Pressure

1. Define "pressure." *The measurement of force exerted on a surface*

2. *a)* Complete the formula for calculating pressure:

$$P = \frac{F}{A}$$

P = *Pressure in N/m²*
F = *Force in N*
A = *Area in m²*

b) N is the symbol for *newton*.

c) m^2 is the symbol for *square metre*.

d) N/m^2 is the symbol for *newton per square metre*.

3. *a)* The unit of pressure in the international metric system is the *pascal*. Its symbol is *Pa*.

b) One pascal is equal to the pressure generated by the force of *1* newton acting on a surface area of *1 square metre*.

c) To measure high pressure, such as the atmospheric pressure on the Earth's surface, we would use the *kilopascal (kPa)*, which is equal to *1000* Pa.

d) List two other units of measurement for pressure, together with their abbreviation.

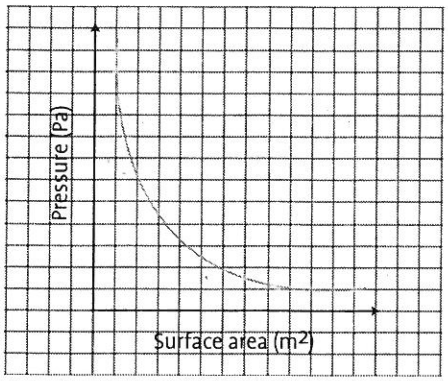
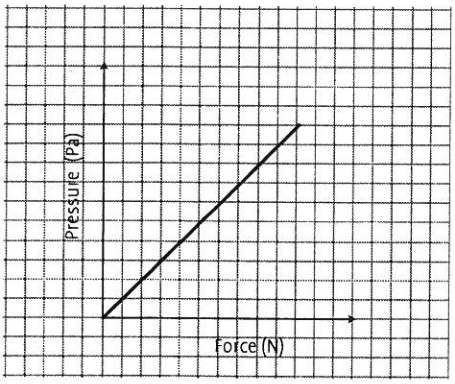
- *Millimetres of mercury (mm Hg)*
- *Atmospheres (atm)*

4. The following equivalencies, which represent the values of normal atmospheric pressure measured at sea level, can be used to convert pressure from one unit of pressure to another:

101.3 kPa = *760* mm Hg = *1* atm

Factors that influence the amount of pressure

5. Summary table of factors that influence the amount of pressure

	Relationship between pressure and the surface area upon which the force is applied	Relationship between pressure and the applied force
Mathematical relationship	Pressure is *inversely proportional* to the surface area upon which the force is applied.	Pressure is *directly proportional* to the applied force.
Explanation	When the force is the same: • The larger the surface area, the *weaker* the pressure • The smaller the surface area, the *higher* the pressure	When the surface area is the same: • The stronger the force, the *higher* the pressure • The smaller the force, the *weaker* the pressure
Diagram	**Pressure as a function of surface area** 	**Pressure as a function of force** 

Pressure and the particle theory

6. *a)* Define "fluid." *A substance that has no defined form and can flow in all directions*

b) All *liquids* and *gases* are fluids.

c) When the particles of a fluid come into contact with the walls of the container holding them, they exert *force* or *pressure* on them. The more the particles *collide* or come into contact with the walls of the container, the *greater* the *pressure* exerted by the fluid will be.

7. *a)* *Differences in pressure* cause fluids to move.

b) Fluids always move from an area of *high* pressure to an area of *low* pressure.

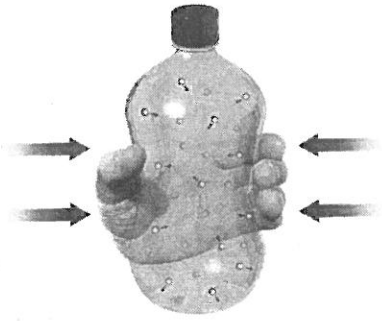
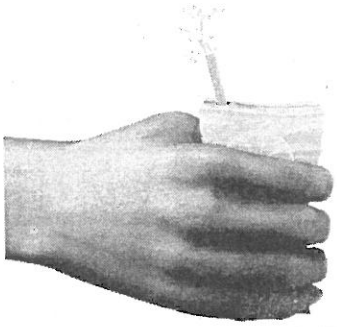
c) In the case of gaseous fluids, this phenomenon is called *diffusion*.

Compressible and Incompressible Fluids

1. Define "compressibility." *Having the capacity to decrease in volume upon application of a force*

2. List some practical applications of gas compressibility. *Gas compressibility makes it possible to store a large volume of gas in a small space. For example, the air needed for a deep-sea dive lasting several hours can be stored in a small tank that the diver can easily carry.*

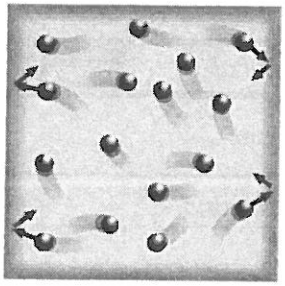
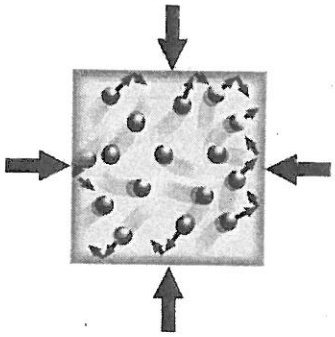
3. Summary table of compressible and incompressible fluids

Type of fluid	*Compressible* Fluid	*Incompressible* Fluid
		
State of the fluid	*Gaseous*	*Liquid*
Space between the particles, according to the type of fluid	*Relatively large*	*Small*
Effect of a force on the particles, according to the type of fluid	*The particles get closer together.*	*The particles cannot get closer together.*
Effect of a force on volume, according to the type of fluid	*The volume decreases.*	*The volume does not change.*

4. When pressure is exerted on an incompressible fluid, force is transferred from one particle to another within the substance. This phenomenon causes the liquid to *flow out of its container* or to *move through a tube or conduit*.

The Relationship Between Pressure and Volume

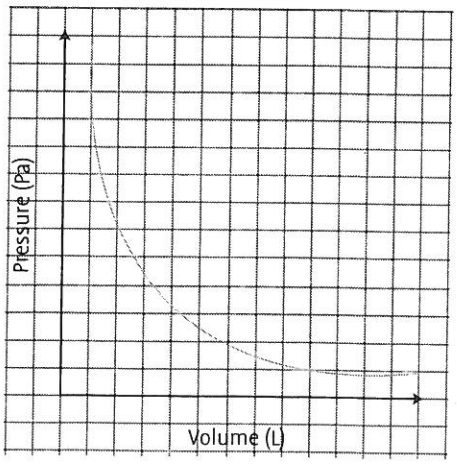
1. Summary table of the relationship between the pressure and volume of a compressible fluid.

	The compressible fluid (gas) occupies a large volume	The compressible fluid (gas) occupies a small volume
Illustration based on the particle model		
Effect on the particles	There are *fewer* collisions between the particles and the walls of the container.	There are *more* collisions between the particles and the walls of the container.
Pressure exerted by the gas	The gas exerts *low* pressure.	The gas exerts *high* pressure.

2. Complete the following sentence:
When the *temperature* is constant, the pressure of a given quantity of gas varies *inversely* with the volume occupied by the gas and vice versa.

3. Complete the following graph, which illustrates the relationship between the pressure of a gas and the volume it occupies:

Gas pressure as a function of its volume



Frequency, Wavelength and Amplitude

Waves

1. Define "wave." *Deformation that propagates through a vacuum or through a medium that contains matter*

2. Summary table of types of waves

	Mechanical waves	*Electromagnetic* waves
Medium in which it moves	Material medium	Material medium or vacuum
Three examples	*Water wave, sound, seismic wave*	*Radio waves, light waves, UV rays*

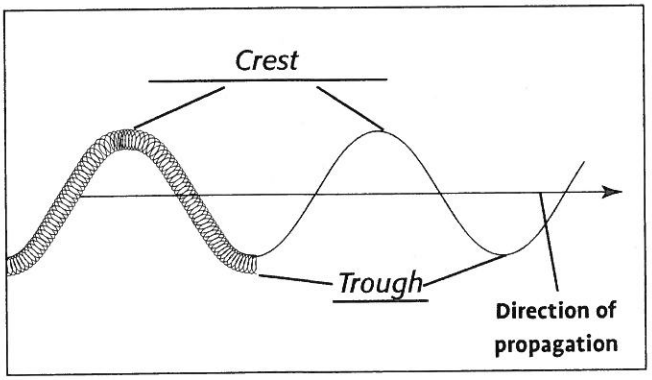
Types of waves

3. *a)* Complete the following diagram:

   b) This type of wave produces a deformation that is *perpendicular* to the direction in which it propagates.

   c) Provide three examples of this type of wave:
   Electromagnetic waves, water waves and earthquakes

Transverse wave



4. *a)* Complete the following diagram:

   b) This type of wave produces a deformation that is *parallel* to the direction in which it propagates.

   c) Provide an example of this type of wave:
   Sound

Longitudinal wave