Kinetic model of an ideal gas

- An **ideal gas** is an imaginary gas that is used to model real gases, and has the following properties:

The molecules that make up an ideal gas…
*…are **identical perfect spheres**.*
*…are **perfectly elastic** – they don't lose any kinetic energy during their collisions with each other, or the walls of their container.*
*…have **no intermolecular forces** – their potential energy does not change.*
*…are so **small** that their volume is much smaller than the volume of their container.*

- If the temperature of a gas increases, so does the average speed (and hence kinetic energy) of the molecules.
- Thus the pressure will increase if the temperature increases.
- In a smaller volume the molecules have less distance to travel to hit a wall. Thus the wall is hit more often. Thus the pressure will be bigger if the volume is smaller.

Average kinetic/internal energy of an ideal gas

$$\vec{E}_k = \frac{3}{2}k_B T = \frac{3}{2}\frac{R}{N_a}T$$

T is temperature in Kelvins

$\mathbf{k_B}$ is called the **Boltzmann constant**

Differences between real and ideal gases

Ideal Gas	**Real Gas**
Ideal gases are identical perfect spheres.	Real gases are not identical perfect spheres.
Ideal gases are perfectly elastic. They do not lose energy when they collide with each other.	Real gases are not perfectly elastic.
Ideal gases have no intermolecular forces.	Real gases have intermolecular forces that attract and repel particles.
Ideal gases are small.	Real gases are relatively large and have a volume.