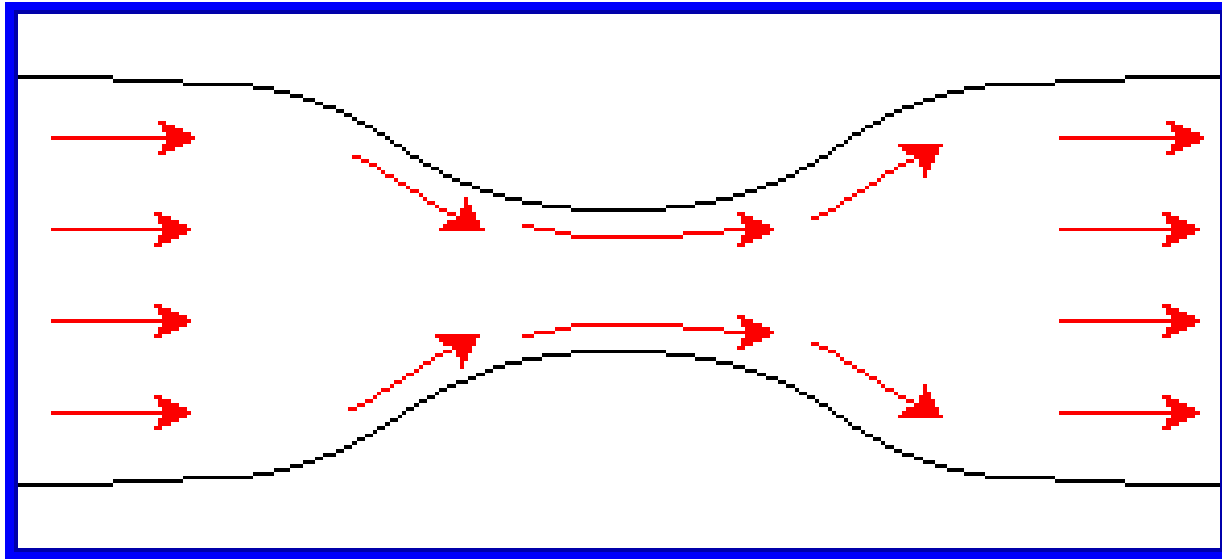
it rises up

faster moving air
causes a low pressure
area on top of the
paper, air pressure in
the room pushes up on
the bottom of the paper

they roll together

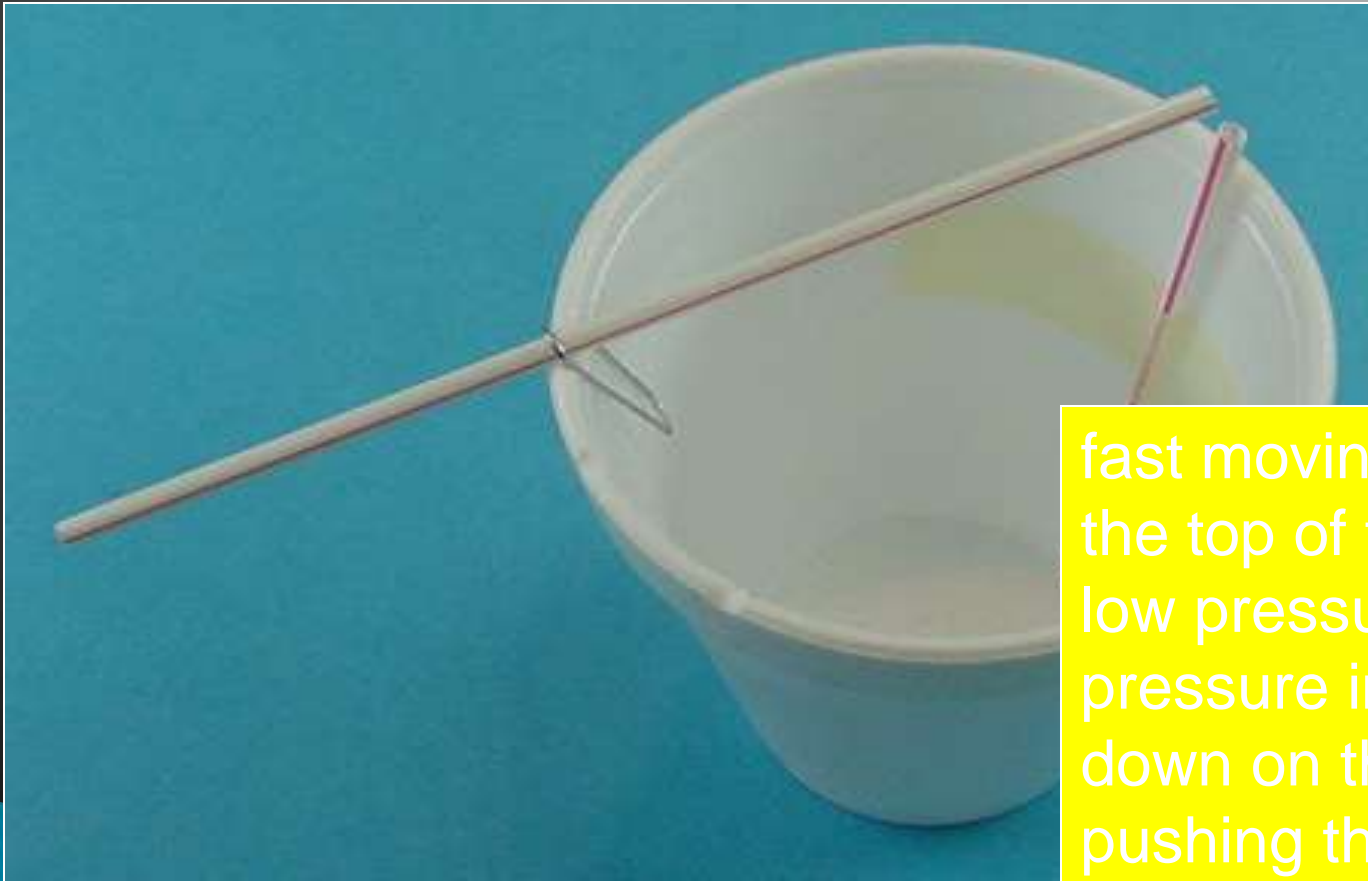
low pressure is created
between the cans, high
pressure in the room
pushes them together

What is a venturi?



- Venturi - a tube that has been narrowed down
 - Air increases in velocity, which decreases pressure
 - This is the Bernoulli Effect, as it applies to a venturi

Venturi Effect

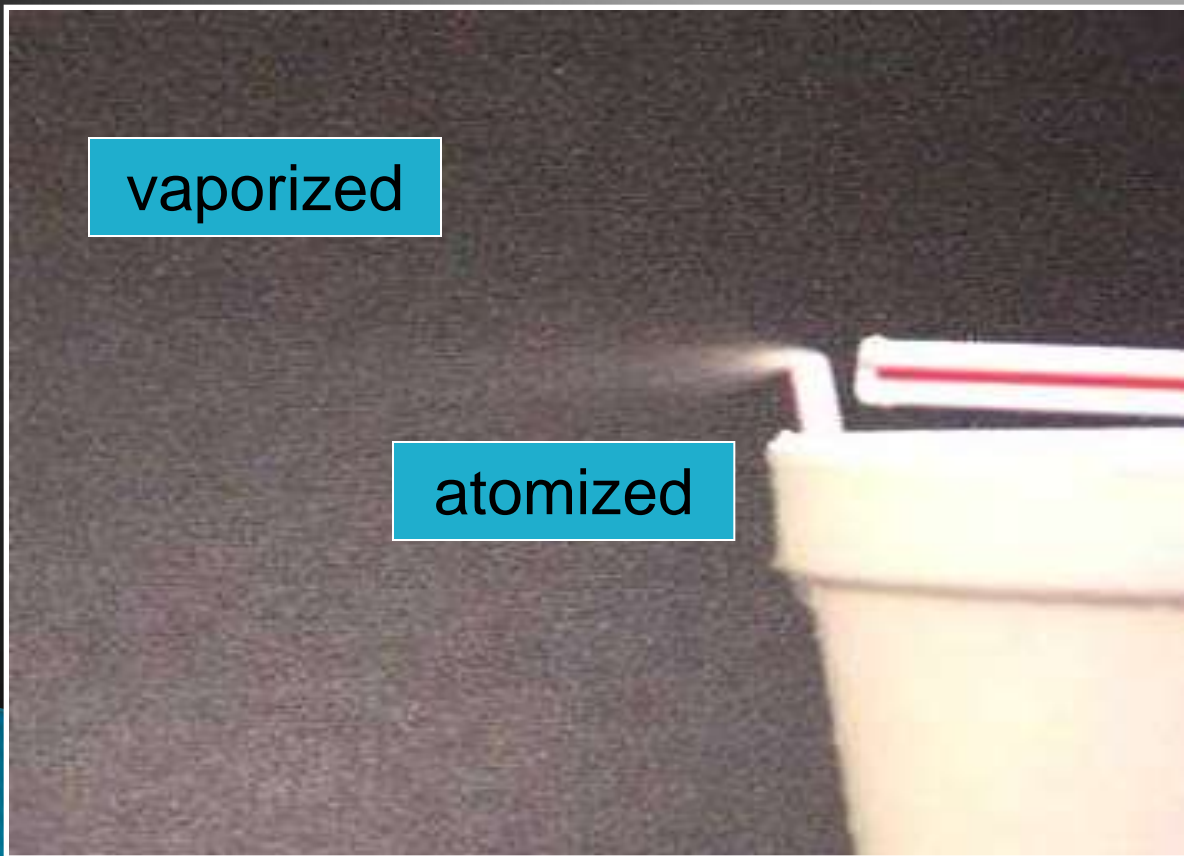


a fine spray of
atomized water
will appear

fast moving air going across
the top of the straw creates a
low pressure zone, higher air
pressure in the room pushes
down on the water in the cup,
pushing the water up the
tube

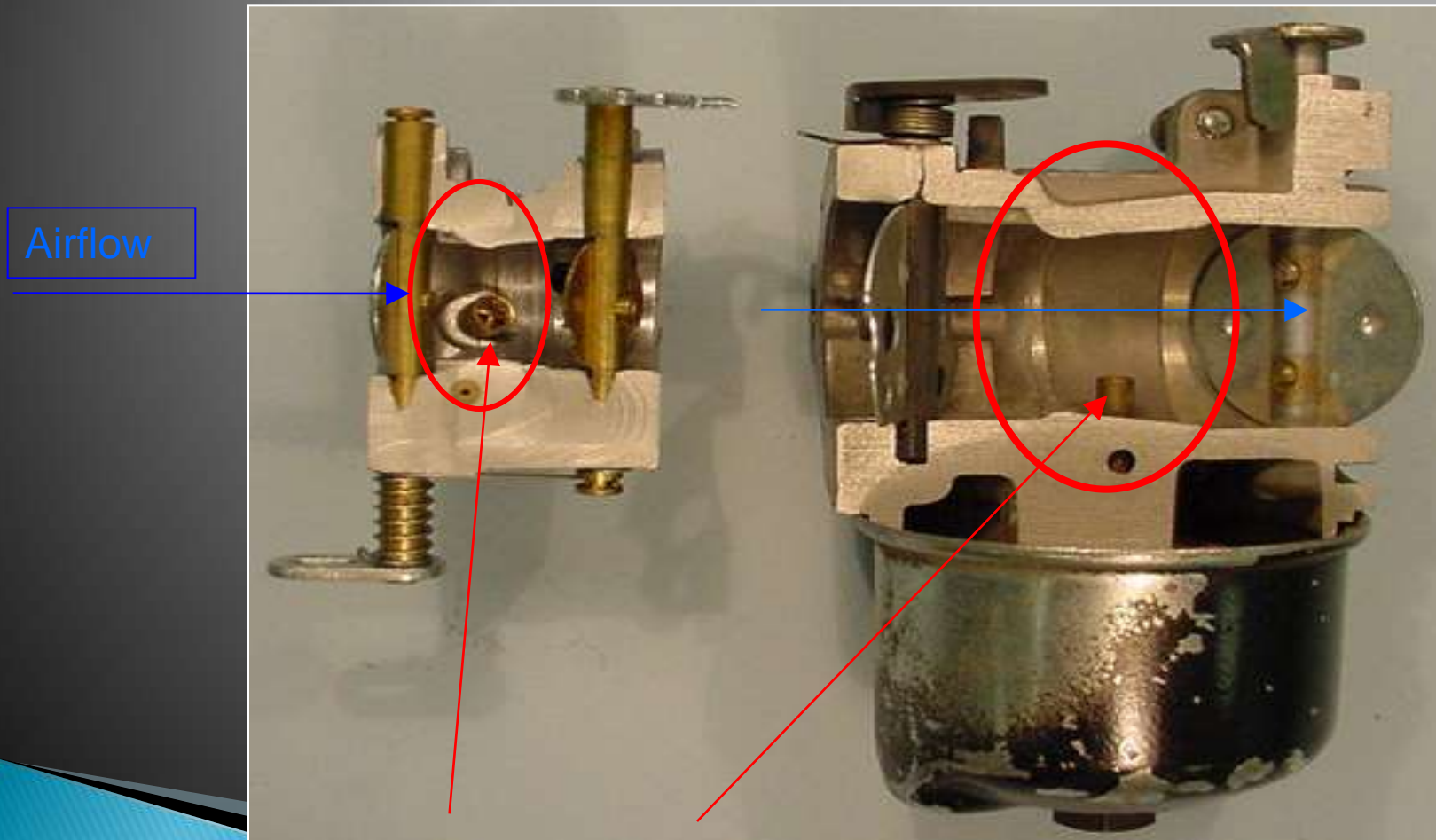
Main Nozzle Demonstrator

Atomization and Vaporization



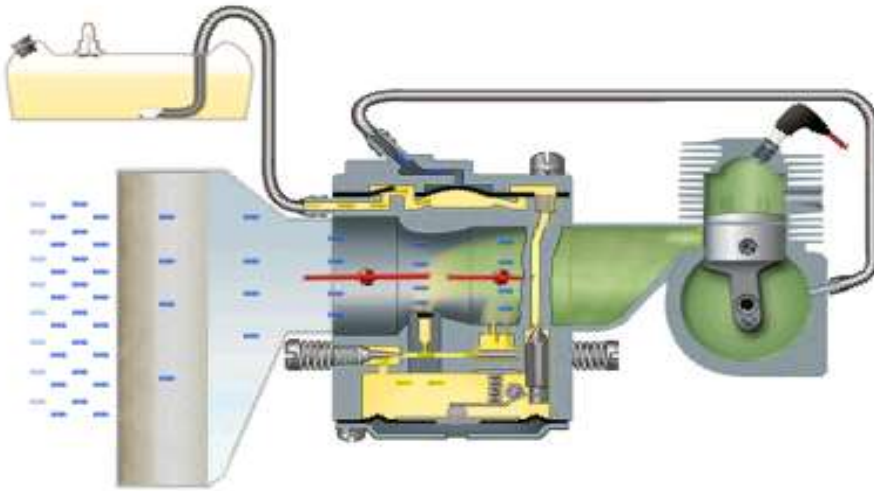
- **Atomized** – convert liquid into tiny particles or droplets
- **Vaporized** – liquid turned to gas

Venturi Examples



Main Fuel Discharge Nozzle

Carburetor Operation



- ▶ Piston movement in the cylinder
 - Low pressure in the crankcase = draws air through the carburetor (Bernoulli Effect begins)
 - The air rushes in to fill the low pressure area in the venturi.

Summary

- ▶ Bernoulli Effect states that as the velocity of a fluid, or air, increases, the pressure decreases
 - ▶ Carburetors use a venturi to create the low pressure zone for fuel and air to mix
 - ▶ Fuel is atomized in the venturi and further vaporized by the heat of the engine components, which aids in cooling
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