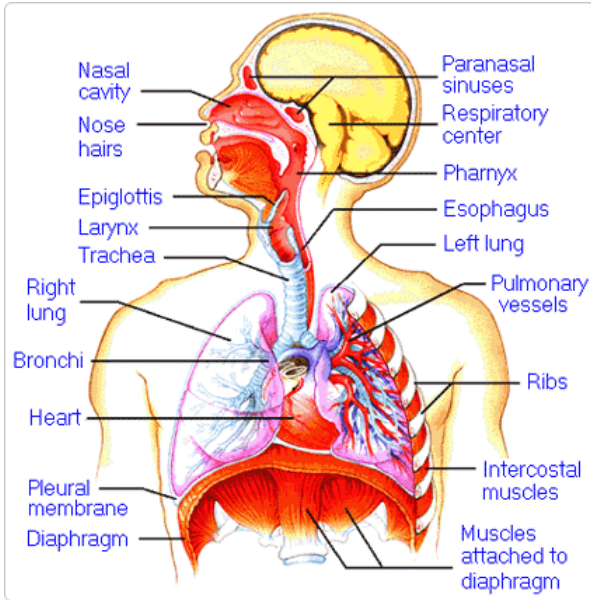


**BTEC Sport Year 12-Unit 1 Learning aim C-The effects of exercise on the respiratory system**

**C1 to C4**

**What is the structure of the respiratory system?**



**What is the function of the respiratory system?**

**Breathing**

Inspiration-Breathing air into the lungs.

-ribs contract and diaphragm is forced downwards

Expiration -Opposite of inspiration

**Gaseous exchange**

Exchanging one type of gas for another

Happens in the alveoli by diffusion

**What is the volume of the lungs?**

Respiratory rate -is the amount of air you breathe in one minute.

Tidal volume- is the amount of air breathed in and out with each breath

Residual volume- is the amount of air left in the lungs after you have breathed out fully

Total lung volume- is the maximum amount of air the lungs can hold

Vital capacity- is the amount of air you can breathe out after maximum inhalation

Minute ventilation- is the total amount of air entering the lungs in one minute

**How is breathing controlled?**

**Neural control**

Breathing is under involuntary control by the respiratory centre in your brain

Inspiration and expiration is controlled by neurones in the brain stem

Neurones in 2 areas of the medulla oblongata are critical-dorsal respiratory group (DRG) and ventral respiratory group (VRG)

The VRG is responsible for rhythm and continuous breathing

**Chemical control**

Chemoreceptors recognise changes in the amount of oxygen and carbon dioxide when you breathe

Found in the medulla, aortic arch and carotid arteries

They detect changes in blood carbon dioxide levels, blood acidity

**C5 to C7**

**How does the respiratory system respond to a single exercise session?**

**Increased breathing rate**

- Rate and depth of breathing increase
- This is because the muscles demand more oxygen
- The increased carbon dioxide stimulates faster and deeper breathing
- The capillary network expands, increasing blood flow to the lungs
- A minor rise in breathing rate before exercise is known as anticipatory rise. This is due to receptors working in the muscles and joints.

**Increased tidal volume**

- Tidal volume increases to allow more air to pass through the lungs
- During exercise oxygen is depleted triggering a deeper tidal volume.

**How does the respiratory system respond to long term exercise?**

**Increased vital capacity**

To provide an increased and more efficient supply of oxygen to working muscles

**Increased strength of respiratory muscles**

- Diaphragm and intercostal muscles get stronger, allowing for greater expansion of the chest cavity
- Easier to take deeper breaths.

**Increase in oxygen and carbon dioxide diffusion rate**

- This means you can train for longer and harder

**What other factors affect the respiratory system?**

**Asthma**

- Airways become restricted making it harder to breathe
- Results in coughing, wheezing and shortness of breath
- Regular exercise can strengthen the respiratory system and help prevent asthma
- Regular aerobic training can improve breathing rate and muscular strength and endurance training will improve oxygen uptake

**Effects of altitude/partial pressure on the respiratory system**

- Many elite athletes train at high altitude as the air pressure is lower and the oxygen particles are further apart
- This makes it harder to breathe
- Over time the athlete's respiratory system will adapt and become more efficient
- In the short term your lungs have to work harder
- Symptoms include dizziness, headaches and difficulties concentrating.