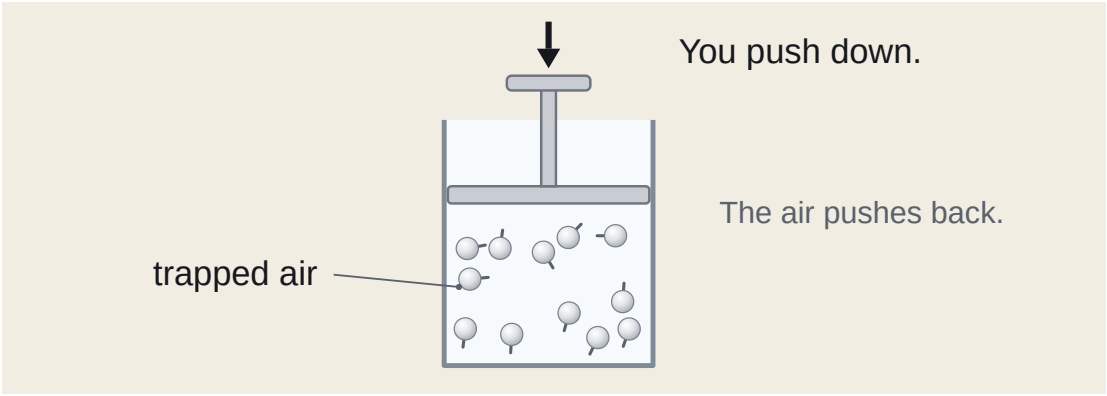
B1 · What we measure about a gas; pressure and its units · Notes

Goals: Name the four things measured about a gas. Explain gas pressure as particles hitting a surface. Change a pressure between kilopascals, atmospheres and millimetres of mercury.

Name: _____ Date: _____

Slide 1 of 6 · Gases you already use

Unit A was about how atoms bond. Unit B is about gases. You already know how a gas feels when you squeeze it.



Key ideas

A trapped gas _____ when you squeeze it.

In a gas the particles are _____.

Gas particles never stop _____.

A gas spreads out to _____ its container.

Example

You squeeze a blown-up balloon. What pushes back on your hand?

Try it

Why does a gas fill its whole container?

Slide 2 of 6 · Four things we measure about a gas

On the last slide the gas in a syringe pushed back. To predict that push, a chemist measures four things about the gas.

what we measure	symbol	unit
pressure	P	kPa
volume	V	L
temperature	T	°C, for now
amount of gas	n	mol

Key ideas

The push of a gas is its _____, P.

The space a gas fills is its _____, V.

How hot a gas is, is its _____, T.

The _____ of gas, n, is counted in moles.

Example

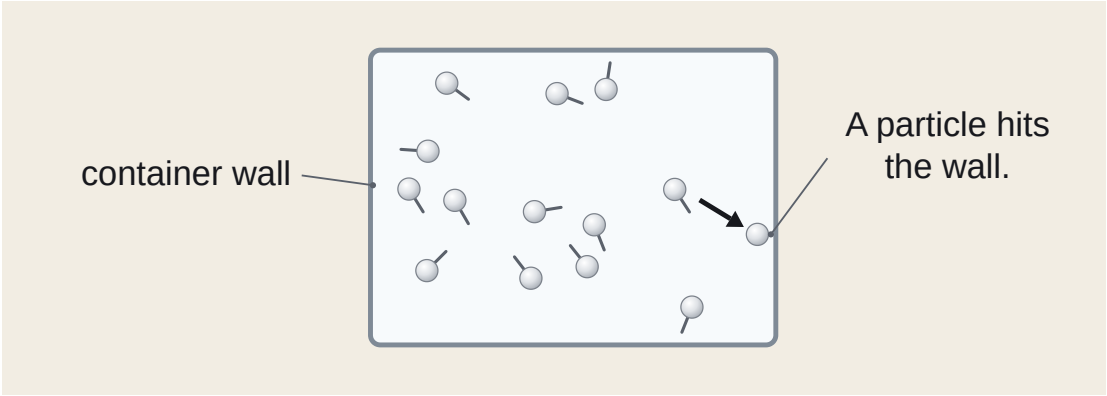
A tire looks flat on a cold morning. No air leaked out. Which of the four things changed?

Try it

Name the symbol and the unit for the amount of a gas.

Slide 3 of 6 · What pressure is

The last slide named pressure as the push of a gas. This slide shows where that push comes from.



Key ideas

Each moving particle sooner or later hits a _____.

Every hit gives the wall a tiny _____.

All the tiny pushes together are the _____ of the gas.

More _____ each second means more pressure.

Example

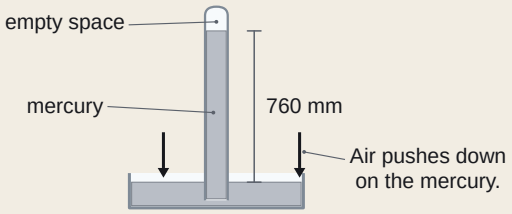
What makes the pressure of a gas on the walls of its container?

Try it

You pump more air into a tire. Why does the pressure go up?

Slide 4 of 6 · Three units for pressure

The last slide said what pressure is. To measure it you need a unit. Chemists use three.



unit	symbol	air at sea level
atmosphere	atm	1 atm
kilopascal	kPa	101.325 kPa
millimetre of mercury	mm Hg	760 mm Hg

1 atm = 101.325 kPa = 760 mm Hg

Key ideas

The air pushes down on the _____ in the dish.

At sea level the air holds the mercury _____ mm high.

The pressure of the air at sea level is one _____.

1 atm = _____ kPa = 760 mm Hg.

Example

What holds the mercury up inside the tube?

Try it

Write the line that links the three units of pressure.

Slide 5 of 6 · Changing from one pressure unit to another

The last slide gave three units and one line that links them. That line lets you change a pressure from one unit to another.

1 atm = 101.325 kPa = 760 mm Hg

$$0.750\ \text{atm} \times \frac{101.325\ \text{kPa}}{1\ \text{atm}} = \mathbf{76.0\ kPa}$$

The unit you want is on top.

Key ideas

Write the two equal values as a _____.

Put the unit you want on _____.

The old units _____.

Example

Use 1 atm = 101.325 kPa = 760 mm Hg. Convert 1.10 atm to kilopascals. What is the pressure in kPa?

Try it

Use 1 atm = 101.325 kPa = 760 mm Hg. Convert 745 mm Hg to kilopascals. What is the pressure in kPa?

Slide 6 of 6 · Method: how to change a pressure from one unit to another

You just changed two pressures to new units. Each time you did the same four things. Here they are as steps.

1. **Write** the pressure you are given.
2. **Choose** the two equal values you need.
3. **Put** the unit you want on top.
4. **Multiply** and round.



Check: the old unit cancels, and the new unit is left.

Used again in: lessons B3, B5 and B8

Key ideas

Step 1: _____ the pressure you are given.

Step 2: _____ the two equal values you need.

Step 3: put the unit you want on _____.

Step 4: _____ and round.

Example

Use 1 atm = 101.325 kPa = 760 mm Hg. Use the four steps to convert 0.500 atm to millimetres of mercury.

Try it

Use 1 atm = 101.325 kPa = 760 mm Hg. Use the four steps to convert 90.0 kPa to atmospheres.