



### Cycle 7 Chemistry 2 Lesson 1

“Gases” Unit

**AGENDA: Gases and Pressure**

**Hand in SHOPTIMES!**

**Warmup:** Why doesn't the water fall down? Write 3 sentences.

**Vocab:** “Pressure”, “Pascal”, Table of Units

**Classwork:**

Pressure Unit Conversions WS



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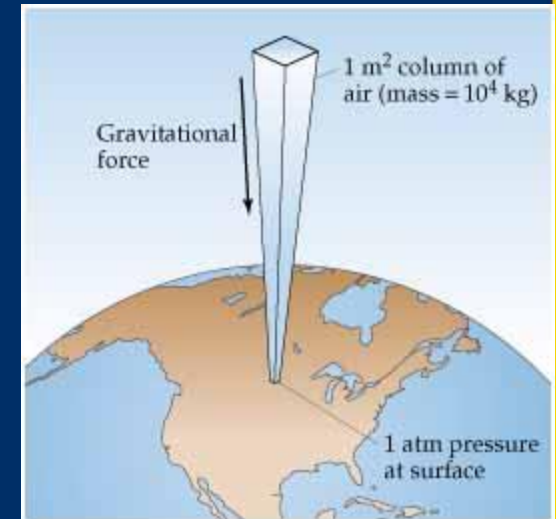
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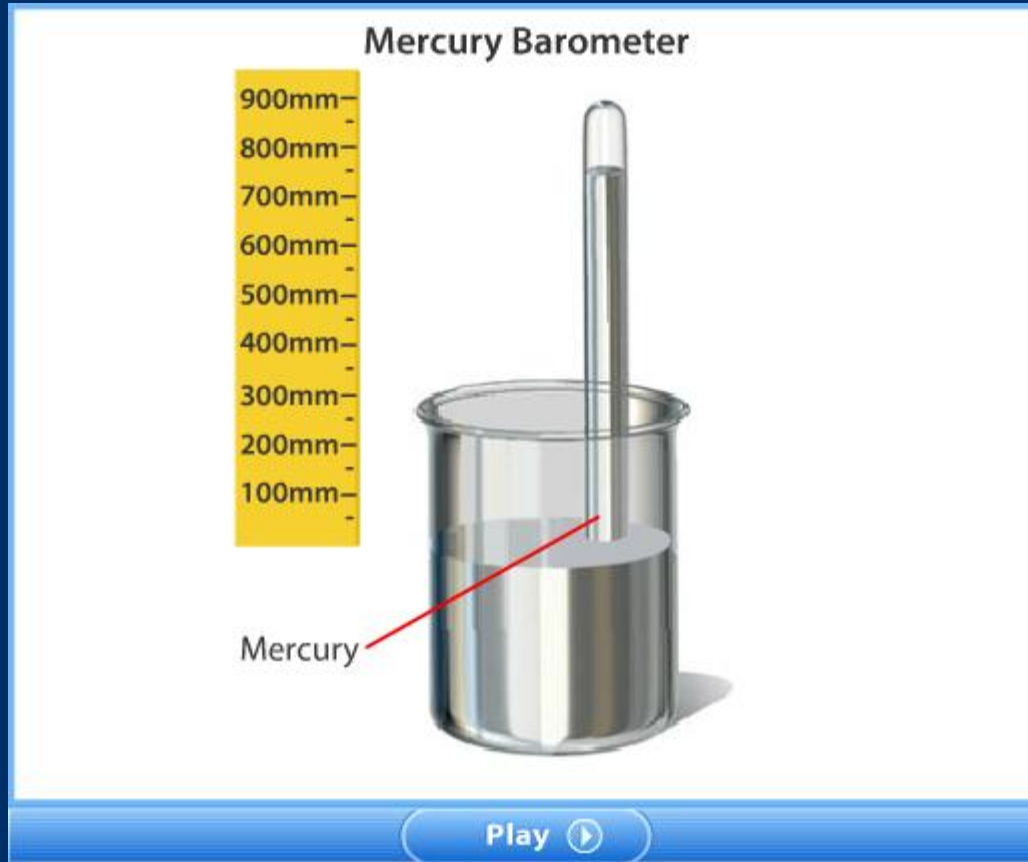
### Gas Pressure

- Air has weight! Draw a 1-inch square on a piece of paper. The air above it has a weight of about 15 pounds!
- Why don't we feel air pressure? Because air is a fluid: pressure exerts equal force in all directions, up down left right.
- What holds the water up in the tube? Air pressure!





# Atmospheric Pressure



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### Gas Pressure, *continued* Measuring Pressure

- The scientific definition of **pressure** is “force divided by area.” Pressure may also be defined as the amount of force exerted per unit area of surface.
  - To find pressure, you need to know the force and the area over which that force is exerted.
- The unit of force in SI units is the **newton**, N.
  - One newton is the force that gives an acceleration of  $1 \text{ m/s}^2$  to an object whose mass is 1 kg.

$$1 \text{ newton} = 1 \text{ kg} \times 1 \text{ m/s}^2 = 1 \text{ N}$$





### Gas Pressure, *continued* Measuring Pressure, *continued*

- The SI unit of pressure is the **pascal**, Pa, which is the force of one newton applied over an area of one square meter.

$$1 \text{ Pa} = 1 \text{ N/1 m}^2$$

- One pascal is a small unit of pressure. It is the pressure exerted by a layer of water that is 0.102 mm deep.
- As pascals are such a small unit, people often use **kilopascals** (kPa) = 1000 Pa



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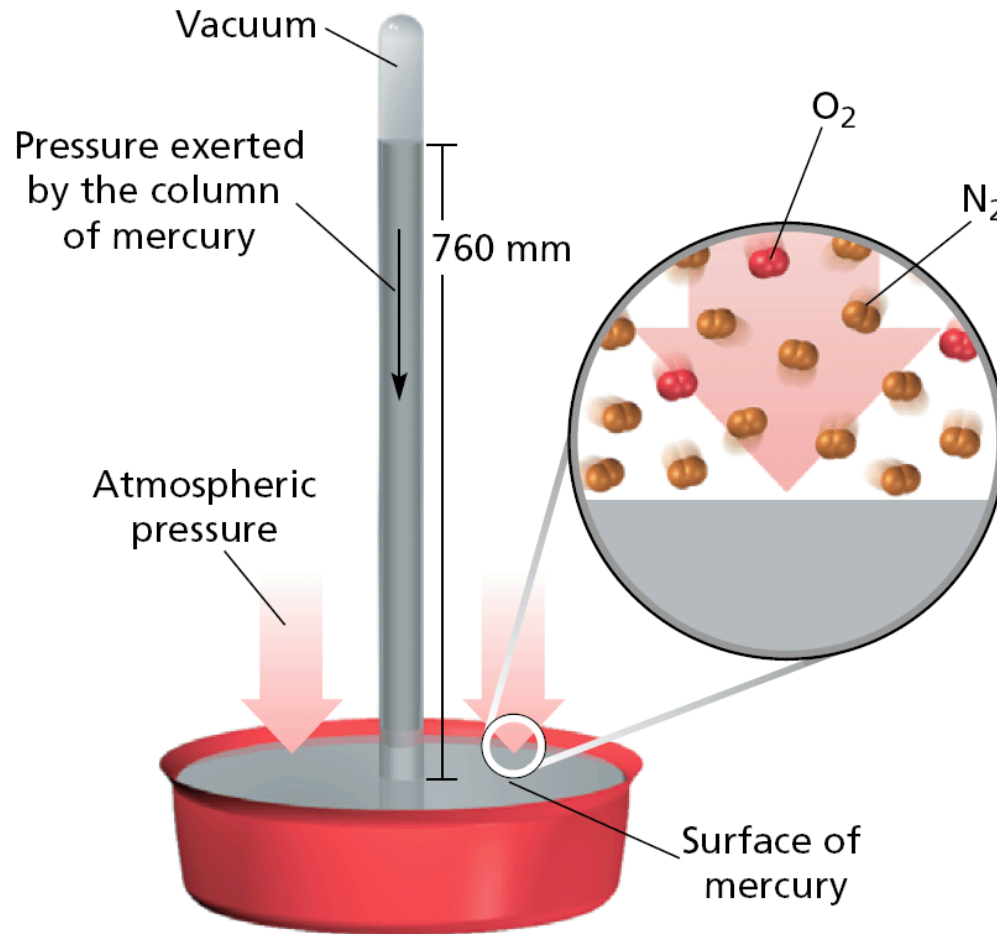
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### Mercury Barometer





## Gas Pressure, *continued*

### Pressure Units

Unit	Abbreviation	Equivalent number of pascals
Atmosphere	atm	1 atm = 101 325 Pa
Bar	bar	1 bar = 100 025 Pa
Millimeter of mercury	mm Hg	1 mm Hg = 133.322 Pa
Pascal	Pa	1
Pounds per square inch	psi	1 psi = $6.892\ 86 \times 10^3$ Pa
Torr	torr	1 torr = 133.322 Pa





### Converting Pressure Units

#### Sample Problem A

Convert the pressure of 1.000 atm to millimeters of mercury.



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## Gas Pressure, *continued*

### Sample Problem A Solution

1 atmosphere = 101 325 Pa, 1 mm Hg = 133.322 Pa

The conversion factors are  $\frac{101\,325\text{ Pa}}{1\text{ atm}}$  and  $\frac{1\text{ mm Hg}}{133.322\text{ Pa}}$ .

$$1.000\text{ atm} \times \frac{101\,325\text{ Pa}}{1\text{ atm}} \times \frac{1\text{ mm Hg}}{133.322\text{ Pa}} =$$

760.0 mm Hg



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