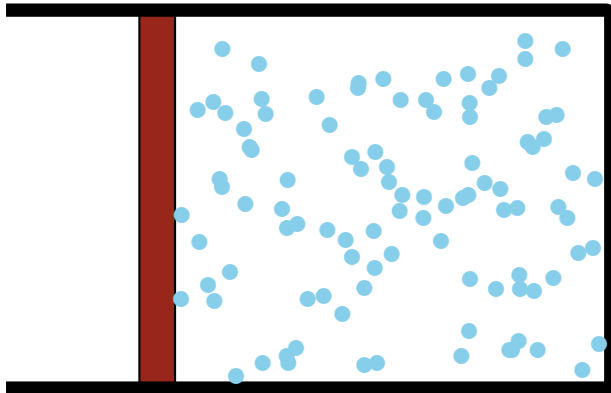


Question 1

Consider a gas in a cylinder with a moveable side (red). The gas is heated while the side is held fixed. Eventually the gas pressure inside is much larger than the air pressure outside.

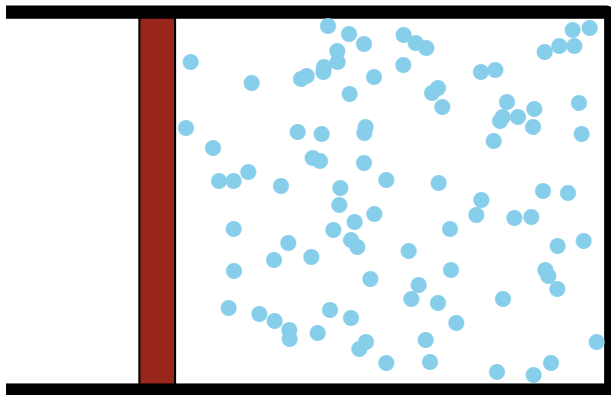


Consider a single atom that approaches the moveable wall. It hits the wall and bounces back. The wall moves to the left as a result of the collision. Which of the following is true regarding the speed of the gas atom after the collision?

1. Same as before.
2. Slower than before.
3. Faster than before.

Question 2

Consider a gas in a cylinder with a moveable side (red). The gas is heated while the side is held fixed. Eventually the gas pressure inside is much larger than the air pressure outside.



As many atoms collide with and move the wall to the left which of the following happens?

1. The gas temperature drops.
2. The gas temperature increases.
3. The gas temperature stays the same.

Question 3

A small quantity of boiling water is placed into the bottom of a glass bottle. The space above the water fills with steam. The bottle is capped with a balloon. The steam and water are allowed to cool to room temperature while the balloon seals the opening of the bottle.

As the steam and water cool to room temperature, what does the balloon do?

1. Stays as it was when placed over the bottle.
2. Inflates a small amount.
3. Inflates a large amount.
4. Deflates a little, but remains outside the bottle.
5. Gets sucked into the bottle.

Question 4

Consider a small smoke particle in a gas. The motion of the particle can be observed with a microscope. Consider two models of a gas:

Fluid: gas material fills all space and flows like a fluid.

Atomic: gas consists of atoms with large spaces between them.

Which of the following would each model predict about the smoke particle?

1. Fluid \Rightarrow smooth, continuous motion.
Atomic \Rightarrow smooth, continuous motion.
2. Fluid \Rightarrow smooth, continuous motion.
Atomic \Rightarrow jumpy motion.
3. Fluid \Rightarrow jumpy motion.
Atomic \Rightarrow smooth, continuous motion.
4. Fluid \Rightarrow jumpy motion.
Atomic \Rightarrow jumpy motion.