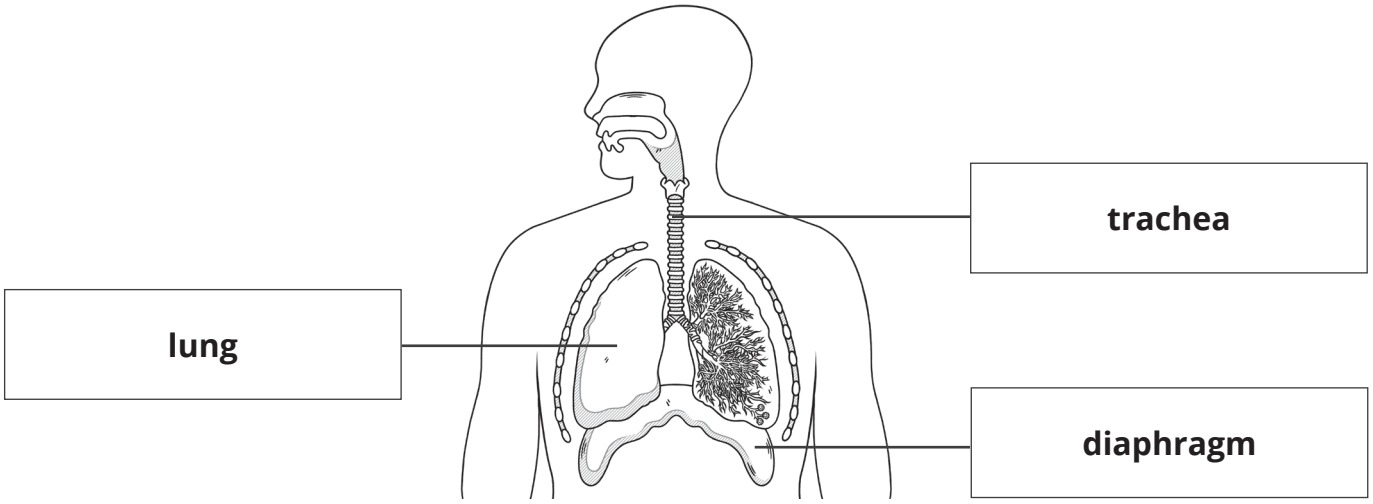
The Mechanism of Breathing **Answers**

1. Label the parts of the human gas exchange system on the diagram below.



2. Name the part of the human gas exchange system represented by each part of the model.

balloon	**lung**
rubber sheet	**diaphragm**
tube	**trachea/bronchi**

3. Describe what you observed when the rubber sheet was pulled down and then pushed up.

When the rubber sheet was pulled down, the balloons inflated.
When the rubber sheet was pushed up, the balloons deflated.

4. Explain your observations using the idea of pressure.

When the rubber sheet was pulled down, the volume of the bell jar increased.
This caused the pressure inside the bell jar to decrease. Air moved into the balloons because the pressure outside the bell jar was greater than the pressure inside.
When the rubber sheet was pushed up, the volume of the bell jar decreased and the pressure inside the bell jar increased. This caused the air to be pushed out of the balloons because the pressure inside the jar was greater than the pressure outside.

5. Describe **two** strengths of the bell jar model in demonstrating the mechanism of breathing.

Any two from:

- **pulling the rubber sheet down causes the pressure inside the bell jar to change (this represents the diaphragm contracting, which increases the volume of the chest cavity)**
- **the glass/plastic tube splits into two branches that are each connected to a balloon (this represents the trachea splitting into two bronchi, with one branch going into each lung)**
- **the balloons are elastic and return to their original shape when air moves out (this is similar to how the shape of the lungs changes as air moves in and out)**

6. Describe **two** limitations of the bell jar model in demonstrating the mechanism of breathing.

Any two from:

- **the bell jar is a rigid structure that cannot move (in the human breathing system, the ribcage moves up and out when the intercostal muscles contract)**
- **the balloons are empty sacs which fill with air (in reality, the lungs are spongy structures filled with many tiny air sacs called alveoli)**
- **the bell jar is filled with air (the chest cavity is actually filled with pleural fluid)**
- **the glass/plastic tube is rigid and inflexible (unlike the trachea, which is flexible due to being made of cartilage)**