

Gas pressure and volume - part 1

Worksheet



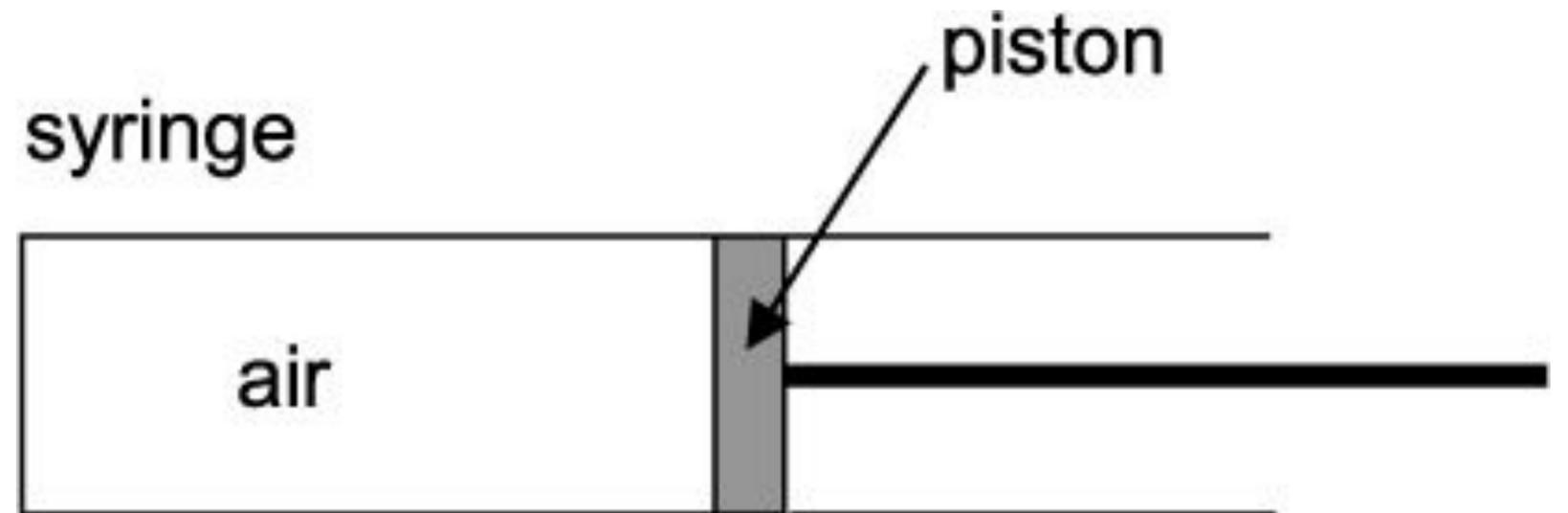
Exam question



Exam questions

1. A syringe contains air.

The piston is pushed inwards.



How does the pressure and volume of the air in the syringe change?

OCR, Gateway Physics A, Paper J249/01, Specimen.



Exam questions

2. These statements are about pressure and volume of a gas.

Which statement is correct?

A Volume doubles, pressure doubles

B Volume doubles, pressure halves

C Volume halves, pressure halves

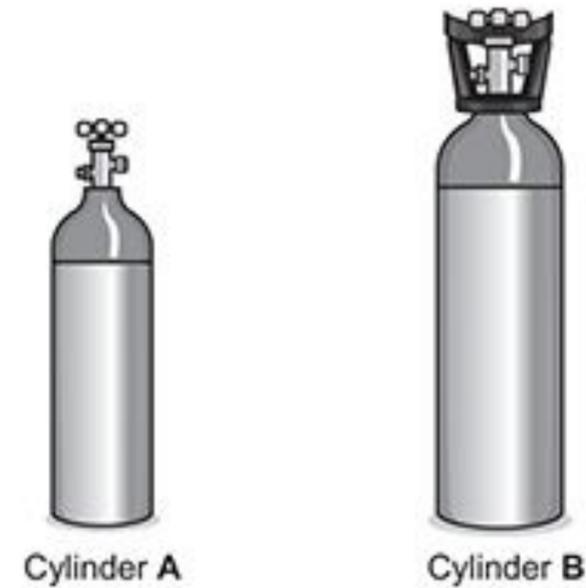
D Volume halves, pressure stays constant

OCR, Gateway Physics A, Paper J249/01, June 2018.



Exam questions

3. Hospitals store oxygen at high pressure in metal cylinders. The pictures show two cylinders, A and B. Both cylinders contain the same mass of gas and have the same temperature.



Cylinder B has a larger volume than cylinder A.

The pressure in cylinder B is smaller than the pressure in cylinder A.

Explain, using ideas about particles, why storing the same mass of gas in a larger volume produces a smaller pressure.



Exam questions

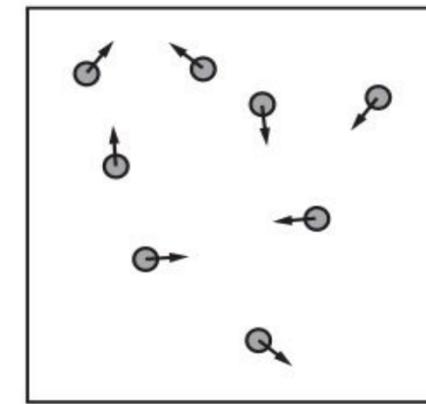
4. This question is about the particles in a gas and the pressure they exert on a container. The diagram below shows four samples of the same gas in containers of the same size.

Each particle is shown as a circle.

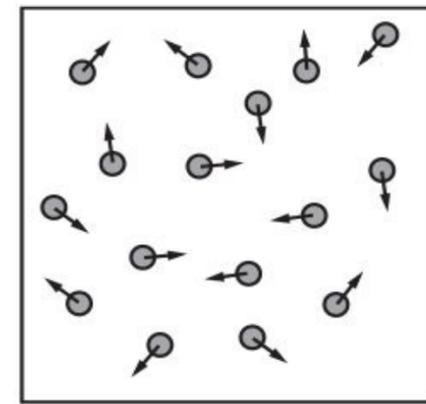
The arrow on each particle shows its velocity.

Answer each question with one of the letters A, B, C or D.

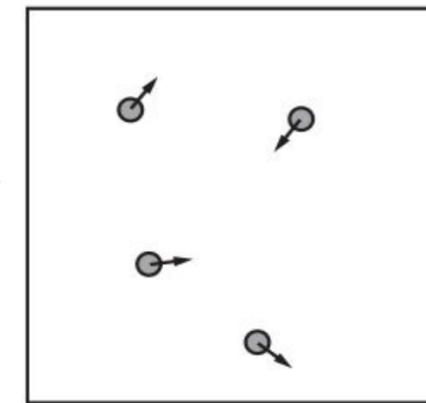
- i. Which sample has the fastest particles?
- ii. Which sample has the greatest density?
- iii. Which sample is at the highest temperature?
- iv. Which sample has the smallest pressure?



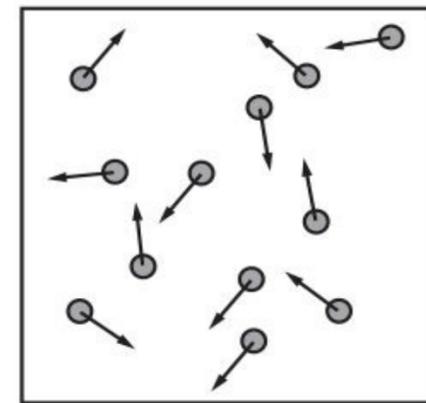
A



B



C



D



Answers



Review

1. The pressure will increase **(1)** and volume will decrease **(1)**.
2. B **(1)**
3. Any two from:
 - pressure caused by particles colliding **(1)**
 - (particles colliding) with walls **(1)**
 - (when the volume increases) particles travel further between collisions or vice versa **(1)**
 - (when the volume increases there are) fewer / less /more likely (frequent) collisions (so lower pressure) or vice versa **(1)**



Review

4.

i D **(1)**

ii B **(1)**

iii D **(1)**

iv C **(1)**



In lesson questions



Warm up

What causes pressure in a gas? Use the kinetic particle theory to explain how pressure is caused.



Pause the video to complete your task

Gas pressure and volume

- 1) State the relationship between pressure and volume of a gas at a constant temperature.**
- 2) What happens to the pressure of a gas at a constant temperature if the volume decreases.**
- 3) Challenge - What happens to the pressure of a gas at a constant temperature if the volume doubles.**

Resume once you're finished



Pause the video to complete your task

Gas pressure

Copy and complete

If you decrease the volume of a gas in a container at a constant _____, the pressure will _____. This is because the same number of _____ now occupy _____ space, leading to more _____ between the particles and the walls of the container

Resume once you're finished



Answers



Review

Warm up

What causes pressure in a gas? Use the kinetic particle theory to explain how pressure is caused.

The particles in a gas move in a constant, **random** motion, **colliding** with each other and the **walls of the container**. During a collision, the particle **exerts a force** on the wall. The **total force** exerted by all of the particles **per unit area** is equal to the pressure.



Review

1. State the relationship between the pressure and volume of a gas at a constant temperature. **The pressure is inversely proportional to the pressure.**
2. What happens to the pressure of a gas at a constant temperature if the volume decreases. **It increases.**
3. **Challenge** - What happens to the pressure of a gas at a constant temperature if the volume doubles. **The pressure will halve.**



Review

Copy and complete

If you decrease the volume of a gas in a container at a constant **temperature**, the pressure will **increase**. This is because the same number of **particles** now occupy **less** space, leading to more **frequent collisions** between the particles and the walls of the container

