

Names:

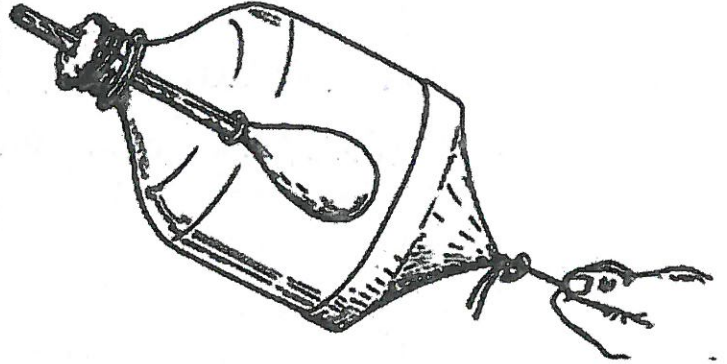
ANSWER KEY

## Lung model activity

In groups of two you will build a working lung model.

### Materials:

- 1 plastic bottle (bottom cut off)
- 2 elastics
- 1 straw
- 2 balloons
- Clay



Once you have finished building your lung model, answer the questions below.

Identify the different components of your model, the respiratory system part they represent and their function.

Model Component	Real Anatomical Part(s) Represented	Function
Plastic bottle	Rib cage	to protect the lungs ; heart
Small balloon	lung	to allow gas exchange at the alveoli. $O_2$ in, $CO_2$ out
Large balloon	diaphragm	to contract ; relax thus changing the volume of the thoracic cavity
Straw	trachea / bronchus	trachea - rigid tube that brings air to the bronchi. It filters the air with cilia "hairs" ; mucus bronchus - brings air into the lungs ; $CO_2$ out.

Analysis:

1. Explain what happens to the **volume** of the thoracic cavity when the "diaphragm" is pulled down.

The volume increases due to the diaphragm contracting (being pulled down) and creating more space in the thoracic cavity.

2. Explain what happens to the **pressure** in the thoracic cavity when the "diaphragm" is pulled down.

The pressure decreases, as there are less collisions of air particles against the lung walls.

3. Explain why the "lungs" inflate.

The pressure inside the cavity decreases so air from outside the body ~~moves~~ moves in.

The air moves from a high pressure area (outside the body) to a low pressure area (your lung).

4. Explain what happens to the volume of the thoracic cavity when the "diaphragm" relaxes.

The volume decreases due to the diaphragm relaxing (pulled up) and creating less space in the thoracic cavity.

5. Explain what happens to the pressure in the thoracic cavity when the diaphragm relaxes.

The pressure ~~decreases~~ increases as there are more collisions of air particles against the lung wall.

6. Explain why the "lungs" deflate.

The pressure inside the cavity increases so the air inside the lung moves out.

The air moves from a high pressure area (in your lung) to a low pressure area (outside the body).



7. Describe the relationship between pressure and volume. (As the volume changes, what happens to the pressure?)

Pressure and volume are inversely proportional. As volume goes up, pressure goes down.  $\uparrow V, \downarrow P$  and as volume goes down, pressure goes up.  $\downarrow V, \uparrow P$ .

Challenge question

Explain how you think the *pressure* and *volume* in the lungs of someone would be affected if they have asthma. HINT: Think of the symptoms of someone with asthma.

Symptoms of asthma is chest tightness, wheezing, shortness of breath ; coughing. The chest tightness is a clue that the volume of the lungs is increased, therefore the pressure decrease. ~~Answer~~

