



**The Effects of Air Pressure**

The air that we breathe is a gas. It is a combination of gases, mainly oxygen (20%) and nitrogen (78%). A gas will expand to completely fill any size container because its particles are free to travel in any direction.

**Gases do not have:**

- shape, strength, or a fixed volume.

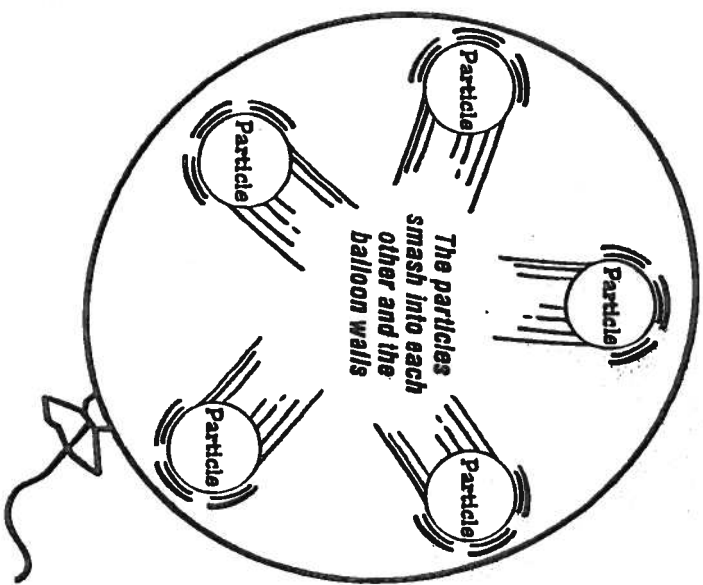
Unlike a gas, the particles in a solid are trapped and are not free to travel.

**Solids have:**

- shape, strength, and a fixed volume.

What happens when gas particles are trapped in a container like a birthday party balloon?

**Gas particles trapped in a balloon**



If a person blows up a balloon, using his or her lungs, the gas particles are trapped within the balloon. The gas particles try to escape by continually smashing into the balloon walls. These collisions put pressure on the balloon walls. The pressure keeps the balloon's skin taut. If the same balloon was placed in a freezer the following sequence of events would occur:

- the speed of the particles slows;
- the pressure is reduced;
- the balloon shrinks in size.

If the same balloon was placed in a hot sauna the following sequence of events would occur:

- the speed of the particles increases;
- the pressure is increased;
- the balloon grows in size and may burst.

To make a balloon light enough to float, it has to be filled with a gas that is lighter than the surrounding air. Hot air is lighter than cold air. A balloon filled with hot air will rise until the temperature in the balloon is the same as the surrounding air temperature.

Hot air or gas takes up more space than cold air or gas. When air is heated it will expand and occupy more space than cold air. Hot air usually expands upward into the atmosphere. A general rule of air is as follows: hot air rises, cold air falls.

First read page 27. Then answer the questions below. Place this note in your science binder.

- 1) What happens when gas particles are trapped in a container like a balloon?
- 2) What happens when air is heated?
- 3) What happens when air is cooled?

- 4) Write a hypothesis for the following experiment.  
You pump up a balloon using an air pump. Then you put it in the freezer.  
If I...

- 5) Draw possible observations for this experiment.

Balloon when inflated.	Balloon after it have been placed in the freezer for 10 minutes.
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- 6) Air is a solid. Do you agree or disagree with this statement? Explain in detail. At least 4 sentences.