Respiration

Inspiration (active)
- Diaphram contracts - active
  External intercostals contract - active
- Diaphram flattens / pushed down
  Ribs / sternum move up & out
3. Thoracic cavity volume increases
4. Lung air pressure decreases below atmospheric air
5. Air rushes into lungs.

↑ ↑ ↑ ↑ ↑ ↑
RESPIRATION AT REST

Expiration (passive)
1. Diaphram relaxes - passive
   External intercostals relax - passive
2. Diaphram pushed upward
   Ribs / sternum move in & down
3. Thoracic cavity volume decreases
4. Lung air pressure increases above atmospheric air
5. Air rushes out of lungs

Inspiration (active)
1. Diaphram contracts
   External intercostals contract
   sternocleidomastoid contracts
   Scalenes contract
   Pectoralis minor contracts
2. Diaphram flattens with more force
   increased lifting of ribs & sternum
3. Increased thoracic cavity volume
4. Lower air pressure in lungs
5. More air rushes into lungs

Expiration (passive)
1. Diaphram relaxes
   External intercostals relax
   Internal intercostals contract - active
   Rectus abdominus / Obliques contract - active
2. Diaphram pushed up harder with more force
   Ribs / sternum pulled in & down
3. Greater decrease in thoracic cavity volume
4. Higher air pressure in lungs
5. More air pushed out of lungs

VE = TV x F
= 500ml x 15
= 7500ml/min
= 7.5L/min

TV = tidal volume
- volume of air inspired or expired per breath.

F = frequency
- no. of breaths taken in 1 min

VE = minute ventilation
- volume of air inspired or expired in 1 min.

Lobes of lungs
→ division of lung
- right has 3
- left has 2

→ branch into bronchioles - into each lobe
→ terminate into alveoli ducts → alveoli sacks - each sac is called alveolus & is actual sight of gas exchange.

Alveoli ↑ efficiency of gas EXCHANGE
1) Form vast surface area for gaseous exchange
2) Have single-cell layer of thin epithelial cells, reduce distance
   - Moist lining of water - help dissolve & exchange oxygen
   - extensive network of narrow alveoli capillaries - short diffusion path.
   - alveoli capillaries have single-cell layer, reducing distance for gaseous exchange.

PULMONARY PLEURA
double wall sacs consist of 2 membranes filled with pleural fluid - helps reduce friction between rib & lung ensures lungs move with chest as it expands & relaxes during breathing.

Pulmonary Ventilation - breathing of air into & out of lungs

External Respiration - exchange of O_2 & CO_2 between lungs & blood

Internal Respiration - exchange of O_2 & CO_2 between blood & muscle tissue.

myoglobin - red pigment in muscles that stores O_2.

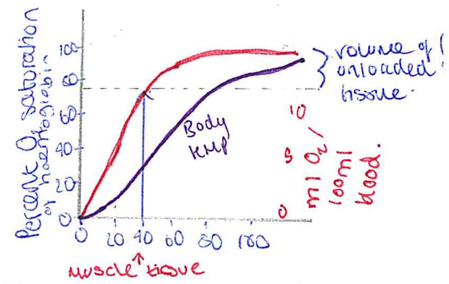
Oxygen Haemoglobin Dissociation Curve

Oxygen (O_2) ASSOCIATES with haemoglobin
↓
SATURATED - fully loaded with O_2
↓
DISSOCIATION - Hb unloading from O_2.

The higher the PP of oxygen, the higher the % of O_2 saturation of Hb.

Oxygen Dissociation Curve

PP comparison:



- informs us of amount of haemoglobin saturated with oxygen

Internal respiration during Exercise

→ 4 factors below all have effect of shifting dissociation curve to right,
↑ dissociation of oxygen from Hb in blood capillaries in the muscle tissue

1) ↑ in blood & muscle temperature
2) ↓ in PP oxygen within muscle, ↑ the oxygen diffusion gradient
3) ↑ in PP of CO_2, ↑ CO_2 diffusion gradient
4) Bohr effect - ↑ in acidity (lower pH)

Smoking effects

- damage to respiratory structures
- tar coats airways & inhibits gaseous exchange
- ↑ likelihood of respiratory diseases
- Hb has greater affinity to CO_2 than O_2
- ↓ gaseous exchange & diffusion gradient
- ↓ efficiency of respiratory system
- ↓ efficiency of supply of oxygen to muscles
- narrowing of air passages causing ↑ in respiratory resistance.
- carbon monoxide reduces amount of O_2 absorbed in blood.