Air Pressure

Exercise 1:

Solution 1(a):

The rubber cork sticks to the table. It does not detach easily and requires more force to pull it free.

Exercise 2:

Solution 1(a):

When a scale is pushed under a newspaper, the layer of air between the table top and the paper decreases. Due to decrease in layer of air, the atmospheric pressure decreases. Hence, more effort is required to lift the unfolded newspaper.

Solution 1(b):

The folded newspaper gets lifted easily.

Solution 1(c):

The flask is placed in hot water bath for some time. The water in the flask gets heated due to the hot water bath and slowly evaporates. Due to the rubber cork there is no space for the vapours to exit from the flask. So, more and more space is occupied by the water vapour. This increases the pressure on the surface of water in the flask. Hence, the water rises in the glass tube and gushes out through its open end. This way water can be drawn out from the flask without sucking it.

Exercise 3:

Solution 1(a):

Bubbles can be produced by blowing air through the glass tube immersed in water. If air is blown through the glass tube which is above the surface of water, the water in the flask will

be pushed out from the other glass tube.

Exercise 4:

Solution 1(a):

We cannot drink water with a straw which has a hole.

Solution 1(b):

While drinking water with the help of a straw, we suck air present in the straw. This decreases the air pressure inside the straw. It is the atmospheric pressure which pushes the water into the straw to fill in the vacuum created. When we try to drink water from a straw which has a hole in it, the air outside the straw enters the straw through its hole to fill the vacuum created on sucking the straw. This outer air does not decrease the air pressure in the straw. Hence, water from the glass does not rise in the straw and we cannot drink water.

Solution 1(c):

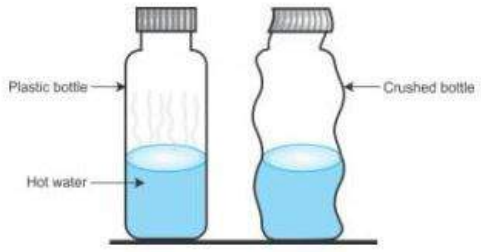
The piece of chalk remains near the neck of the bottle and cannot be pushed inside.

Exercise 5:

Solution 1(a):

When we keep blowing air into the bottle, it gets filled with air. This increases the air pressure inside the bottle which begins to constantly push the chalk in the outward direction. Thus, the air pressure inside the bottle does not allow the chalk to go inside the bottle.

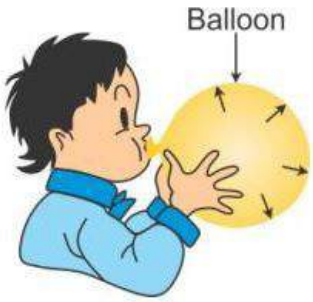
Solution 1(b):



The bottle contracts and is compressed when cold water is poured over it.
The closed bottle with hot water contains steam. When cold water is poured over it, the steam inside the bottle cools and condenses. This reduces the air pressure inside the bottle and it cannot balance the high air pressure from outside. So, the high air pressure from outside the bottle crushes it inwards.

Solution 1(c):

When air is blown into a balloon, it gets inflated. This happens due to the pressure exerted by the air molecules on the inner walls of the balloon.



If we continue to blow air, then after a certain point the air pressure inside the balloon increases tremendously. This high pressure bursts the balloon and the air escapes outside.

Exercise 6:

Solution 1(a):

When we close the front part of an injection syringe and press the knob, the air enclosed in the syringe gets compressed. If we continue to press the knob, the air pressure inside the syringe increases. So, the compressed air exerts a pressure on the knob. This large air pressure does not allow the knob to advance further after a certain point. Hence, the knob of the syringe cannot be pushed totally.

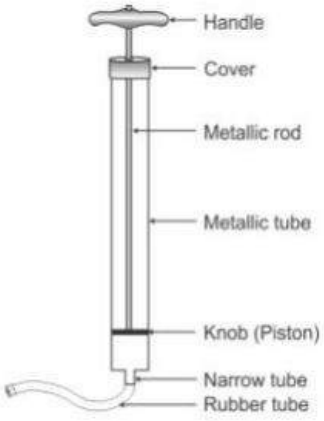
Exercise 7:

Solution 1(a):

When air is blown through the horizontal part of the straw, the air from the vertical part of the straw rises up with force. This decreases the air pressure in the vertical part of the straw. Hence, water rises up and comes out along with the blow.

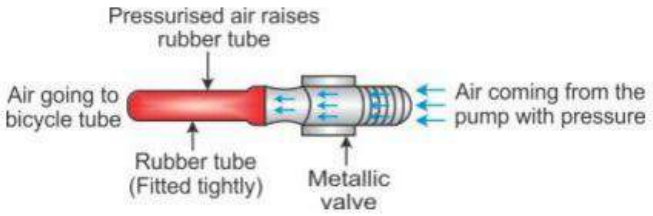
Solution 1:

Structure of a cycle pump:



A cycle pump consists of a long metallic hollow tube. There is a small narrow tube connected to one of its ends. A long metallic rod fitted with a rubber knob is passed through the open end of the tube. The rod and the knob are passed in the tube such that the knob is air tight with the tube. This arrangement is called a piston. This rod has a handle attached to the other end of the rod. A rubber tube is connected to the narrow tube.

Solution 2:



The cycle valve is a metallic valve fitted through a rubber tube to the inner side of a bicycle tube. The metallic valve has a hole and is a one way valve. The pressurised air coming from the pump through the valve raises the rubber tube and air is filled in the bicycle tube.

Solution 3:

A valve-tube is fixed on a bicycle tube. We know that a bicycle tube is filled with the help of a cycle pump. While filling air in the tube, the valve-tube opens due to the pressurised air coming through the pump and air is filled in the tube. Thus, with the help of the valve-tube air can be filled in the bicycle tube. Also, a valve-tube does not allow air filled in the tube to escape.

Solution 4:

We use air pressure in our daily activities in the following manner:

1. We use a straw to drink cold drinks.
2. We use a water gun or pichkari to spray water.
3. We use a cycle pump to fill air in bicycle tubes.
4. We use an ink filler to fill ink in a pen.
5. We use a siphon to transfer water from two vessels kept at different levels.