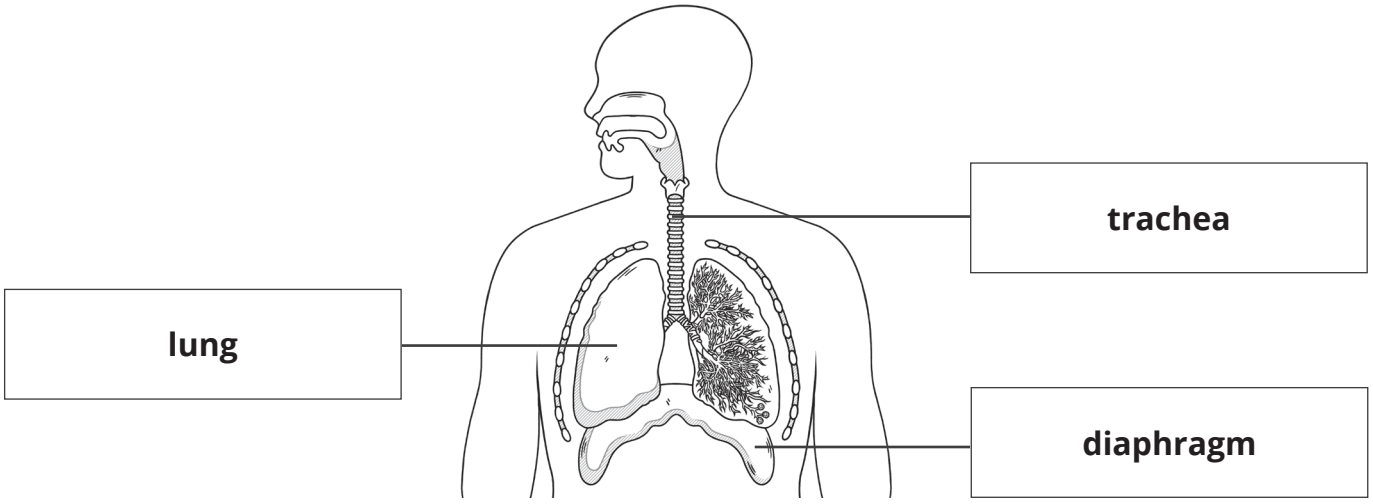
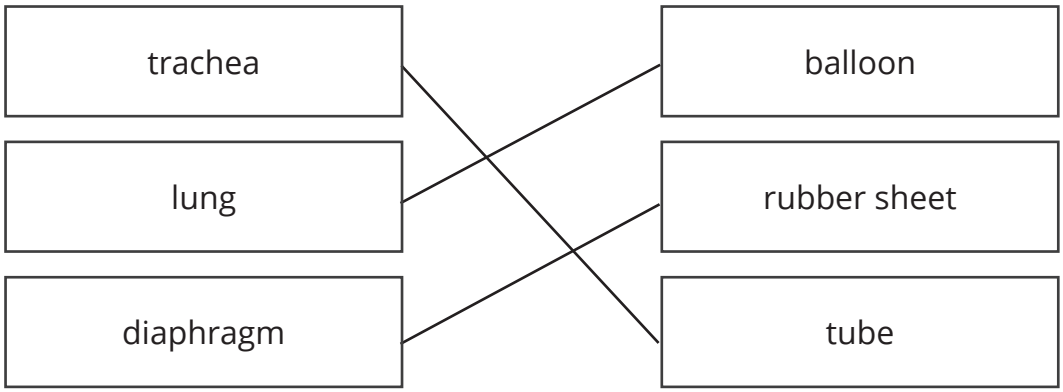
The Mechanism of Breathing **Answers**

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

diaphragm	lung	trachea



2. Draw one line from the name of each part to the corresponding part of the model.



3. Describe what you observed when the rubber sheet was pulled down.

When the rubber sheet was pulled down, the balloons inflated.

4. Describe what you observed when the rubber sheet was pushed up.

When the rubber sheet was pushed up, the balloons deflated.

5. Complete the sentences to explain your observations. Use words from the box below. Some words may be used more than once.

decreased	increased	into	out 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 the bell jar.

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.

6. Describe **one** strength and **one** limitation of the bell jar model. A strength is something the model does well to represent the mechanism of breathing. A limitation is something that could be improved.

Any one strength 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)**

Any one limitation 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)**