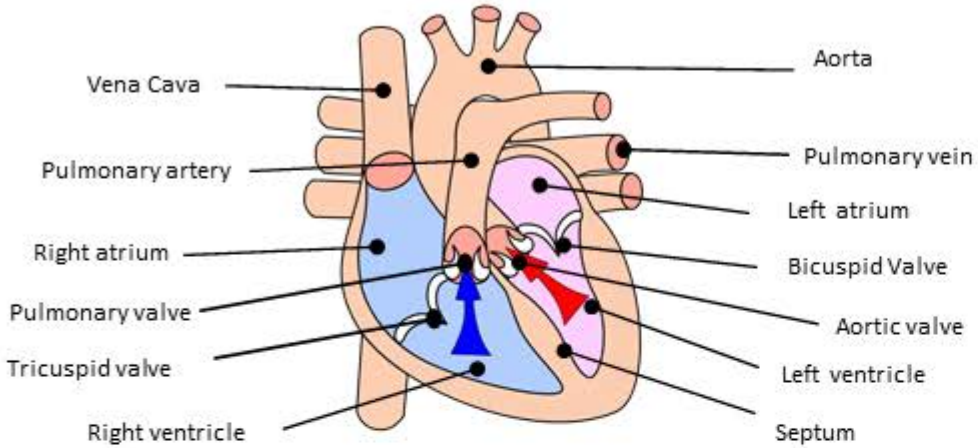
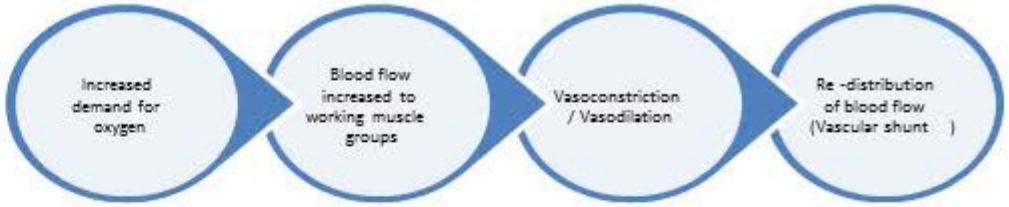
TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 1.2.1/2/3/4/5: CARDIOVASCULAR SYSTEM

Deoxygenated blood = **BLUE** (Right side) Oxygenated = **RED** (Left side)



Vascular Shunting



Vasoconstriction –NARROWING

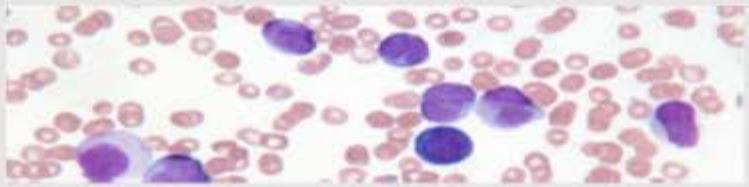
Vasodilation -EXPANDING

Function of the cardiovascular system
1. Transport of oxygen, carbon dioxide and nutrients
2. Clotting of open wounds
3. Regulation of body temperature

Arteries	Veins	Capillaries
1. Away from the heart 2. Oxygenated blood (except pulmonary artery) 3. Thick/elastic walls 4. High pressure	1. Back to the heart 2. Deoxygenated blood (except pulmonary vein) 3. Thin walls + larger lumen 4. Lower pressure 5. Valves	1. In the tissue 2. Site of gaseous exchange 3. Very thin walls

Components of blood-Red blood cells
Carry oxygen from the lungs to the working muscles + Removes CO_2.
Haemoglobin binds the oxygen.

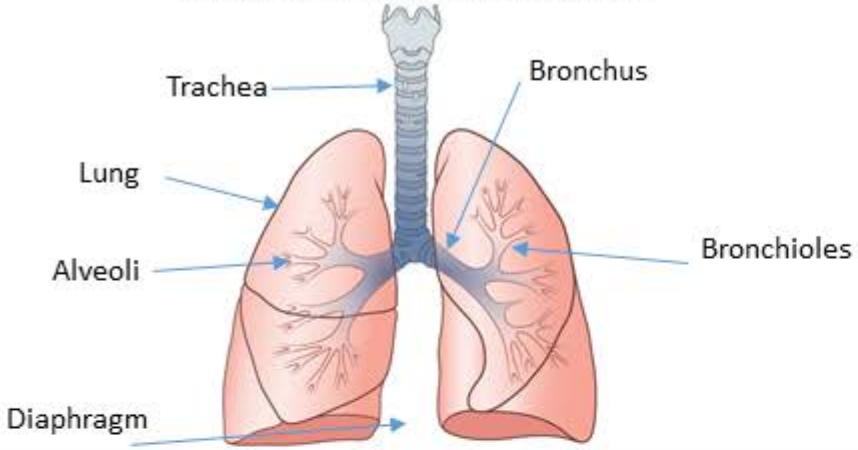
White blood cells
Are part of the immune system and **fight disease** and infection.



Platelets & Plasma
Platelets **clot blood** and form a scab around the site of injury. Plasma is the **liquid/fluid** part of blood that allows it to flow.

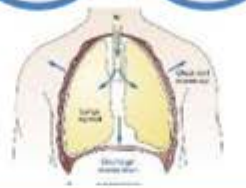
TURTON SCHOOL YR10 PE KNOWLEDGE ORGANISER – TOPIC 1.2.6/7/8/9 : THE RESPIRATORY SYSTEM

Structure of the Respiratory System

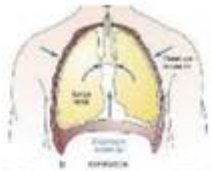


Inhalation

- Diaphragm and intercostal contract
- Diaphragm flattens and pulls down
- Lung size increases and air pressure inside is reduced
- Air pressure outside the lungs moves from high to low and is drawn in



Exhalation



- Diaphragm and intercostal relax
- Diaphragm returns to dome shape
- Lung size reduces and air pressure inside is increased
- Air pressure outside the lungs is lower and therefore air is exhaled

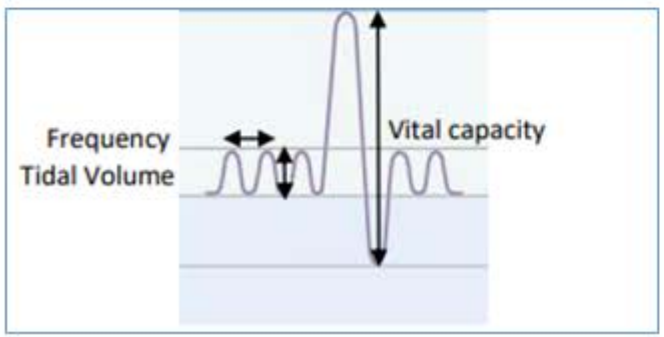
Respiratory Values

Tidal Volume – the amount of air inhaled and exhaled per breath Resting value = 500ml

Vital Capacity- The maximum amount of air exhaled following a maximal breath in.

Frequency – The number of breaths taken per minute. Resting value – 12-20 breaths

Minute Ventilation – The amount of air inhaled and exhaled per minute. Measured in litres.



Composition of inhaled and exhaled air

Gas	Inhaled air	Exhaled air
Oxygen	21%	16%
Carbon dioxide	0.04%	4%
Nitrogen	78%	78%

Gaseous exchange at the alveoli

- Diffusion is the movement of molecules from an area of high concentration to a low one.
- The alveoli have thin moist walls to allow diffusion to occur.
- Capillaries are closely wrapped around the alveoli to reduce the distance of diffusion and increase efficiency.

During inhalation:

- The concentration of oxygen is air is higher than the alveoli.
- The concentration of carbon dioxide in the blood is higher than that in the air.

During exercise : Gaseous exchange increases as the intensity of the activity increases to cope with:

- An increase demand for oxygen at working muscles
- An increase in carbon dioxide production and the need to rid this waste product.

Frequency ⬆ + Tidal Volume ⬆

Training increases total lung capacity and vital capacity readings.

TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 1.4.1/2/3/4/5 : SHORT/LONG TERM EFFECTS OF EXERCISE

Key Terms

Stroke Volume- Volume of blood pumped by heart per beat

Cardiac Output- Volume of blood pumped by the hear each minute

Tidal Volume – Volume of air inhaled per breath at rest

Vital Capacity - The greatest volume of air that can be expelled from the lungs after taking the deepest possible breath.

Capillarisation- process where new capillaries are formed. Takes place at the alveoli or skeletal muscle and increases oxygen transportation.

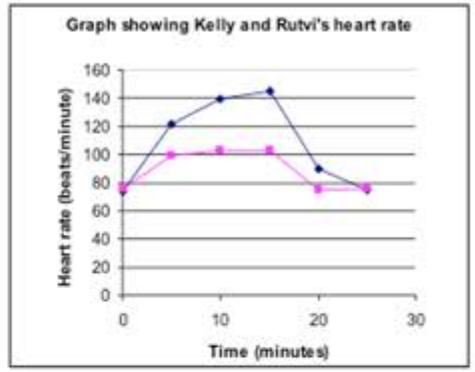
Short Term Effects - Immediately as you begin exercising!

Long Term Effects- Adaptations to the body after sustained consistent exercise

You should also be able to:

- Interpret graphical representations of heart rate, stroke volume and cardiac output values at rest and during exercise.
- TOP TIP! - Look at the differences in the numbers between resting & exercise

REMEMBER!
Cardiac Output (CO) = Heart Rate (HR) x Stroke Volume (SV)



What are the short term effects of exercise…?

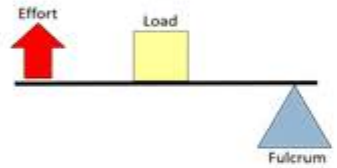
Body System	Short term effects of exercise
Cardiovascular system	Increase in stroke volume (SV); increase in heart rate (HR); increase in cardiac output (Q); increase in blood pressure (BP); redistribution of blood flow
Respiratory system	Increase in breathing rate (BR); increase in tidal volume (TV); increase in minute ventilation (VE)
Cardio- respiratory system	Increase in oxygen uptake and transport to the working muscles Increase in carbon dioxide (Co2) removal
Energy system	Increase in lactic acid (lactate) production
Muscular system	Increase in temperature of muscles; increased pliability (elasticity); muscle fatigue

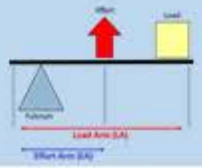
What are the long term effects of exercise then…?

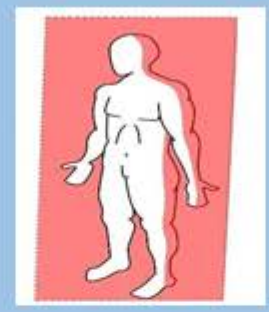
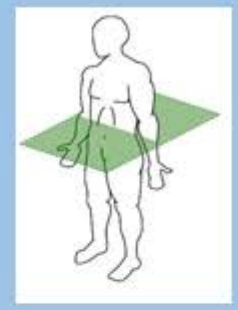
Body System	Long term effects of exercise	Type of Training
Cardiovascular system	Cardiac hypertrophy; increased stroke volume (SV) at rest and during exercise; decrease in resting heart rate (HR); increase in cardiac output (Q); capillarisation at the lungs and muscles; increase in number of red blood cells	Aerobic
Respiratory system	Increased vital capacity; increase in minute ventilation (VE); increase in tidal volume (TV); decrease in breathing rate (BR); increased number of functioning alveoli; increased strength of the respiratory muscles (internal and external intercostals and diaphragm)	Aerobic
Energy system	Increased production of energy from the aerobic energy system; increased tolerance to lactic acid	Aerobic; Anaerobic
Muscular system	Muscle hypertrophy; increased strength of tendons; increased strength of ligaments	Resistance
Skeletal system	Increase in bone density	Resistance

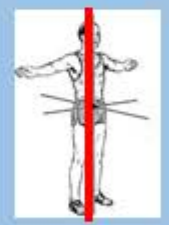
TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 2.1: MOVEMENT ANALYSIS

Fulcrum (F)	Load (L)	Effort (E)
A fixed pivot point 	The weight/resistance to be moved 	The source of energy that will be applied 

Classes of lever	Drawing	Example		
First class lever:			F	1st
Second class lever:			L	2nd
Third class lever:			E	3rd

Mechanical Advantage	Mechanical Disadvantage
This is where a lever's **effort arm** is greater than its **load arm**. Large loads can be moved with limited effort.	This is were a lever's **load arm** is longer than its **effort arm**. Can only move light loads, but can be done at speed.
 	 

Frontal plane	Transverse plane	Sagittal plane
A vertical plane divides the body into **front** and **back.**	A horizontal plane divides the body into **upper** and **lower** halves.	A vertical plane divides the body into **right** and **left.**
		

Sagittal plane	Vertical plane	Frontal plane
Runs through the body horizontally from the **back** to **front.**	Runs through the body vertically from the **top** to **bottom.**	Runs through the body horizontally from **left** to **right.**
		
Example: Cartwheel	Example: Full twist	Example: Somersault
		

TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 3.2.1/2/3 COMPONENTS OF FITNESS

REMEMBER!

Within sports, a combination of components of fitness is required, but not necessarily all at once or in equal amounts. Marathon runners do not require muscular strength but do need muscular endurance. Good flexibility within their lower body will help improve their stride length. They will also probably have a slim body composition, the main and essential feature is a high level of cardiovascular fitness to enable them to keep running for a long period of time.

Components of Fitness

A person is considered to be physically fit if they are able to carry out all of their daily tasks easily and without becoming fatigued. However, being 'fit for sport' requires a much higher level of fitness than that needed for activities such as walking the dog or gardening.

What Fitness tests are relevant to each component of fitness?

Component of Fitness	Relevant Fitness test
Cardiovascular Fitness	12 Minute Cooper Run
Muscular Strength	One rep max test. (bench press, squats, deadlift)
Muscular Endurance	Sit up bleep test, Press up bleep test
Flexibility	Sit and reach test
Body Composition	Skin fold callipers

How would you define each Component of Fitness and the sports that it is associated with?

Component of Fitness	Definition	Sports linked
Cardiovascular Fitness	The ability of the heart and lungs to supply oxygen to the working muscles	Long distance running, aerobics, swimming
Muscular Strength	The ability of a muscle group to develop maximal contractile force against a resistance in a single contraction	Sprint starts, Powerlifting, throwing of a shot putt
Muscular Endurance	The ability of a muscle group to exert submaximal force for extended periods.	Cycling, Rowing, Swimming, Football, Rugby
Flexibility	The quality of bending easily without breaking	Gymnastics, Dance, Tennis
Body Composition	The percentages of fat, bone, water and muscle in the human body.	Bodybuilding, Rugby, Football

TURTON SCHOOL YEAR 10 PE KNOWLEDGE ORGANISER – TOPIC 3.2.5 – FITNESS TESTING

Whatever your sport, fitness is key to success. Different sports require different types of fitness and will have completely different training programmes. You can use a single fitness test or a number of fitness tests to measure and assess your current fitness level in a specific area. You can compare your results to other athletes or against the standards for your gender and age groups in national scoring tables.

Cooper 12-Minute Run Test

Tests cardiovascular fitness and estimates VO2 max.

What do I do? – Run for 12 minutes and measure the distance you have covered. Calculate your score against national data.

Re-Test – Use the same course

Harvard Step Test

Tests cardiovascular endurance .

Step on and off the box. Measure recovery heart rate.

The quicker you recover the fitter you are.

Hand Grip Test

Tests muscular strength.

Use the hand grip dynamometer. With your strongest hand, squeeze as tightly as possible

One Minute Press-Up Test

Tests muscular endurance.

See how many full press-ups you can do in 1 minute. Record how many you do.

30 Meter Sprint Test

Tests speed.

Work with a partner. Mark out 30m distance. When your partner signals you to run, run as fast as you can while they record your time.

Sit and Reach Test

Test flexibility of the hamstrings and lower back.

Use a standard sit and reach box. With your feet flat reach as far as you can.