B6 · Why gases behave this way: kinetic molecular theory; ideal and real gases · Worked examples and practice

Name: _____ Date: _____

Worked examples

Read these first. There is one for each kind of question in this lesson.

Example 1 · Explain what a gas does, using the theory

The hole of a bike pump is blocked and the handle is pushed in. Use the kinetic molecular theory to explain why the pressure rises.

1. Idea 2 says the particles move all the time, so they keep hitting the walls.
2. In the smaller space, the particles have less far to go between walls.
3. So each particle hits a wall more often.
4. More hits each second means more pressure.

Answer: In the smaller space the particles hit the walls more often, so the pressure is higher.

Example 2 · Decide whether a real gas acts like an ideal gas

Nitrogen gas is at room temperature and normal air pressure. Does it act almost like an ideal gas? Explain.

1. Real particles take up a little space and attract each other a little.
2. At normal temperatures and pressures these effects are tiny.
3. So nitrogen acts almost like an ideal gas.

Answer: Yes. At normal temperature and pressure a real gas acts almost like an ideal gas.

Practice

Questions 1 to 4 are easy. Questions 5 to 8 are medium. Questions 9 and 10 are harder.

EASY

1. How do gas particles move, according to the kinetic molecular theory?

EASY

2. What does the word "kinetic" mean? Say why it fits the theory.

EASY

3. A gas is heated. Which idea of the theory tells you what happens to its particles? Say what happens.

EASY

4. Name one way the particles of an ideal gas differ from the particles of a real gas.

MEDIUM

5. Explain why a gas fills its whole container.

MEDIUM

6. A balloon is warmed in the sun and gets bigger. Use the theory to explain why.

MEDIUM

7. Explain why a gas can be squeezed far more than a liquid.

MEDIUM

8. A real gas is put under very high pressure. Explain why it stops acting like an ideal gas.

HARDER

9. A propane tank holds liquid propane. Use what you know about real gases to explain how a gas can turn into a liquid.

HARDER

10. A sealed glass jar of air is put in a freezer. The jar cannot change size. Use the theory to predict what happens to the pressure. Explain.