Long Term Effects of Exercise

Cardiovascular System		A
Effect	**Description**	**Functional effect**
Cardiac hypertrophy	The cardiac muscle of the heart becomes bigger and stronger	This means that the heart can pump more blood with less effort increasing the amount of blood being distributed throughout the body.
Resting heart rate decreases	The heart rate at rest becomes lower	As the heart is stronger it can expel more blood in one beat therefore does not need to beat as often as an untrained heart
Resting stroke volume and cardiac output increases	More blood is pumped out of the heart during rest than previously	As the heart is bigger and stronger it means more blood can enter the heart and be expelled than before, this contributes to the lower resting heart rate
Increase in capillarisation	More capillaries are formed in the body	This means there is a greater surface area for gaseous to exchange to occur meaning more O_2 can enter the blood vessel and more CO_2 can exit the blood vessel
Decrease chance of cardiac heart disease	With regular exercise the chance of developing cardiac heart disease decreases	As the heart and blood vessels are being used more regularly it means that they stay healthy and do not become blocked or reduce their elasticity. This contributes to healthy heart.

Respiratory System		A
Effect	**Description**	**Functional Effect**
Increased aerobic capacity	The ability of the heart and lungs to supply the muscles with oxygen	This increasing means that athletes can exercise for longer or at a higher intensity without fatiguing as they can provide the muscles with enough oxygen to create energy.
Increased strength of respiratory muscles	As the respiratory muscles are used more frequently they become stronger	This means that more air can be drawn into the performer's lungs with less effort. This leads to increased breathing rate, tidal volume and minute volume.
Increased breathing rate, tidal volume and minute volume	The amount of breaths and volume of air we inspire and expire increases	More O_2 is able to enter the respiratory system whilst more CO_2 is able to leave the respiratory system at a faster rate.
Increase surface area of alveoli	The alveoli increase their surface area	This means that there is a greater area for gaseous exchange to occur increasing the body's ability to take in 0_2 and release CO_2
Decrease in lung disease	The lungs remain healthy for longer	As the lungs are being used more they remain healthy and reduce the chance of developing diseases.

Muscular System		B
Effect	**Description**	**Explanation**
Muscular hypertrophy	Muscles can be become bigger, stronger and increase endurance	As muscles are trained they become stronger being able to exert more force as well as increasing their endurance meaning they can contract repeatedly for a longer period of time without fatiguing.
Resistance to fatigue	Muscles can contract and relax for longer without tiring	This means that a performer can exercise for a longer period of time at a higher intensity without slowing down or decreasing performance
Increased flexibility	Muscles, tendons and ligaments become more pliable with training	As muscles are used more regularly they become less rigid increasing to flexibility at the joints increasing.
Increase rate of recovery	Muscles are quicker at replenishing their energy stores and removing waste products	This means that they are able to work at a higher rate over repeated exercises without fatiguing.
Increase in mitochondria	Size and density of mitochondria in the muscle increases	Mitochondria is where energy is created, increasd stores means more energy can be created to keep the performer exercising for longer
Reduce injury	As the muscle is used to a greater level of stress the chance of injury reduces	This means the performer can compete at a high level without the risk of injury, it leads to greater amounts of training leading to further adaptations.
Increased tolerance and capacity to remove lactic acid	The muscle is able to get rid of waste products at a faster rate than a non-trained performer and can also perform with higher levels of lactate in the muscle	The performer can work at higher intensities for longer without feeling pain or discomfort.