Particle Motion in Gases

➤ Movement of Particles

- **Particles in a gas move constantly and rapidly.** In a gas, particles are moving constantly. They move around each other randomly, at different speeds and different directions.

- **Particles in a gas have high kinetic energy.** The moving particles in a gas have **kinetic energy**. This kinetic energy is allowing the particles to move, but it is affected by the temperature of the particles.
- **High temperature leads to high KE.** As the temperature increases, the kinetic energy of the particles will also increase. The increase in kinetic energy is averaged across all the particles.

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➤ Movement related to Pressure

- **Gas particles constantly collide.** The particles in the gas will move around in different speeds and directions, and they will have lots of **collisions**. These gas particles are inside a container. The collisions will occur between two particles, or between a particle and the walls of the container.
- **Colliding particles exert a pressure on the walls of a container.** As the particles collide with the sides of the container, they will exert forces onto the walls of the container. All the individual forces from each collision will combine together. This combined force will exert a **pressure** on the walls of the container

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➤ Temperature and Pressure

The temperature of a gas is related to the average kinetic energy of its particles. If we heat a gas, the kinetic energy of its particles increases, so the average speed of the particles will increase.

Below, there are two containers containing gases at different temperatures.

- Gas particles at a lower temperature have lower kinetic energy. This results in fewer collisions per second, and the average energy of these collisions is also lower. Therefore, at lower temperatures, the gas pressure is relatively low.

- Gas particles at a higher temperature have higher kinetic energy, leading to more collisions per second and a higher average energy for these collisions. Therefore, at higher temperatures, the gas pressure is relatively high.

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Overview of particle motion in gases with respect to Temperature and pressure

Fig 4. Movement and Pressure.

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