

Modelling the Mechanism of Breathing **Answers**

1. Name the part of the model that represents each of the following structures.

Students' answers may vary depending on the materials used.

| | |
|--------------|-----------------------|
| chest cavity | plastic bottle |
| diaphragm | large balloon |
| lungs | small balloons |
| trachea | plastic straw |

2. Describe what you observed when the part of the model representing the diaphragm was pulled downwards.

When the diaphragm was pulled downwards, the balloons inflated.

3. Describe what you observed when the part of the model representing the diaphragm was pushed upwards.

When the diaphragm was pushed upwards, the balloons deflated.

4. Explain your observations using the idea of pressure.

When the balloon/diaphragm was pulled down, the volume of the plastic bottle/chest cavity increased. This caused the pressure inside the plastic bottle/chest cavity to decrease. Air moved into the balloons/lungs because the pressure outside the plastic bottle/chest cavity was greater than the pressure inside.

When the balloon/diaphragm was pushed up, the volume of the plastic bottle/chest cavity decreased and the pressure inside the plastic bottle/chest cavity increased. This caused the air to be pushed out of the balloons/lungs because the pressure inside the plastic bottle/chest cavity was greater than the pressure outside.

5. Suggest **two** improvements that could be made to the model.

Students' answers will vary. Students might refer to aspects of the model that were difficult to make, or suggest changes to overcome limitations such as:

- **the plastic bottle is a rigid structure, which is unable to move in the same way as the ribcage;**
- **the model shows the lungs as empty sacs, whereas in reality the lungs are composed of many alveoli;**
- **the balloon needs to be pulled down to cause the balloons to inflate, whereas the diaphragm only flattens to cause air to enter the lungs.**