



PE.HW6 Health, Fitness and Wellbeing: Diet, Body Composition and Matching Nutrition to Sport

AQA 8582 · Calculators not allowed · about 50 minutes

Total Marks

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Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

1 Which of these best describes what a 'somatotype' is?

- ☐ A) A fixed target body shape that every performer in a sport should aim for
- ☐ B) One of three broad, descriptive categories used to classify general body shape
- ☐ C) A measurement of a performer's body fat percentage
- ☐ D) A method for calculating a performer's ideal training weight

(Total for Question 1 is 1 mark)

2 State the three somatotype categories and give one general physical characteristic typically associated with each.

(Total for Question 2 is 3 marks)

3 Very few people are a 'pure' example of a single somatotype.

(a) State why most people are not a pure example of a single somatotype. (2)

(b) Explain why having a particular somatotype does not, on its own, guarantee success in a sport. (2)

(Total for Question 3 is 4 marks)

- 4 State two factors, other than the sport a person plays, that can affect what is considered an appropriate 'optimum weight' for them.

(Total for Question 4 is 2 marks)

- 5 Which term describes the weight considered appropriate for a specific individual, taking into account factors such as their height, gender, bone structure and build?

- ☐ A) Somatotype
- ☐ B) Optimum weight
- ☐ C) Body mass index (BMI)
- ☐ D) Energy balance

(Total for Question 5 is 1 mark)

- 6 Explain why there is no single 'optimum weight' figure that applies to everyone.

(Total for Question 6 is 2 marks)

- 7 State the formula for BMI (body mass index), and state two limitations of using BMI to assess an individual performer's health.

(Total for Question 7 is 3 marks)

- 8 A rugby forward has a high BMI reading according to the standard BMI formula.
Explain why this single reading, on its own, is not a reliable way to judge whether this performer carries excess body fat.

(Total for Question 8 is 3 marks)

- 9** State two methods, other than BMI, that could be used to estimate a performer's body composition.

(Total for Question 9 is 2 marks)

- 10** Explain, using two contrasting named sports as examples, why body composition needs can differ between sports.

(Total for Question 10 is 2 marks)

- 11** Which statement about somatotypes and sporting performance is most accurate?

- ☐ A) Elite performers in a given sport typically show a wide range of body builds, alongside other important factors such as skill and fitness
- ☐ B) Only performers with one specific somatotype can succeed in a given sport
- ☐ C) Somatotype is a more important predictor of sporting success than skill or fitness
- ☐ D) A performer's somatotype can be changed completely through diet alone

(Total for Question 11 is 1 mark)

- 12** Discuss how the physical demands of two different named sports, for example rugby scrummaging and marathon running, can be associated with different typical physical builds among elite performers in each, and evaluate why it would be inaccurate to describe either sport as needing one single 'ideal' body type.

(Total for Question 12 is 9 marks)

13 Which somatotype category is typically associated with a narrow frame and long limbs?

- ☐ A) Ectomorph
- ☐ B) Mesomorph
- ☐ C) Endomorph
- ☐ D) None of these categories describe frame or limb length

(Total for Question 13 is 1 mark)

14 Explain why a sports scientist would be cautious about using BMI alone to compare the health of two performers from very different sports, for example a marathon runner and a shot putter.

(Total for Question 14 is 2 marks)

15 Explain why a performer's diet should generally be matched to the physical demands of their own sport and training, rather than to a fixed idea of an 'ideal' body shape.

(Total for Question 15 is 3 marks)

16 State two individual factors, other than sport or training, that can affect the physical characteristics a performer shows.

(Total for Question 16 is 2 marks)

17 Which of these is a genuine limitation of BMI, rather than a limitation of somatotype classification?

- ☐ A) It cannot distinguish between muscle mass and fat mass
- ☐ B) It only describes broad body shape rather than a numerical health measurement
- ☐ C) It groups people into three descriptive categories
- ☐ D) It exists on a spectrum with wide individual variation

(Total for Question 17 is 1 mark)

- 18** It is sometimes assumed that all successful performers in a given sport share the same body type.

Explain, using evidence of individual variation, why this assumption is inaccurate.

(Total for Question 18 is 3 marks)

- 19** A PE teacher explains to a class that 'there is no single body type that is best for sport in general'.

State whether you agree with this statement, and justify your answer using knowledge of somatotypes and different sporting demands.

(Total for Question 19 is 2 marks)

- 20** State two things a coach should consider, other than body composition alone, when assessing a performer's readiness for their sport.

(Total for Question 20 is 2 marks)

- 21** Which statement about somatotypes is correct?

- ☐ A) Most people show a blend of characteristics from more than one somatotype category
- ☐ B) Every performer fits into exactly one pure somatotype category
- ☐ C) Having a particular somatotype guarantees success in a matching sport
- ☐ D) Somatotype is calculated using the same formula as BMI

(Total for Question 21 is 1 mark)

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Question 1

- **B1 B**
- **Answer: B**

Question 2

- **B1** ectomorph: typically a narrow frame with long limbs, oe
- **B1** mesomorph: typically a more muscular, wedge-shaped frame, oe
- **B1** endomorph: typically a rounder frame with a greater tendency to store body fat, oe
- **Answer: Ectomorph: typically a narrow frame with long limbs. Mesomorph: typically a more muscular, wedge-shaped frame. Endomorph: typically a rounder frame with a greater tendency to store body fat.**

Question 3

- (a) **B1** most people show a blend or combination of characteristics from more than one category, oe
- (a) **B1** somatotype exists on a spectrum/continuum rather than as three completely separate, fixed types, oe
- (a) **Answer: Most people show a blend of characteristics from more than one somatotype category, since somatotype exists on a spectrum rather than as three completely separate, fixed types.**
- (b) **B1** sporting success depends on many other factors besides physical build, such as skill, fitness, technique and psychological factors, oe
- (b) **B1** performers with a wide range of body types have succeeded in the same sport, showing there is no single required profile, oe
- (b) **Answer: Sporting success depends on many other factors besides physical build, such as skill, fitness, technique and psychological factors, and performers with a wide range of body types have succeeded in the same sport, showing there is no single required profile.**

Question 4

- **B1** height, oe
- **B1** bone structure, gender, or muscle girth (build), oe
- **Answer: Height, and bone structure or muscle girth, are both factors that can affect what is considered an appropriate optimum weight for a person.**

Question 5

- **B1 B**
- **Answer: B**

Question 6

- **B1** optimum weight depends on individual factors such as height, gender, bone structure and muscle girth, which vary from person to person, oe
- **B1** so what is considered an appropriate weight for one individual will not necessarily be appropriate for another, oe
- **Answer: Optimum weight depends on individual factors such as height, gender, bone structure and muscle girth, which vary from person to person, so what is considered appropriate for one individual will not necessarily be appropriate for another.**

Question 7

- **B1** BMI = mass (kg) divided by [height (m)]², oe
- **B1** BMI does not distinguish between muscle mass and fat mass, so a very muscular performer can be misclassified as overweight, oe
- **B1** BMI does not show how body fat is distributed around the body, oe
- **Answer: BMI = mass (kg) / [height (m)]². Two limitations: BMI does not distinguish between muscle mass and fat mass, so a very muscular performer can be misclassified as overweight; and BMI does not show how body fat is distributed around the body.**

Question 8

- **B1** the BMI formula only uses height and total body mass, and cannot separate how much of that mass is muscle versus fat, oe
- **B1** rugby forwards typically carry a large amount of muscle mass built through strength/resistance training, which adds to body mass without being body fat, oe
- **B1** so a high BMI reading in this case is more likely to reflect high muscle mass than excess body fat, meaning BMI alone gives an incomplete picture for this performer, oe
- **Answer: The BMI formula only uses height and total body mass, and cannot separate muscle from fat. Rugby forwards typically carry a large amount of muscle mass built through strength training, which adds to body mass without being body fat. A high BMI reading in this case is therefore more likely to reflect high muscle mass than excess body fat, so BMI alone gives an incomplete picture for this performer.**

Question 9

- **B1** skinfold callipers, oe
- **B1** hydrostatic (underwater) weighing, oe
- **Answer: Skinfold callipers and hydrostatic (underwater) weighing are both methods, other than BMI, used to estimate body composition.**

Question 10

- **B1** a sport demanding an explosive, powerful contact effort, e.g. rugby scrummaging, can benefit from a build with more overall muscle mass, to generate and withstand force, oe
- **B1** a sport demanding sustained, repeated movement of the body's own weight, e.g. distance running, can benefit from a lower relative body mass to move efficiently over a long distance, oe
- **Answer: Rugby scrummaging can benefit from a build with more overall muscle mass, to generate and withstand force, while distance running can benefit from a lower relative body mass, to move the body efficiently over a long distance.**

Question 11

- **B1 A**
- **Answer: A**

Question 12

- **Level 3 (7-9):** A detailed and coherent response that accurately links the physical demands of both named sports to typical build tendencies, and reaches a well-justified evaluative judgement, supported by evidence of individual variation and other performance factors, that neither sport requires one single ideal body type. Sustained, accurate use of terminology throughout, with somatotypes and build discussed only as descriptive tendencies.
- **Level 2 (4-6):** Some accurate coverage of the demands of at least one named sport and its typical build tendency, with some evaluative comment, though coverage of both sports or the 'no single ideal type' judgement may be underdeveloped or one-sided. Generally correct use of terminology.
- **Level 1 (1-3):** Basic or generic statements about body types and sport with little or no specific application to the two named sports and little evaluation of the 'ideal body type' claim.
- **Level 0 (0):** No relevant content.
- **Indicative content:**
 - Rugby scrummaging demands generating and withstanding large forces at close quarters, which is often associated with a build carrying substantial overall muscle mass (broadly mesomorph-leaning tendencies).
 - Marathon running demands sustaining a running action, against the body's own weight, for a very long duration, which is often associated with a lighter, leaner build (broadly ectomorph-leaning tendencies) to support a favourable power-to-weight ratio.
 - These are typical tendencies observed at elite level, not requirements, since somatotype exists on a spectrum and most people show a blend of characteristics.
 - Individual variation within either sport is wide: successful performers in both rugby and marathon running have been found across a range of builds.
 - Skill, technique, fitness (e.g. specific components relevant to the sport) and psychological factors also strongly determine success, independently of build.
 - Evaluative point: because success depends on multiple factors together, and because individual variation within each sport is wide, describing either sport as needing one single 'ideal' body type overstates what typical-tendency evidence actually shows.
 - Balanced conclusion: it is more accurate to describe certain builds as commonly advantageous on average for a sport's typical demands, while recognising that no specific body type is required for an individual to succeed.

Question 13

- **B1 A**
- **Answer: A**

Question 14

- **B1** BMI cannot separate muscle mass from fat mass, so it does not directly measure health or fitness, oe
- **B1** the two performers are likely to have very different muscle mass for reasons related to their sport's demands, which BMI alone cannot explain, oe
- **Answer: BMI cannot separate muscle mass from fat mass, so it does not directly measure health or fitness, and the two performers are likely to have very different muscle mass for reasons related to their sport's demands, which BMI alone cannot explain.**

Question 15

- **B1** different sports place different physical demands on performers, e.g. differing needs for muscle mass, power, or a favourable power-to-weight ratio, oe
- **B1** diet should provide the energy and nutrients needed to fuel and recover from those specific training demands, oe
- **B1** aiming for a fixed body shape not linked to the performer's own training and sport risks providing a diet that does not actually match what their body needs to perform and recover well, oe
- **Answer: Different sports place different physical demands on performers, so diet should provide the energy and nutrients needed to fuel and recover from those specific training demands. Aiming for a fixed body shape not linked to the performer's own training and sport risks providing a diet that does not actually match what their body needs to perform and recover well.**

Question 16

- **B1** genetics/inherited body frame, oe
- **B1** growth and development (age), oe
- **Answer: Genetics (inherited body frame) and growth and development (age) can both affect a performer's physical characteristics, independently of their sport or training.**

Question 17

- **B1** A
- **Answer: A**

Question 18

- **B1** within any sport, elite performers can be found with a wide range of heights, builds and somatotype tendencies, oe
- **B1** this shows that body type alone does not determine sporting success, oe
- **B1** other factors, such as skill, technique, fitness and psychological factors, also strongly influence performance and can vary independently of body type, oe
- **Answer: Within any sport, elite performers can be found with a wide range of heights, builds and somatotype tendencies, which shows that body type alone does not determine sporting success. Other factors, such as skill, technique, fitness and psychological factors, also strongly influence performance and can vary independently of body type.**

Question 19

- **B1** agree, oe
- **B1** justification: different sports have different physical demands, so a build suited to one sport (e.g. more muscle mass for scrummaging) would not necessarily suit a very different sport (e.g. distance running), showing there is no single type best for all sport, oe
- **Answer: Agree. Different sports have different physical demands, so a build suited to one sport, such as more muscle mass for scrummaging, would not necessarily suit a very different sport, such as distance running, showing there is no single body type that is best for all sport.**

Question 20

- **B1** their skill/technical ability, oe
- **B1** their fitness levels, in the components of fitness relevant to the sport, oe
- **Answer: A coach should also consider a performer's skill/technical ability, and their fitness levels in the components relevant to the sport.**

Question 21

- **B1** A
- **Answer: A**