RAYNES
PARK SIXTH FORM

Knowledge-based project Sport and Exercise Science

SPORT AND
EXERCISE SCIENCE

Researching Sport and Exercise Science

Sports science is the study of how the healthy human body works during exercise and how sport and physical activity promote health, physically, mentally and socially.

Sport science is a relatively new academic discipline, but one that is taken extremely seriously and which has received serious funding. Advances in technology and medicine are breaking ground every day.

Sports scientists are a profession in high demand - the job market is very good. As technology evolves and the need for athletes to get any extra edge becomes more acute, your skills will be valued.to maximise sports performance and improve general health and wellbeing through exercise.

Watch this brief video to get a quick understanding of the importance of sport science:

https://youtu.be/IRGq-N0gdbs

This knowledge-based project invites you to research and consider a variety of aspects involved in Sport and Exercise Science.

SPORT AND EXERCISE SCIENCE

Topics Tracker

Topic focus	Completed [tick when complete]	Further comments [ideas, questions, opinions]
Anatomy and physiology		
Fitness testing		
Sport Nutrition		
Sport psychology		
Coaching for Performance		
Sports Injuries		

Anatomy and Physiology

Having an understanding of body systems is imperative in the sports industry so that professionals can help support people who are taking part in sport and exercise. The human body is made up of many different systems that interrelate to allow us to take part in a huge variety of sport and exercise activities. For example, an athlete can go from rest to sprinting in a matter of seconds, whereas an endurance athlete can continue exercising for many hours at a time.

In order to appreciate how each of these systems use in sport and exercise, you will use the internet to find out about the **function and structure** of each of the following:

- the skeletal system
- Muscular system
- Cardiovascular system
- Respiratory system
- energy systems

For each one use the questions on the following pages to form the answers required.

Useful links:

https://www.youtube.com/watch?v=LReJG7PrXFY
https://www.youtube.com/watch?v=E4RjzRzKafk
https://www.youtube.com/watch?v=__ZwQ7J9v2c
https://www.youtube.com/watch?v=Et5St6Qt2b0
https://www.youtube.com/watch?v=_RKe8gBvJ_M
https://www.youtube.com/watch?v=TBDSpOnzFAo

The Skeletal System

1. The functions of the skeletal system
2. Types of bones and their main function
3. Types of synovial joints

Muscular System

1. The functions of the muscular system
2. Types of muscles and their main function
3. Types of muscles contractions

Cardiovascular system

1. The functions of the Cardiovascular system
2. The control of the cardiac cycle and how it changes during exercise

Respiratory system

1. The functions of the Respiratory system
2. The different lung volumes
3. How breathing rate is controlled in response to exercise

Energy Systems

1. The role of ATP in exercise
2. The role of the ATP-PC system in energy production for exercise
3. The role of the lactate system in energy production for exercise

Anatomy and Physiology reflections

Something I have found interesting	Questions I have about anatomy and physiology
Something that I would like to further investigate	Personal skills I have utilised

Fitness testing

It is essential that sport performers regularly participate in fitness tests to determine their baseline measures. These fitness test results are then used to identify strengths and areas for improvement. You will explore the principles of fitness testing and examine the factors affecting the selection and administration of tests, including validity, reliability and suitability of tests.

Watch the video clip on YouTube:

https://www.youtube.com/watch?v=Qb-1hMw3spo

Make notes on what you understand about reliability, validity and practicality of fitness testing.

Fitness testing

Answer the following questions on Fitness testing:

1. What does validity mean in the application to fitness testing.
2. What does reliability means in the application to fitness testing.
3. There are different methods of ensuring reliability, describe each one and give an example:
   - calibration of the equipment
   - warm-up
   - fitness test technique practice
   - skill level of the administrator
   - adherence to test protocol

4. Describe the protocol for each of the following test. How will you ensure it is reliable and valid?
   - Flexibility –shoulder flex test
   - Strength – 1RM tests
   - Aerobic endurance maximal oxygen consumption test (VO2 max).

Useful websites:

https://www.brianmac.co.uk/eval.htm

https://www.topendsports.com/testing/

Fitness testing - response

Fitness testing - response

Fitness testing reflections

Something I have found interesting	Questions I have about fitness testing
Areas of fitness testing that I would like to further investigate	Personal skills I have utilised

Sport Nutrition

Sports nutrition plays a key role in optimising the beneficial effects of physical activity, whether you're a bodybuilder, professional athlete in training or exercising to improve your mental and physical health.

Making informed decisions with your nutrition and hydration can result in improved performance, injury prevention and quicker recovery but it's difficult to know where to start with so much conflicting information readily available.

Use the internet to research the task below, describe each of the following in as much detail as possible:

1. What is a balanced diet (eatwell plate)
2. What are benefits of a healthy diet?
3. Describe each of the Macronutrients (carbohydrates, fats, protein), and sources of food for each one.
4. Describe each of Micronutrients (vitamins A, B, C and D, minerals calcium, iron), and sources of food for each one.
5. Hydration (requirements of fluid intake).
6. The effects on performance of dehydration and hyperhydration and the signs and symptoms of each.

Useful links:

https://www.nhs.uk/live-well/eat-well/the-eatwell-guide/

https://www.gov.uk/government/publications/the-eatwell-guide

https://www.nutrition.org.uk/healthyliving/basics/exploring-nutrients.html

Sport Nutrition - Response

Sport Nutrition - Response

Sport nutrition reflections

Something I have found interesting	Questions I have about sport nutrition
Areas of Sport nutrition that I would like to further investigate	Personal skills I have utilised

Sport Psychology

At the highest level in sport, success is often down to small margins and performers are always looking for ways to gain an edge over their opponents. You will look at individual psychological factors that can influence performance, the psychological aspects of environments that sports are played in and the influences that others can have on performance.

Watch the video clip on YouTube:

https://www.youtube.com/watch?v=yG7v4y_xwzQ

Make notes on what you understand about Sport psychology and sport performance.

Sport Psychology

Research using the internet, sport psychology and complete the following tasks:

1. There are two types of motivation (intrinsic and extrinsic), describe each type of motivation and give examples how they can be used to improve an athlete's performance.

2. Explain achievement motivation and how coaches can use this to improve the performance of a sports team.

3. Explain the drive theory and how this links with sports performance. Make sure you give two sporting examples.

4. Explain the Inverted U hypothesis and how this links with sports performance. Make sure you give two sporting examples.

5. Explain the Catastrophe theory and how this links with sports performance. Make sure you give two sporting examples.

Useful links:

https://courses.lumenlearning.com/boundless-psychology/chapter/theories-of-motivation/

https://www.youtube.com/watch?v=mkllc7U_KZ8

Sport Psychology - Response

Sport Psychology - Response

Sport Psychology reflections

Something I have found interesting	Questions I have about Sport psychology
Areas of sport psychology that I would like to further investigate	Personal skills I have utilised

Sports Coaching

Sport participation is increasing in the UK and so there is a demand for sports coaches who can develop the techniques and performance of athletes. National Governing Bodies (NGBs) in sport are pursuing international and major competition success. This requires athletes at all levels of the performance pathway to be guided to correctly develop the techniques that can be built on and refined to produce elite performers. This task will develop your knowledge of the key skills and qualities needed by a sports coach to improve performance.

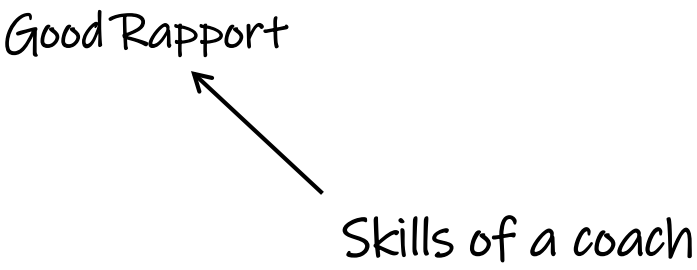
Sports coaching

Research the **skills** and **qualities** of a sport coaching and complete the mind map below. Put down as many skills as you can. An example has been done for you, to get you started.

Useful link:

https://www.ukcoaching.org/resources/topics/guides/skills-and-qualities-of-a-coach

https://www.brianmac.co.uk/coachsr.htm



Sports Coaching

Now create a poster to highlight the key skills and qualities needed to be a successful coach. Give as much explanation and examples as possible.

Sports coaching reflections

Something I have found interesting	Questions I have about Sports coaching
Areas of coaching that I would like to further investigate	Personal skills I have utilised

Sports Injuries

For all personnel involved in any aspect of sport and leisure activities, an understanding of sports injuries and their symptoms is essential in order to ensure appropriate treatment is administered in the event of an injury.

Complete the following tasks:

1. What is an acute injury?
2. Give a full description for each of the following injuries:
   - Bone fracture
   - Joint dislocation
   - Ligament sprain/tear
   - Muscles strain/tear
3. What is an overuse injury?
4. Give a full description for each of the following injuries:
   - stress fracture
   - osteoarthritis.
   - Tendinitis
   - Callus.
5. When a first aider treats an injury two main methods are used:
   - P.R.I.C.E.D.
   - S.A.L.T.A.P.S.

   What do these acronyms stand for? Explain each procedure.

Useful link:

https://www.sportsinjuryclinic.net/

Sports Injuries - response

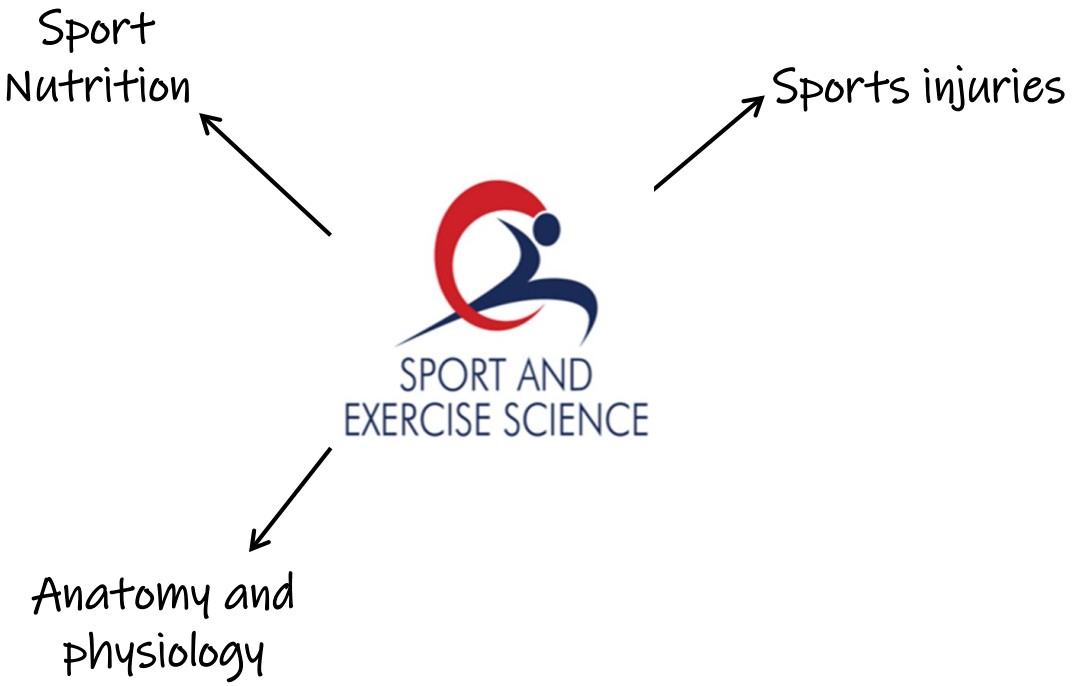
Sports Injuries - response

Sports injures reflections

Something I have found interesting	Questions I have about Sports injuries
Areas of sports injuries that I would like to further investigate	Personal skills I have utilised

What have you learnt?

Mind-map what you have learned about Sport and exercise science[themes, perspectives, key words, research evidence]



Final Reflections

Questions I have about Sport and exercise science	Areas that I would like to further investigate
Research that interested me the most	Personal skills I have utilised throughout this project

Submitting research

Congratulations!

You have completed this research project!

You need to submit your project during our first lesson in September or email to Mr Sanderson: jsanderson@raynespark.merton.sch.uk

SPORT AND EXERCISE SCIENCE