

Topic Area 5: The use of technology in sport

5.1 The role of technology in sport

To enhance performance:

Equipment	
Tennis rackets 	Tennis rackets have moved on considerably since wooden rackets, tennis rackets are now made from carbon composites such as graphite. This comes with many advantages for performance such as: - Carbon composite rackets can be easily designed to create a bigger sweet spot to hit the ball faster with greater accuracy - Rackets can be weighted to suit playing styles - Carbon rackets are less likely to break and are immune to changes in humidity and temperature
Golf clubs 	Golf clubs have evolved from wooden clubs to modern materials such as graphite and carbon. Modern clubs improve a golfer's control of the ball and can generate more distance. The new TaylorMade driver has twist face technology that promotes a straight drive regardless of where you hit the ball on the club face.
Balls 	Technology has made significant changes to the football. Many years ago, the football was made from bladder and was surrounded by a stitched leather casing, modern day footballs are made from a synthetic material that meet governing body specifications: - Balls have an accurate and fast in flight, making it easier to control and curve the ball - They are waterproof and keep their shape
Bikes 	Subtle changes in technology have improved performance: - Tires are tubeless and have a mix of solvent and latex which will seal any small punctures. - Frames are made of carbon fibre which is much lighter than steel or aluminium. - Brakes allow you to stop quickly allowing more control over the bike. Disc brakes are not affected by the rim which can wear brake pads unevenly
Clothing	
Breathable fabrics 	Technology has allowed clothing to be light and breathable which allows heat and sweat to be evaporated efficiently this can help prevent dehydration and overheating. Adidas have the Clima-Cool range and Nike a Dri-Fit range.
Compression garments 	Many sports stars wear compression garments, they have a high lycra content that clings to the skin. Compression garments can help oxygen delivery to the muscles and the removal of lactic acid. This can help reduce swelling in the muscles, preventing the delayed onset of muscle soreness and aiding recovery
Swimsuits 	Swimsuits and swim caps are designed to reduce drag in the water. This will allow the body to travel through the water more easily allowing the performer to get a faster time. However, some full-length hi-tech swimsuits have been banned from competition
Trainers 	Technology has allowed trainers to improve performance. Trainers are now lighter and have soles that absorb shock and can return the energy so the performer can run quicker. The new Nike alpha-fly has carbon plates and airbags in the sole which reduces the amount of energy lost when running. Although they are currently banned, they allowed Kipchoge to run a marathon in under 2 hours.
Recovery and rehabilitation	
	Technology can reduce the time it takes for athletes to recover from training or injury, preventing a loss of fitness. Cryosauna: is a very cold sauna that reaches very low temperatures (-200°C) this allows the muscles to recover quicker and avoid inflammation. Hypoxic Chambers: Contains a higher level of oxygen than normal allowing injuries to heal quickly Foam Rollers: help release the tension of muscles and relieve muscle soreness and improve flexibility

Accessibility	
Access 	Sport is now accessible to a wide range of performers, as a result performance has increased. For disabled athletes, wheelchairs and now lighter and more agile which improves performance in sports such as rugby and basketball, technology has also allowed prosthetics to replace missing limbs, Blades have allowed athletes to run much quicker
Increase safety of performers	
Helmets 	Helmets are worn by performers in sports such as horse riding, ice hockey, cycling and skiing. Helmets are designed to prevent injuries such as concussion. Technology has provided shock absorbing material that help prevent damage to the brain.
Gloves 	Gloves are worn by performers in sports such as Cricket, golf, ice hockey, boxing and cycling they have various functions such as protection in cycling and boxing and to prevent injuries such as blisters in golf and provide grip for a goalkeeper in football
Headguard 	Head guards are worn in sports such as boxing, they help prevent injuries to the brain such as concussion. Shinpads are also used to prevent injury to the lower leg they are used in sports such as football and hockey.
Gumshield 	A gumshield prevents injury to the teeth, they are used in many contact sports such as rugby and boxing. Gum shields can be fitted professionally by a dentist to provide maximum protection
Formula 1 	Formula one cars travel at very fast speeds if they are in an accident there is a increased chance of being seriously injured. Technology has been used to ensure the drivers are as safe as possible. Technology such as the halo has made the sport safer by protecting the driver.
Increase fair play & increase the accuracy of officiating	
Video ref 	Video referees are used in the sports such as football and rugby. If the match referee is unsure of the decision, they can ask the video referee to look at the incident to get the correct decision.
Hawk-eye 	Hawk-Eye is a computer system used in numerous sports Such as cricket, tennis, and football, to visually track the trajectory of the ball. It is used in tennis and football to correctly identify if the ball is in or out.
Hot-spot 	Hot Spot is an infrared imaging system used in cricket to determine whether the ball has struck the batsman, bat or pad. This allows umpires to make correct decisions
To enhance spectatorship	
See all the action 	Video replay: Video cameras at games have allowed spectators to watch replays from various different angles. Modern TV's: allow you to pause and rewind so you do not miss any part of the match or game. Multiscreen: allows spectators to watch more than one game at the same time. Stadiums: Technology has allowed spectators to see the whole game without any structural obstructions
Decision making 	Technology can allow the spectator to feel more part of the decision making aspect of the game. Officials usually have microphones. In some sports such as rugby you can hear the communication between the various match officials. You can also see the decision being made on the big screen
Scores and information 	Technology has improved fan base such as: - Statistics - Post-match analysis - Graphics - Internet - mobile apps - Easier purchasing of tickets

5.2 Positive and negative effects of the use of technology in sport

Positive effects of technology in sport:

Enhanced performance: Technology through training aids, equipment and clothing enhances performance, this makes the spectators get an improved performance to watch. Over the years athletes have run thrown and jumped further than ever before. 	
Lower risk of injury: Technology is used to make performers safe and therefore, reduce the risk of injury. This can be seen in many sports such as gum shields, shin pads and helmets. You are more likely to injury your teeth if you do not wear a gum shield. 	
Quicker recovery from injury: Technology can reduce the time it takes for athletes to recover from training or injury, preventing a loss of fitness such as: - Cryosauna - Hydrotherapy - Physiotherapy - Acupuncture - Electromagnetic therapy 	
More accurate decisions: If decisions are more accurate in games there is less controversy and performers/teams win on merit. There have been many football matches in the past that goals would have been disallowed 	
Technical analysis: Technical analysis highlights any errors in performance such as video analysis of a golf swing. Technical analysis can also monitor technique and exertion to improve performance and reduce the chance of injury 	

Negative effects of technology in sport:

Unequal access: Not all performers have access to technology this allows some performers to gain an advantage over others. There is a only a couple of indoor ski centres in the country 	
Increased cost and availability: Technology can be very expensive or may not be available. Not all performers can afford the latest technology, these leaves them at a disadvantage. For example, a cryosauna chamber that aids recovery can cost £180 000. 	
Decisions influenced by technology: Referees may rely on technology too much. Instead of making an easy decision they may go technology instead. Technology may not interpret the rules correctly. This has been seen in VAR who changed the way offside was determined. 	
Potential reduction in the flow of the game: Technology can alter the flow the game is played. The introduction of VAR in football has delayed and disrupted the flow of the game as it can take minutes to make a decision. 	

Positive and negative effects of sports technology on the spectator experience

Stadiums: Technology has allowed spectators to see the whole Game without any structural obstructions. This has been possible by using new materials such as steel. 	Changing the nature of the sport: Some people think technology such as VAR and Hot-spot has spoilt the tradition of the sport and think the referee should make decisions without the use of technology. 
Fairness: Technology such as VAR, Hot-spot, HawkEye allows the correct decision to be made. Before technology they may think that performers or officials have acted unfairly. 	Holds up play: Although technology gets the correct decision it can take a long time. The video referee in football and rugby delays the flow of the game. It can take several minutes to make a decision. 
24/7 coverage: Spectators can now watch, listen or learn about the sport or athletes at any time through apps, internet and social media. 	Deteriorate skills: Skills may deteriorate due to an over reliance on technology. Spectators would rather watch performers with natural talent rather than them relying on technology. 
Referee/player cam: Some sports such as rugby even allow you to watch the game from the referee perspective. Player cam also allows you to follow and track individual players movements. 	Lessens the excitement: Before technology when a goal was score in a football match the spectators would celebrate. Now they may feel less excited as the goal may be disallowed through technology. This can take excitement away from the game. 