St Dominic's Sixth Form College

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A Level Physical Education Transition Work 2025-26

The work that you have been set to complete over the summer has been purposely designed to ensure retention of prior knowledge (or help bridge some of the gaps if you haven't done GCSE PE) and to allow for preparation of the challenges of A Level PE. By completing these tasks, you will be well prepared to start the A Level in PE and will have looked at key content relevant to the course.

Task 1- Seneca Learning

Approximate completion time: 170-280 minutes

You have been set an assignment on Seneca learning that you need to complete before the **26th of August 2025 by 3pm**. This is to revise and consolidate some of the work that you may have covered at GCSE. It will help you be ready for the A level content.

Many of you will have used Seneca learning for your GCSE work. Click on the following link:

https://app.senecalearning.com/dashboard/class/tbf5d0udwu/assignments/assignment/31ff6b41-23ca-4e9a-a1c4-da898970bbe7

If you already have an account, you can join the class with the code: **tbf5d0udwu**

Otherwise, you will be asked to create an account, which you can do using your personal email. The assignment can be started and come back to at different times, so you don't need to do it all in one go.

You can also scan the QR code below with your phone to take you to the assignment:

Task 2-Flipped Learning

Approximate completion time: 30-45 minutes

Due to the vast amount of content on the A Level in Physical Education, before each lesson, you will need to pre-read/learn the information for the next lesson, so that we can focus on applying and evaluating that knowledge in class, rather than having to start with learning the knowledge. With this in mind, you will need to read the following four pages of information and make concise revision notes, either by hand or on the computer (whatever works best for you). The revision notes can be in the form of flashcards, spider-diagrams, or another method that works for you. You will hand this into me during our first workshop lesson.

The impact of physical activity on stroke volume, heart rate and cardiac output

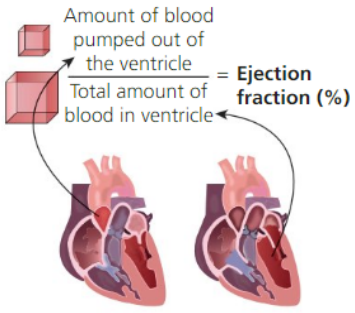
During exercise, the need to transport more oxygen to the working muscles means the heart has to work harder. This means that more blood is pumped around the body and faster. Measurements such as **stroke volume**, heart rate and cardiac output all have to change as a result.

Stroke volume

This is the volume of blood pumped out by the heart ventricles in each contraction. On average, the resting stroke volume is approximately 70ml.

Stroke volume depends upon the following:

- Venous return: this is the volume of blood returning to the heart via the veins. If venous return increases, then stroke volume will also increase. (If more blood enters the heart, then more blood goes out!)
- The elasticity of cardiac fibres: this is concerned with the degree of stretch of cardiac tissue during the **diastole phase** of the cardiac cycle. The more the cardiac fibres can stretch, the greater the force of contraction will be. A greater force of contraction can increase the **ejection fraction**. This is called Starling's Law.



$$\text{Ejection fraction} = \frac{\text{stroke volume}}{\text{end diastolic volume (volume of blood in the ventricles at rest)}}$$

Figure 3 The ejection fraction

- The contractility of cardiac tissue (myocardium): the greater the contractility of cardiac tissue, the greater the force of contraction. This results in an increase in stroke volume. It is also highlighted by an increase in the ejection fraction. This refers to the percentage of blood pumped out by the left ventricle per beat. An average value is 60 per cent, but it can increase by up to 85 per cent following a period of training.

Diastole phase: When the heart relaxes to fill with blood.

Ejection fraction: The percentage of blood pumped out by the left ventricle per beat.

Heart rate

This is the number of times the heart beats per minute. On average, the resting heart rate is approximately 72 beats per minute.

Cardiac output

KEY TERM

Cardiac output: The volume of blood pumped out by the heart ventricles per minute.

Cardiac output is the volume of blood pumped out by the heart ventricles per minute. It is equal to stroke volume multiplied by heart rate.

Cardiac output (Q) = Stroke volume (SV) × Heart rate (HR)

Q = 70 ml (see page 5) × 72

Q = 5040 ml (5.04 litres)

It can be seen from this calculation that if heart rate or stroke volume increase, then cardiac output will also increase.

Heart rate range in response to exercise

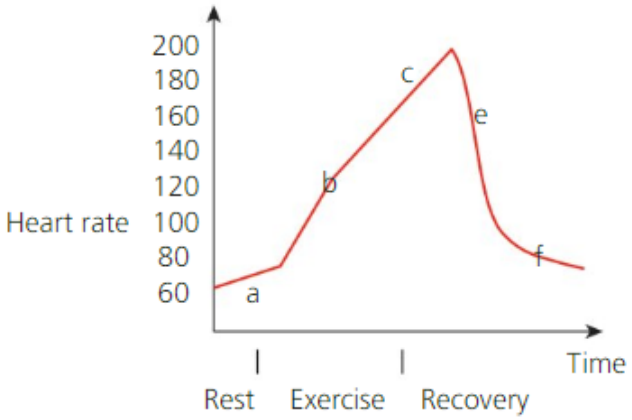
Heart rate increases with exercise but how much it increases is dependent on the intensity of the exercise. Heart rate will increase in direct proportion to exercise intensity – the higher the intensity, the higher the heart rate. Heart rate does eventually reach a maximum. Maximum heart rate can be calculated by subtracting your age from 220. An 18 year old will have a maximum heart rate of 202 beats per minute.

220 – 18 = 202

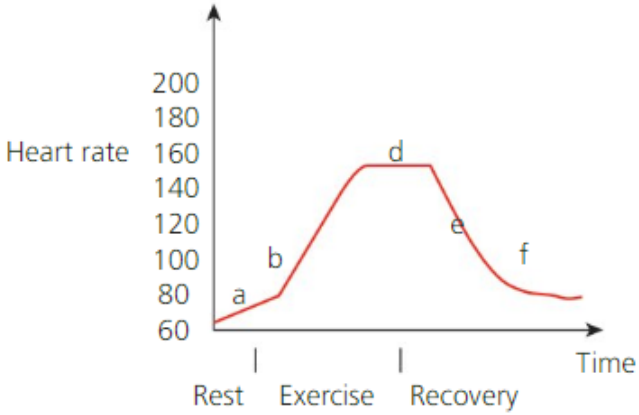
A trained performer has a greater heart rate range because their resting heart rate is lower and their maximum heart rate increases. Think of Sir Bradley Wiggins, who had a resting heart rate of 35 bpm at the peak of his cycling career, and Sir Mo Farah, who had a resting heart rate of 33 bpm at the height of his running success. These two performers will also have a higher maximum heart rate. Compare this to a 40-year-old untrained individual whose resting heart rate is 72 and their maximum heart rate is simply linked to their age, so it is 180. Their heart rate range is much lower!

The graphs opposite illustrate what happens to heart rate during maximal exercise such as sprinting and sub-maximal exercise such as jogging.

Maximal exercise



Submaximal exercise



a = *Anticipatory rise* due to hormonal action of adrenaline which causes the SAN to increase heart rate

b = *Sharp rise in* heart rate due mainly to anaerobic work

c = Heart rate continues to rise due to maximal workloads stressing the anaerobic systems

d = *Steady state* as the athlete is able to meet the oxygen demand with the oxygen supply

e = *Rapid decline* in heart rate as soon as the exercise stops

f = *Slower recovery* as body systems return to resting levels. Heart rate needs to remain elevated to rid the body if waste products, for example, lactic acid

Figure 4 Heart rate responses to high intensity and submaximal exercise

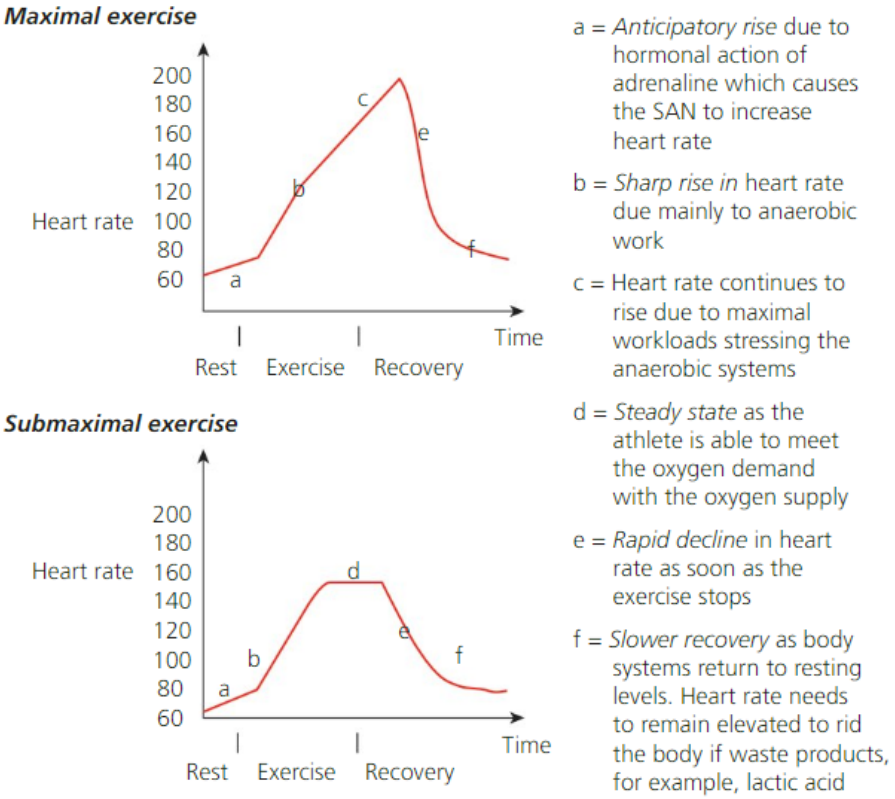


Figure 4 Heart rate responses to high intensity and submaximal exercise

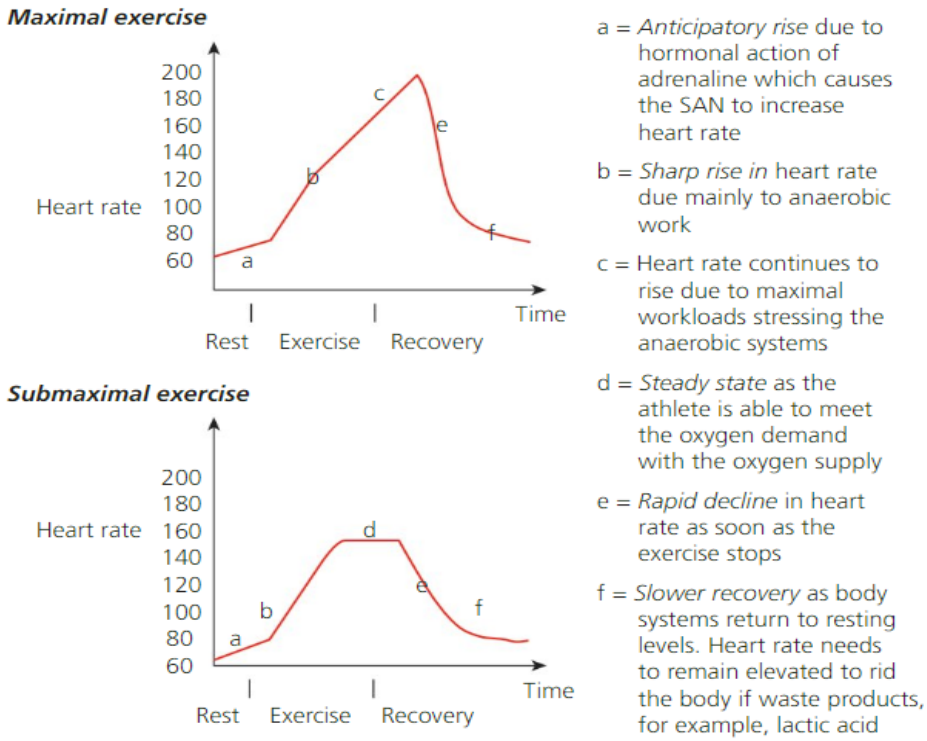


Figure 4 Heart rate responses to high intensity and submaximal exercise

Task 3-Exam Question Practice

Approximate Completion Time: 10 minutes

The key to success in all A Level subjects is interpreting what the exam question is asking you. For the final task of the transition work, you will be required to try and answer some exam questions, based on the flipped learning task you have just completed. For this task to be of any value, spend some time reviewing your revision notes that you completed in task two, and set yourself ten minutes to answer the exam questions on this and the next page. You will also bring this with you to your first workshop lesson with me.

The table below represents heart rate and stroke volume for an untrained performer as intensity of exercise increases.

Point	Heart rate (bpm)	Stroke volume (ml)
A (rest)	70	85
B	90	90
C	100	95
D	120	100

Calculate cardiac output for the untrained performer at point D in the table above.

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(Total 2 marks)

The table below represents heart rate and stroke volume for an untrained performer as intensity of exercise increases.

Point	Heart rate (bpm)	Stroke volume (ml)
A (rest)	70	85
B	90	90
C	100	95
D	120	100

Explain how **and** why the components of cardiac output differ for a **trained** performer at point **A**.

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(Total 3 marks)

Paul and Mark are both 20 years old. Paul does no exercise. Mark is a cross country runner who trains three times a week.

How would maximal cardiac output differ between Paul and Mark? Justify your answer.

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(Total 3 marks)