Understandings:

1. Explain what ventilation is.

- Ventilation is the mechanism of air moving in and out (not to confuse with respiration!). We absorb oxygen and release carbon dioxide.

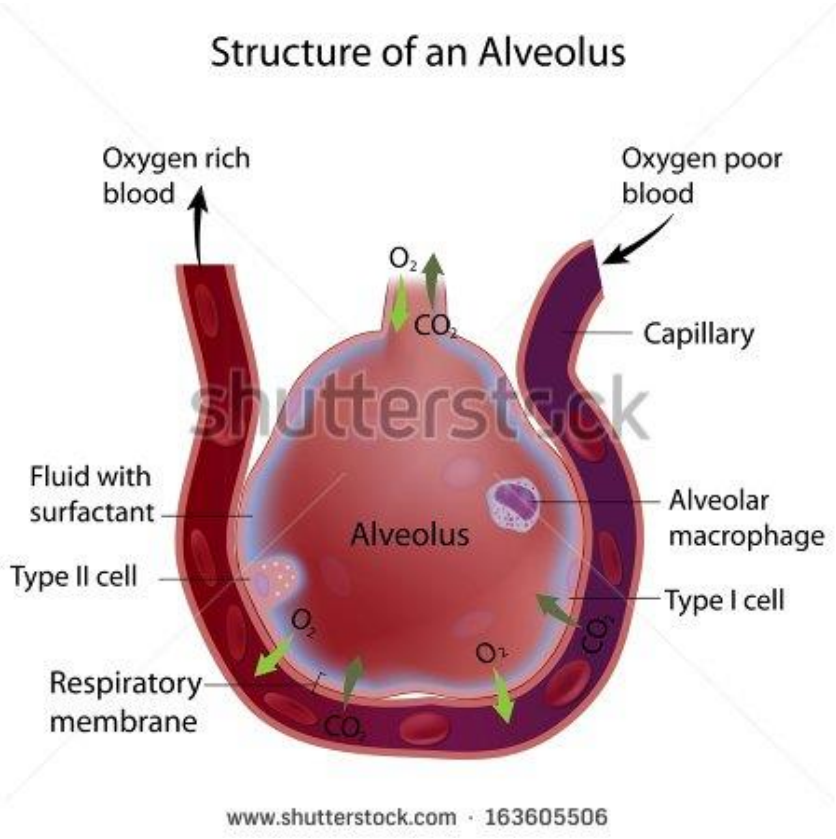
This gas exchange happens in a small sac called alveoli. Alveoli are surrounded by capillaries that have high concentration of waste (carbon dioxide) and therefore the carbon dioxide diffuses out while oxygen diffuses into the blood.

2. Describe Type I pneumocytes.

- On the epithelial layer of the alveoli, we have extremely thin, flat cells called Type 1 pneumocytes.

The wall of the capillary we know is also a layer of thin epithelial cells.

Therefore, the diffusing distance is small. It is a result of evolution.



3. Describe Type II pneumocytes.

- These cells occupy around 5% of the surface area on alveoli.

The main job of these workers is to release detergent like surfactants that lubricate the alveoli. Why on earth would you want to do that? Well, it has many reasons.

1. Gas dissolves in fluid. This is good since it is going inside the blood anyways.

2. Since water has strong adhesive properties, having water as the moisture is dangerous. It can just adhere to each other and make the alveoli collapse. This is more specifically called pulmonary surfactant.

4. Explain the pathway of the air from atmosphere to alveoli.

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Cavity

Trachea (cartilage to keep it open despite pressure changes)

Bronchi

Bronchioles

Alveoli

5. Explain the physical mechanisms in ventilation.

- Inhalation or inspiration:

Volume of thorax increases, decreasing pressure, making air move in.

Exhalation or expiration:

Volume of thorax decreases, increasing pressure, making air move out.

6. Explain antagonistic muscles.

- Well, this could be something new for you.

Muscles cannot relax :O

The only way they can relax is when another muscle contracts and forces them to relax. These muscles are called antagonistic muscles. Antagonist in a novel is the enemy, so the terminology makes sense.

Applications and skills:

1. Explain the causes and consequences of lung cancer.

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Cause	Consequence
1. Smoking 2. Passive smoking. Smokers are still idiots. 3. Radioactive gas. 4. Air pollution. 5. Asbestos, find solids that may get inhaled. Mines are a common place.	1. LUNG CANCER. Chest pains, coughing blood, weight loss, fatigue, and the list goes on forever.

2. Explain the causes and consequences of emphysema.

- It is an irreversible disease where surface area of alveoli is reduced and walls become inelastic, making it harder to breathe.

The exact mechanism for this is not yet understood. Hmm!

Theories:

1. Phagocytes ingest bacteria in alveoli and produce elastase, killing both the bacteria and cells in alveoli.

2. The inhibitor of elastase called A1AT is deficient.

The cause is of course smoking.

3. Explain the changes in external and internal intercostal muscles, and diaphragm and abdominal muscles.

- Diaphragm and abdominal muscle are antagonistic pairs.

External and internal intercostal muscles are antagonistic pairs.

During inspiration, volume of thorax should increase. This is achieved by diaphragm contracting and external intercostal muscles contracting (causing chest to rise).

During expiration, its antagonistic muscles are at work. This is achieved by the abdominal muscle and the internal intercostal muscle contracting.

4. Be able to monitor ventilation in humans at rest and after mild and vigorous exercise.

- This was done in class.