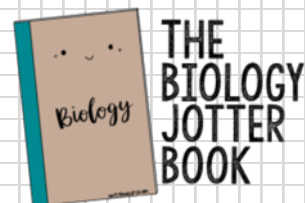


Breathing Mechanisms

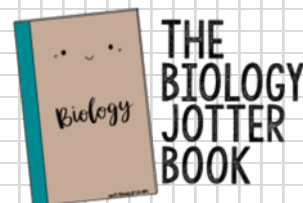
Inhalation

Exhalation



Breathing Mechanisms

- To increase rate of oxygen exchange between animals and external environment
- 2 phases:
 - Taking in air (*inspiration / inhalation*)
 - Giving out air (*expiration / exhalation*)

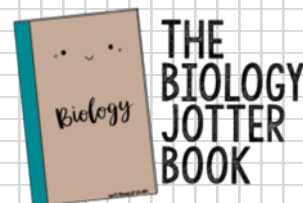


Inhalation/Inspiration

- **External** intercostal muscles **contract**
 - Internal intercostal muscles relax
 - Ribs swing upwards and outwards
 - Sternum moves up and away from backbone
 - **Diaphragm contracts** and flattens
 - Volume of thoracic cavity increases
- } antagonistic muscles

One way to help you remember:

External intercostal muscles and diaphragm both contract during inhalation.



Inhalation (Inspiration)

Thoracic cavity increases



Air pressure in alveoli decreases



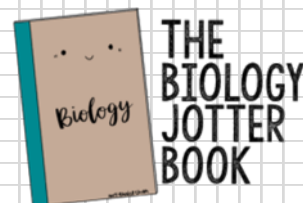
Air pressure in alveoli **less than** atmospheric pressure



Atmospheric air gets **forced into lungs**
due to pressure difference



Gaseous exchange between alveolar air
and blood occurs

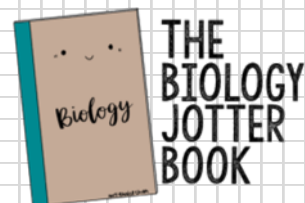


Exhalation/Expiration

- **External** intercostal muscles **relax**
- Internal intercostal muscles contract
- Ribs and sternum return to original position
- **Diaphragm relaxes** and arches upwards
- Volume of thoracic cavity decreases

One way to help you remember:

External intercostal muscles and diaphragm both relax during inhalation.



Exhalation (Expiration)

Thoracic cavity decreases



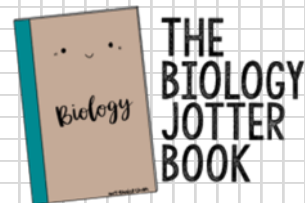
Air pressure in alveoli increases



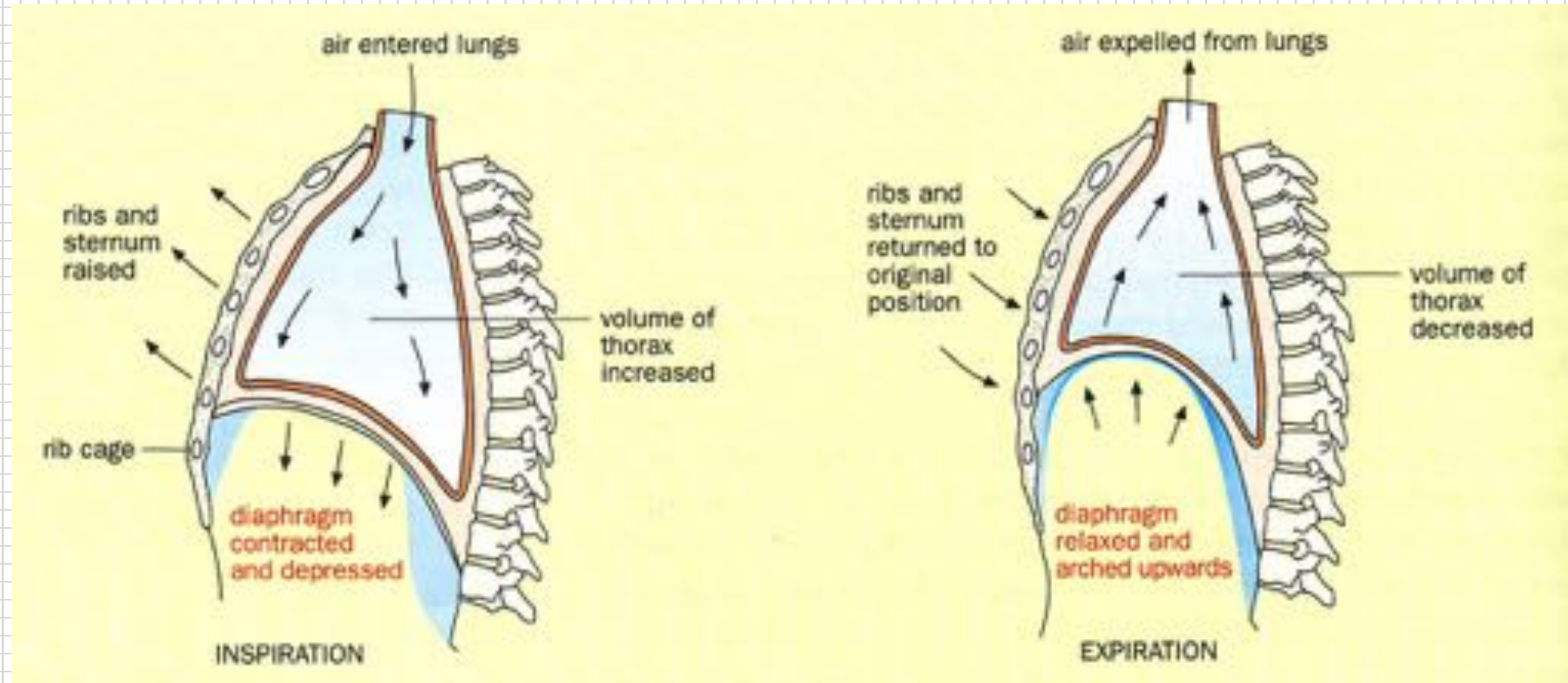
Air pressure in alveoli **more than** atmospheric pressure



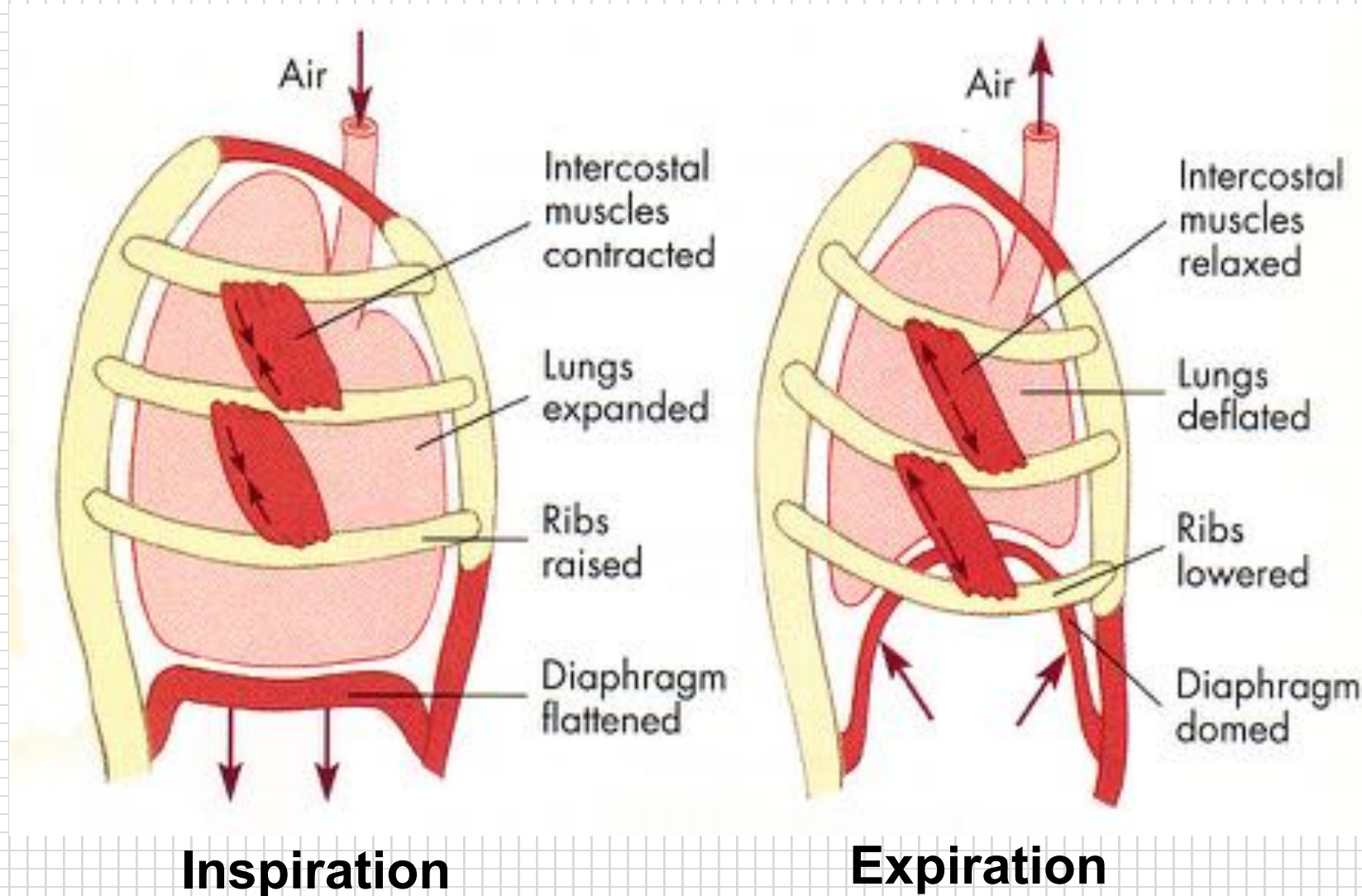
Alveolar air containing CO_2 gets **forced out of lungs** due to pressure difference



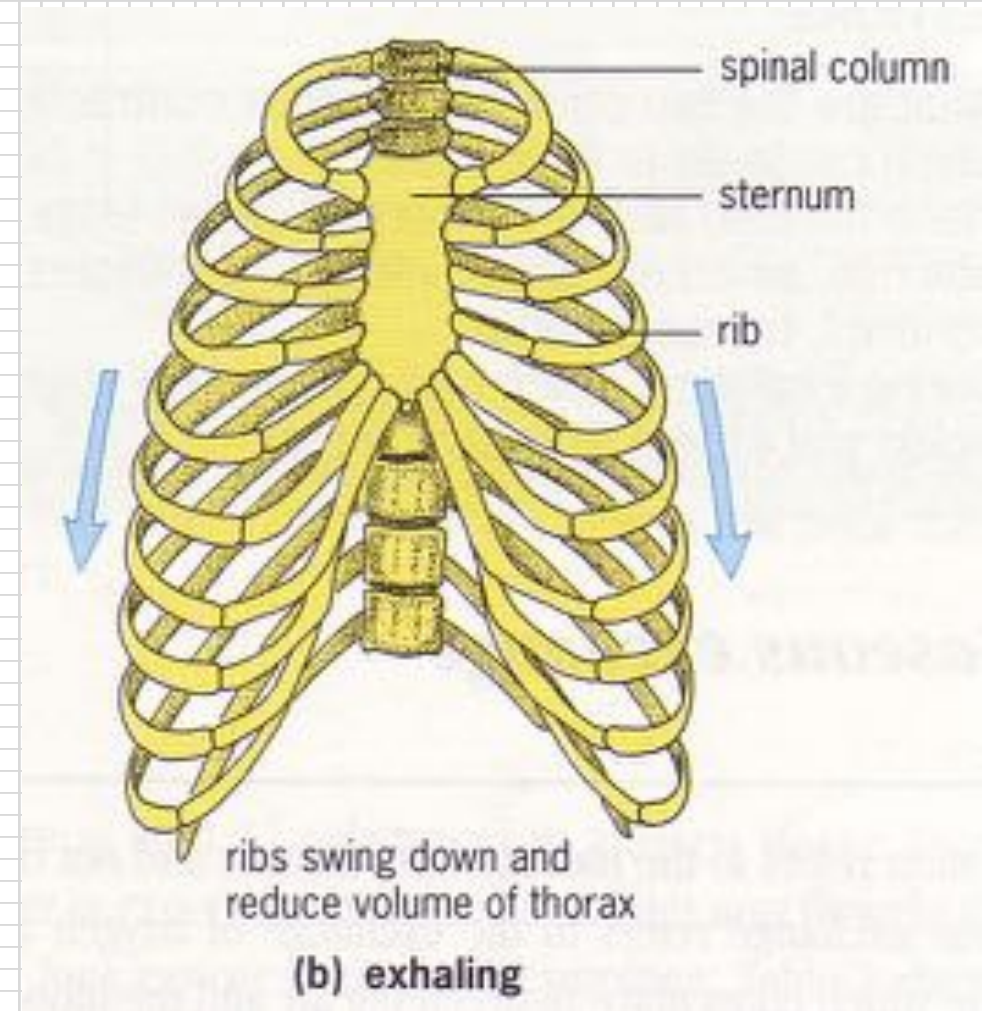
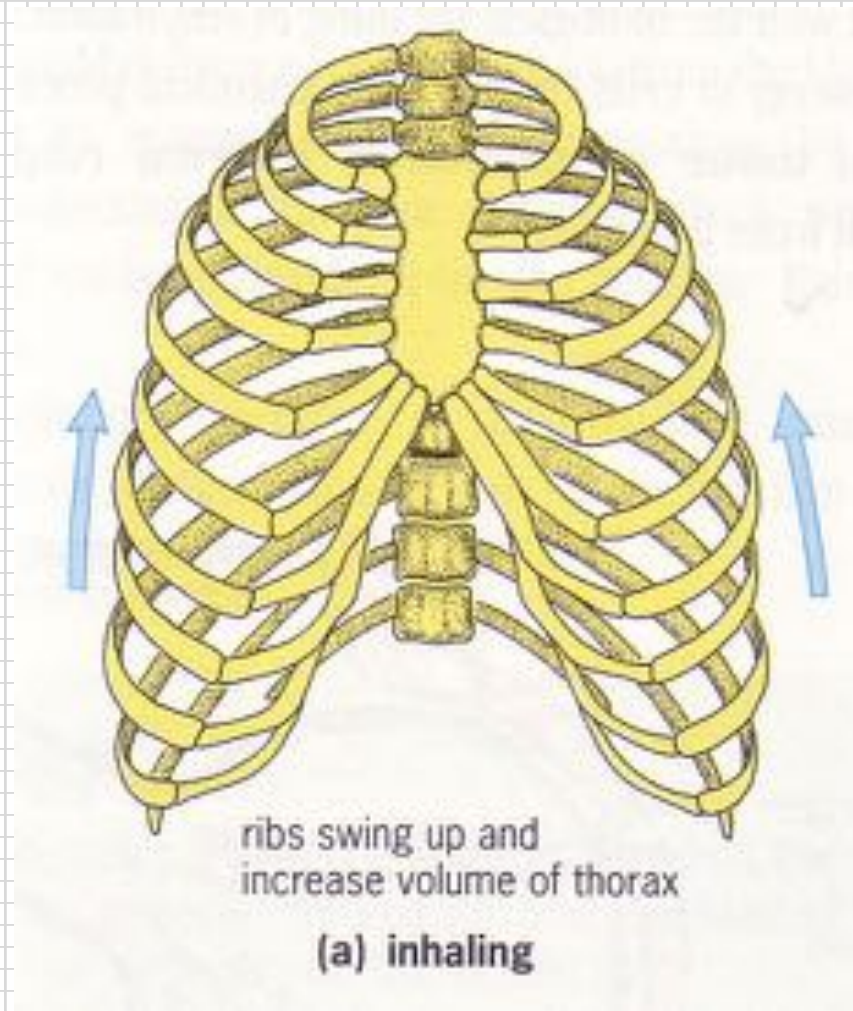
Inhalation and Exhalation



Inhalation and Exhalation



Movement of Ribcage



A Brief Summary...

| Breathing Phase | Diaphragm | External Intercostal muscles | Thoracic volume |
|------------------------|------------------|-------------------------------------|------------------------|
| Inhalation | <i>Contracts</i> | <i>Contract</i> | <i>Increases</i> |
| Exhalation | <i>Relaxes</i> | <i>Relax</i> | <i>Decreases</i> |

