Types of Pleural in the Lung

In our lungs, there are many types of pleural membranes and fluids which keep our lungs and ribcage safe from damage. The table below explains these types in more detail.

Pleural Type	Information
Pleural Membrane	**A membrane forming a protective envelope around the lungs.**
Pleural Fluid	**A lubricant to stop the lungs and ribcage from sticking to the inside of the chest.**
Pleural cavity	**The space between the membrane and fluid/**

3: Change: Alveoli's

There are over 700,000,000 of these alveoli's in each lung. The alveoli's are small air sacs which bunched together like grapes, and are responsible for taking oxygen to the red blood cells; while ejecting carbon dioxide into the plasma; so it will be breathed back out into the atmosphere. When the oxygen hits the alveoli and is diffused to the red blood cells; the oxygen will mix with the haemoglobin of the red blood cells and forms oxyheamoglobin, therefore, this oxygen will be taken though the capillaries, to the pulmonary vein, before going to the right atrium of the heart. The alveoli's also have a film of moisture which lets the oxygen diffuse into the red blood cells. Not all oxygen is removed from the air, on average; the human will breathe in 21% of air but only will emit 16% of the oxygen back into the atmosphere.

4: Exhalation

Carbon dioxide, created from the after product of respiring cells and tissues, is ejected from the blood plasma into the alveoli's. This is where the individual will breathe out, send the carbon dioxide all the way the alveoli's, bronchioles, bronchus, trachea; before finally out of the mouth. Other type of gases, which is sent to the alveoli's in exhalation; are nitrogen, water vapour, oxygen and argon.

How does our Ribcage and Lung work in Ventilation?

Exhalation

In the process of exhalation, the opposite happens. Therefore, when an individual breathes out carbon dioxide; the internal intercostals muscles of the ribcage contract, while the external intercostals muscles relax. Since carbon dioxide need to be pushed out from the lungs, the diaphragm will relax and recoil back into it dome shape. At the same time as the diaphragm does this, the volume of air in the lungs decreases.

Characteristics of the Respiratory System

Characteristic	Information
Large Surface Area	**Since there are a total of 700,000,000 alveoli's on each lung, the surface area would come to 60 squared. If we where t compares this surface area in real life; the surface area would 60 square meters which is larger than a classroom.**
Ventilation	**Ventilation of the lungs and ribcage helps keep the body functioning and living.**
Capillary Network	**The capillaries, which the oxygen and carbon dioxide is carried, helps in getting rid of waste and supporting cell respiration**

Summary of the Body Systems

Body System	Role

Digestive System	**Break down food for nutrients; therefore, this keeps the body active ad in good condition.**
Circulatory System	**Pumps blood around the body. The red blood carries oxygen in and carbon dioxide out in order to keep us alive.**
Renal System	**Excretes fluid waste and toxins from our bodies so we don't die from internal poisoning.**
Respiratory System	**Keeps our muscles in good condition by taking out carbon dioxide and brining in oxygen. This also helps with cellular respiration.**

How does the Respiratory and Cardiovascular/Circulatory System Work Together to maintain Bodily Functions?

The way the Respiratory and Cardiovascular/Circulatory System work together to maintain the body's functions is though cell respiration. Not only can humans do this, but also animals and plants can do this. The differences between an animal and a plant in respiration, is that plants gain their chemical energy though sunlight and the process called photosynthesis.

Cell Respiration

What is Cell Respiration?

Cell respiration is a process, where the circulatory and respiratory systems work together to give cells their needed chemical energy. Therefore, this helps the cells to carry on doing their bodily functions, such as creating new tissue; carrying oxygen to the muscles of the body they also remove carbon dioxide and other wastes out from the body.

Types of Cell Respiration

- **Aerobic Respiration:** This type of respiration requires oxygen to give the cells energy. In this type of respiration, three processes take place; therefore, these three processes are Glycolsis, Kerbs cycle and Electron Transport Phosphorylation.
- **Anaerobic Respiration:** This type of respiration does not require any oxygen to give the cells energy. The cells located in the organs, tissue, and muscles; will respire themselves in order to create energy to carry out their bodily functions. This normally happens when the individual is doing high levels of cardio or exercise.

How does Cell Respiration Work?

The chemical energy our cells need comes from the food we eat. Therefore, in a way our digestive system is also a part of the cell respiration process; which gives our cells the needed energy to carry out the many bodily system functions. When an individual eats a piece of food, it goes down the oesophagus, stomach and the other digestive organs of the body. Therefore, as the food is broken down by certain enzymes in the body; oxygen; which has been breathed in from the respiratory lungs oxidises the now broken down food. In the process of food oxidisation, most of the food is broken down into glucose; therefore, this is where the chemical energy, needed for the cells, is stored. This glucose will be converted into a chemical molecule called Adenosine Tri-sulphate (ATP), therefore, once the glucose has been converted to ATP; it's absorbed by the cells, which gives it energy to carry on its bodily functions.

The Three processes in Aerobic Respiration

- **Glycolsis**

This is a more detailed process of how the glucose is oxidised down, and turned into ATP to gives cells energy in aerobic respiration. When glucose is broken down, three carbon molecules called pryuvate are made; followed by four ATP molecules, two more ATP molecules and two molecules called NADH. The NADH is actually the molecules which carry two energy rich electrons needed by the cells to have energy.

- **Kerbs Cycle**

In Kerbs cycle; the two NADH molecules are put though a complicated set of reactions to produce eight more NADH molecules, therefore, meaning there will be sixteen more energy rich electrons for the cells. From this process, two molecules called FADH2 will be made as well.

- **Electron Transport Phosphorylation.**

In this process, the extra NDAH and FADH2 molecules will travel to the cells special membranes, where molecules (called the electron transport system) will take the energy rich electrons and use them to make more ATP.

Process in Anaerobic Respiration

Because anaerobic respiration means no oxygen is needed to do it, the only process that takes place, is the Glycolsis Process. Another small difference is that only two ATP molecules will be made from this type of respiration.

Diffusion and Active Transport

What is Diffusion?

Diffusion is a process in respiration, where material, such as oxygen, water, nutrients, waste and carbon dioxide, move though the cells membrane to get to other types of cells. Therefore, this movement of the materials in and out of the cell depends on the concentration gradient of the cells membrane. If the concentration of the membrane cells is high; it causes the material in the cell to diffuse out of it.

Active Transport

For cells that want to take up the materials, for example, organ cells and tissues cells, they use a process called Active transport this is where the cell uses energy from respiration to take in the needed materials.

Equation for Respiration

Glucose + Oxygen + Carbon Dioxide + Water (+energy)

Symbol Equation for Cellular Respiration

C6H12O6 6O2 6CO2 6H2O (+energy)

Breathing Rates

Breathing State	Breathing times per minute
Resting	16
Exercise	20-30

How does the Circulatory System help to maintain the Bodies Functions?

The circulatory system helps maintain the body's functions by carrying the red blood cells all over the body to gives nutrients, oxygen, as well as taking in carbon dioxide. It then goes back to the lungs; where the respiratory system takes place and sends the respiratory waste out of the body. When the circulatory system takes oxygenated blood to the muscles and organs of the body, it's helping the cells give nutrition to the muscles and organs to keep them contracting. This produces movement; builds large proteins, for example, enzymes; and supports the process of cell division.

Contraction and Movement of the Muscles

This is all done by our red blood cells providing the muscle cells with oxygen and nutrients the muscles need. If there is a lack of oxygen in the muscles; the muscles cells can do anaerobic respiration on their own. However, overworked muscles, which stop oxygen reaching the muscles to support them; can cause glucose to be converted to lactic acid.

There are four mustered coloured pea sized parathyroid glands; which are located a little bit behind the actual thyroid gland with two glands lying behind the butterfly shaped wing. When the thyroid senses something wrong in the body; for example, high levels of calcium, it will secrete a hormone called Calciitonin. This will flow though the blood to the bones and stop the activity of oesteoclasts in the bone marrow. This action causes the decrease of calcium in the blood and stimulates the parathyroid glands to release their hormones.

What is the role of the Parathyroid Gland?
The role of the parathyroid glands to secrete its hormones, therefore, its hormones helps to:

- **Release Calcium from bones.**
- **Absorb Calcium from the intestine into the blood.**
- **Takes back Calcium located in the urine.**
- **Stimulates kidneys to excrete phosphate in the urine.**
- **Increase magnesium levels in the blood.**

Calcium
Calcium is very important, especially for the nervous system. The reason for this is because the role of Calcium is to provide electrical energy for the nervous system as well as for the muscles of the body. Regulation of calcium in the body is the only role that the parathyroid does.

Thymus
What is the Thymus?
The thymus is a gland located between the upper part of the breast bone and the heart. It has two lobes which are made from lymphoid cells. The thymus is normally at a large size until the individual hits puberty, therefore, when he or she does, the thymus will start to shrink.

What is the Role of the Thymus?
The role of the Thymus is to secrete hormones called Thymuses. These hormones stimulate the body to create T lymphocyte cells; which are needed by the immune system. Also, these hormones help the body create its own lymphoid system.

Adrenal Glands
What are the Adrenal Glands?
Adrenal glands are endocrine glands that are located on top of the kidneys. The outer part of the adrenal glands is the adrenal cortex; while the inner part is the adrenal medulla. The adrenal medulla is made from Chromaffin cells; while the adrenals cortex is made from a range of cells, for example, Glomerulosa, Fasiculata and Reticularis cells.

What are the roles of the Adrenal Glands?
The adrenal glands are mainly responsible for the fight or flight response. This is to the adrenal medulla secreting the hormone adrenaline. Therefore, this causes the individual to become scared, very happy, or angry. Adrenaline also causes the individual to move faster and act quicker in situations that can be a threat to their lives. The table below shows the different hormones excreted by the adrenal glands; followed by their roles.

Role of the Adrenal Glands Table.

Hormone	Gland its Secreted By	Function of Hormone

Cortisone, Cortisol, and Corticosterone	**Adrenal Cortex**	**Combats Inflammation, produces sugar glucose from amino acids, utilizes fat, protein and carbohydrates. The hormones also regulate salt and water in the body.**
Adrenaline, Epinephrine and Norepinephine	**Adrenal Medulla**	**Adrenal triggers happiness, anger, or fear in the human body. Therefore, this individual will react to adrenaline and rather react or escape. This is the flight or fight response is. Effects of these hormones are increased heart rate, increase of deep breathing, muscle power improves and metabolic rate is increased.**
Mineralcorticoids	**Adrenal Cortex**	**Maintains and regulates electrolyte balance**
Glucocorticoids	**Adrenal Cortex**	**Creates the effects of stress at a low pace. For example, such effects of stress, caused by the hormones, are high blood pressure, inflammation and disrupt the immune response.**
Noradrenalin	**Adrenal Medulla**	**Increases blood pressure, increases blood flow throughout the body, and increases breathing rate.**
Estrogen and Testosterone	**Adrenal Glands**	**Stimulates sexual development in boys and girls.**
Dehydroepiandrosterone sulfate (DHEA-S).	**Adrenal Glands**	**Their function is unknown; however, individuals with high amounts of this hormone heal quicker from illnesses, flu and colds.**
Androgen Testosterone	**Adrenal Glands**	**Takes part in fat, carbohydrate and protein metabolism.**

Pancreas

What is the Pancreas?

The pancreas is an endocrine gland, exocrine gland, and digestive gland. Its location is behind the stomach. Although it's mainly known to secrete digestive enzymes; it also secretes glycogen and insulin to keep the body's sugar levels balanced.

What is the role of the Pancreas?

In the endocrine system the role of the Pancreas is to secrete Insulin and Glycogon. The table below shows what functions these two hormones have in the body:

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