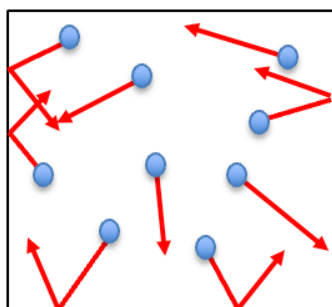


3.5.1 Gas pressure

Consider a container filled with a gas:



The gas particles are spaced out and moving quickly. They bounce against the sides of the container, pushing out on the container wall. This creates a pressure on the walls. Remember, that $pressure = \frac{force}{area}$.

Note: Temperature is related to the mean speed of the particles.



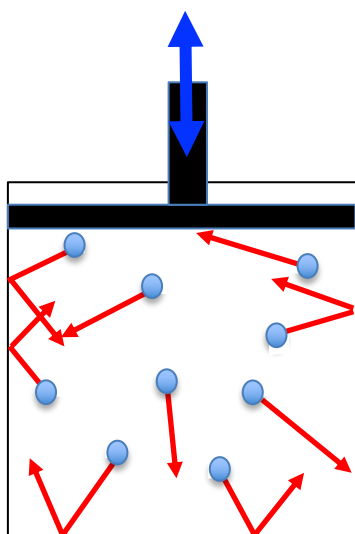
videos

(1) *What happens to the mean speed of particles when the temperature increases.*

(2) *What happens to the force of impact (of the particles with the container walls) as the temperature increases? Explain why.*

(3) *What happens to the frequency of collisions (of the particles with the container walls) as the temperature increases? Explain why.*

(4) *In terms of impact force and frequency of collisions, explain why the pressure increases as the temperature rises.*

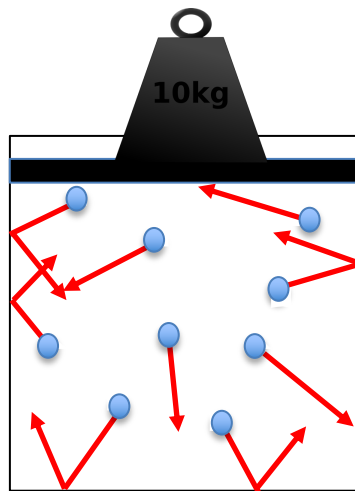


Consider the situation, left. Here the volume of the container can be changed by moving a piston up and down. If this is done slowly, the temperature remains unchanged.

(5) *What happens to the force of impact (of the particles with the container walls) as the volume is reduced? Explain why.*

(6) *What happens to the frequency of collisions (of the particles with the container walls) as the volume is reduced? Explain why.*

(7) *In terms of frequency of collisions, explain why the pressure increases, as the volume is reduced.*



Consider the situation, left. Here the volume of the container can change as the piston rises and falls. The pressure in the container supports the weight placed on the piston. This means that the pressure is kept constant (i.e. the pressure needed to support the weight $\text{weight} = \text{pressure} \times \text{area}$.)

(8) *The force of impact (of particles with the container wall) increases as the temperature increases. Explain why.*

(9) *What affect will an increase in temperature have on the piston? Explain why.*

(10) *What affect will an increase in temperature have on the volume? Explain why.*