Ideal gases

A-Level Physics · Vocabulary in context

Word	Example
mole /məʊl/	One **mole** of carbon has a mass of 12 g. 12 g
amount of substance /əˈmaʊnt ɒv ˈsʌbstəns/	The **amount of substance** is measured in moles.
kelvin /ˈkelvɪn/	Water freezes at 273 **kelvin**. 273
Avogadro constant /ˌævəˈgædrəʊ ˈkɒnstənt/	The **Avogadro constant** is the number of particles in one mole.
atom /ˈætəm/	An **atom** has a nucleus and electrons.
monatomic /ˌmɒnəˈtɒmɪk/	Helium is a **monatomic** gas: its particles are single atoms.
molecule /ˈmɒlɪkjuːl/	A water **molecule** has two hydrogen atoms and one oxygen atom.
molar mass /ˈməʊlə mæs/	The **molar mass** of water is 18 g/mol. 18 g/mol
equation of state /ɪˈkweɪʒn ɒv steɪt/	pV = nRT is the **equation of state** for an ideal gas. pV = nRT
ideal gas /aɪˈdɪəl gæs/	An **ideal gas** follows pV = nRT exactly. pV = nRT
pressure /ˈpreʃə/	A sharp knife puts a large **pressure** on the bread.
thermodynamic temperature /ˌθɜːməʊdaɪˈnæmɪk ˈtemprɪtʃə/	**Thermodynamic temperature** starts at absolute zero.

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volume /ˈvɒljuːm/	The **volume** of the box is 2 m × 1 m × 1 m = 2 m^3. 2 m × 1 m × 1 m = 2 m^3
molar gas constant /ˈməʊlə gæs ˈkɒnstənt/	R is the **molar gas constant**. R
Boltzmann constant /ˈbɒltsmən ˈkɒnstənt/	k is the **Boltzmann constant**. k
mean-square speed /miːn skweə spiːd/	Square each speed, then take the average: this is the **mean-square speed**.
internal energy /ɪnˈtɜːnl ˈenədʒi/	Heating the gas raises its **internal energy**.
Boyle's law /bɔɪlz lɔː/	**Boyle's law** says pressure doubles when the volume halves.
Charles's law /ˈtʃɑːlzɪz lɔː/	**Charles's law** says a gas expands when it gets hotter.
pressure law /ˈpreʃə lɔː/	The **pressure law** says pressure rises with temperature.
kinetic theory /kɪˈnetɪk ˈθɪəri/	**Kinetic theory** says gas particles move all the time.
random motion /ˈrændəm ˈməʊʃn/	Smoke particles show **random motion**.
intermolecular /ˌɪntəməˈlekjʊlə/	**Intermolecular** forces hold the water molecules together.
elastic collision /ɪˈlæstɪk kəˈlɪʒn/	In an **elastic collision**, no kinetic energy is lost.
kinetic energy /kɪˈnetɪk ˈenədʒi/	A fast car has a lot of **kinetic energy**.
momentum /məʊˈmentəm/	A heavy truck has a lot of **momentum**.

Word	Example
impulse /ˈɪmpʌls/	A kick gives the ball an **impulse**.
$\times^2$ **mean square** /miːn skweə/	Take the **mean square** of the speeds.
$\sqrt{}$ **root-mean-square** /ruːt miːn skweə/	The **root-mean-square** speed is the square root of the mean-square speed.
↔ **average translational kinetic energy** /ˈævrɪdʒ trænˈsleɪʃənl kɪˈnetɪk ˈenədʒi/	Hotter gas particles have more **average translational kinetic energy**.
→ **translational kinetic energy** /trænˈsleɪʃənl kɪˈnetɪk ˈenədʒi/	A moving particle has **translational kinetic energy**.

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