2025/6561
Web version of 2024/77883

Government of **Western Australia**
School Curriculum and Standards Authority

ATAR course examination, 2024

Question/Answer booklet

PHYSICAL EDUCATION STUDIES

Place one of your candidate identification labels in this box.

Ensure the label is straight and within the lines of this box.

WA student number: In figures | | | | | | | | | |

In words _____

_____

Time allowed for this paper

Reading time before commencing work: ten minutes
Working time: two and a half hours

Number of additional answer booklets used (if applicable):

Materials required/recommended for this paper

To be provided by the supervisor

This Question/Answer booklet
Multiple-choice answer sheet

To be provided by the candidate

Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

Special Items: up to three calculators, which do not have the capacity to create or store programmes or text, are permitted in this ATAR course examination

Important note to candidates

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised material. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

Structure of the examination

The Physical Education Studies ATAR course examination consists of a written component and a practical (performance) component.

Structure of this paper

Section	Number of questions available	Number of questions to be answered	Suggested working time (minutes)	Marks available	Percentage of written examination
Section One Multiple-choice	20	20	30	20	20
Section Two Short answer	7	7	70	69	50
Section Three Extended answer	4	2	50	40	30
				Total	100

Instructions to candidates

1. The rules for the conduct of the Western Australian external examinations are detailed in the *Year 12 Information Handbook 2024: Part II Examinations*. Sitting this examination implies that you agree to abide by these rules.

2. Answer the questions according to the following instructions.

   Section One: Answer all questions on the separate Multiple-choice answer sheet provided. For each question, shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. Do not use erasable or gel pens. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid/tape. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

   Section Two: Write your answers in this Question/Answer booklet preferably using a blue/black pen. Do not use erasable or gel pens. Wherever possible, confine your answers to the line spaces provided.

   Section Three: Consists of four questions. You must answer two questions. Write your answers in this Question/Answer booklet preferably using a blue/black pen. Do not use erasable or gel pens.

3. You must be careful to confine your answers to the specific questions asked and to follow any instructions that are specific to a particular question.

4. Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

See next page

Section One: Multiple-choice **20% (20 Marks)**

This section has **20** questions. Answer **all** questions on the separate Multiple-choice answer sheet provided. For each question, shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. Do not use erasable or gel pens. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid/tape. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

Suggested working time: 30 minutes.

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1. The microstructure of the muscle is made up of different components. Which **two** components are being identified by (i) and (ii)?

   (i) the contractile unit of the muscle
   (ii) the area in the contractile unit containing only the thick myosin filament

   (a) (i) sarcomere (ii) A band
   (b) (i) I band (ii) H zone
   (c) (i) I band (ii) A band
   (d) (i) sarcomere (ii) H zone

2. To help prevent dehydration during a triathlon, an athlete may be advised to follow which of the following hydration strategies?

   (a) 200 mL fluid intake every 15 minutes
   (b) hyperhydrate on the hour
   (c) 600 mL fluid intake every 20 minutes
   (d) 1.5 L fluid intake for every litre of sweat being lost

3. What is the **primary** physiological benefit of increasing levels of EPO (erythropoietin) for an athlete?

   (a) to increase red blood cell production in order to improve their oxygen-carrying capacity and endurance
   (b) to promote tissue repair and cell regeneration to assist with recovery
   (c) to activate the nervous system and increase the body's tolerance to intense exercise
   (d) to stimulate the pituitary gland in order to improve muscle growth and endurance capacity

See next page

4. Team sports often require players to 'peak' on a weekly basis. Coaches implement a series of mini tapers to ensure players are at their physical and psychological best each match day. Which of the following statements reflects an effective taper for a team player two days prior to the game?

   (a) high volume, low intensity training, with a focus on strategies and tactics
   (b) moderate volume, high intensity training and longer recovery periods
   (c) high volume, high intensity training and shorter recovery periods
   (d) moderate volume, low intensity training, with a focus on strategies and tactics

5. Which of the following statements would be the **most** accurate to describe the use of caffeine as a method of enhancing an athlete's performance? Caffeine

   (a) regulates the nervous system and optimises arousal levels.
   (b) is a diuretic and should be avoided prior to performing.
   (c) enhances endurance performance by delaying time to exhaustion.
   (d) is primarily suited to strength-based events.

6. A netball coach has identified that his goal shooter consistently does not make the ring when shooting for a goal. Which of the following statements **best** describes what the athlete should do to make the ring height?

   (a) increase the velocity and possible angle of the ball at release
   (b) flick the wrist as the ball is released
   (c) shoot the ball from the chest
   (d) use a lighter ball during game play

7. The **main** purpose of off-season is to

   (a) focus purely on skill development.
   (b) continue training regularly and taper to maintain fitness levels.
   (c) provide mental and physical rest and maintain some form of aerobic activity.
   (d) provide total rest and do nothing to improve psychological wellbeing.

8. A well-fitted wetsuit is essential to maintaining heat while diving in cold waters. The wetsuit limits continual cold-water circulation between the suit and diver's body. This minimises heat loss via

   (a) conduction.
   (b) evaporation.
   (c) radiation.
   (d) convection.

See next page

9. Understanding how muscle length impacts force production is useful when designing a weight training program to optimise functional strength. According to the force-length relationship, at which length is maximal force achieved in the muscle?

(a) at normal resting length, as the number of cross bridges formed is minimised
(b) beyond normal resting length, as the number of cross bridges formed is increased
(c) less than normal resting length, as the number of cross bridges formed is increased
(d) at normal resting length, as the number of cross bridges formed is increased

10. Athletes training and performing in cold environments experience certain physiological responses that can affect their overall performance. Which of the following statements is correct for situations in which athletes are exposed to extremely cold conditions? These conditions can

(a) cause peripheral vasodilation, leading to reduced blood flow to extremities, impacting fine motor skills.
(b) trigger shivering as a mechanism to generate heat, which may increase energy expenditure, deplete glycogen stores and lead to fatigue more quickly during exercise.
(c) result in decreased water loss due to a decrease in ventilation rates and lower humidity, potentially leading to early onset fatigue and dehydration.
(d) result in a decrease in core temperature, a decrease in submaximal VO_2 max to the working muscles and a lack of coordination through shivering.

11. The use of a hydrofoil, as shown below, has become popular in many watersports.

The hydrofoil

Which of the following statements is correct about the fluid mechanics of using a hydrofoil? The

(a) slower the board moves through the water the more it is lifted into the air.
(b) faster the board moves through the water the more it is lifted into the air.
(c) board is lifted due to water flowing around the winged hydrofoil, causing high pressure on top and low pressure below the hydrofoil.
(d) board is lifted due to water flowing around the winged hydrofoil, causing low velocity water flow on top and high velocity flow below the hydrofoil.

See next page

12. Which of the following statements below **best** describes the positive transfer of learning? When an athlete

(a) can transfer game strategies without impacting team dynamics.
(b) can transfer knowledge and skills from one activity to another, enhancing the outcome.
(c) learns a new skill that does not impact their game play.
(d) has to rely on their coach for knowledge and skills.

13. A catcher's glove used in softball and baseball is padded heavily. The reason for this is because it decreases the chance of injury to the hand by

(a) decreasing the time the force of the ball is applied to the catch.
(b) decreasing the force the glove applies to the ball during the catch.
(c) increasing the time the force of the ball is applied to the catch.
(d) increasing the force the glove applies to the ball during the catch.

14. Rami is looking to buy a tee ball bat for her seven-year old daughter. She has the option of either Bat X or Bat Y. Which bat should she purchase so that her daughter finds it easy to swing?

Bat X
Weight: 400 g
Length: 76 cm

Bat Y
Weight: 400 g
Length: 66 cm

(a) X because it has a greater moment of inertia
(b) X because it has a lower moment of inertia
(c) Y because it has a greater moment of inertia
(d) Y because it has a lower moment of inertia

15. The reason players use top spin on the ball during tennis ground shots is so that it travels

(a) high over the net and stays in the air for a long period of time before dropping slowly into court.
(b) low over the net and stays flat for a long period of time before dropping into court.
(c) high over the net and drops quickly into court.
(d) flat over the net and drops slowly into court.

16. Which of the following is **not** an accurate statement regarding best practice for peer feedback?

(a) it is best written down and given to the player at a social gathering with their peers
(b) players may feel more comfortable receiving feedback from a peer
(c) peers need to be confident and competent in giving feedback
(d) peers can provide feedback more immediately than a coach if the coach is not within close proximity of the player

See next page

Use the table below to answer Question 17.

Type of ball	Table Tennis	Marble	Cricket	Tennis	Golf
Measure of the coefficient of restitution	0.90	0.56	0.48	0.82	0.79

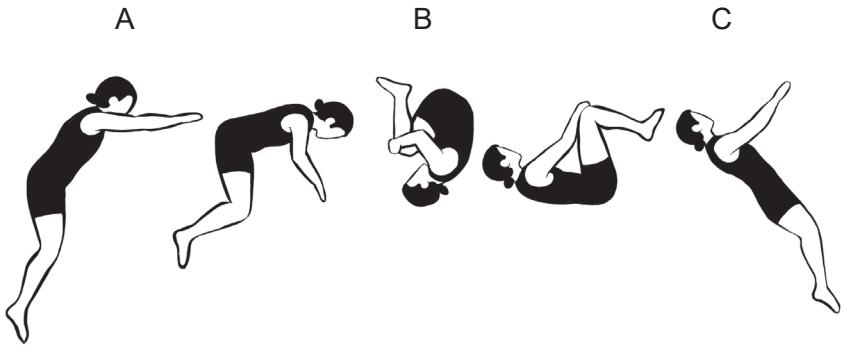
17. Which of the following statements is correct in relation to the table above? The

(a) marble is more elastic than the cricket ball, but less elastic than the tennis ball.
(b) table tennis ball is more elastic than the cricket ball, but less elastic than the golf ball.
(c) tennis ball is more elastic than the table tennis ball, but less elastic than the golf ball.
(d) golf ball is more elastic than the marble, but less elastic than the cricket ball.

18. The **best** advice a coach can give their athletes on using self-talk is

(a) that it should be said loudly to put off the opposition.
(b) that it should be both positive and negative to balance their thoughts.
(c) that it should highlight the possible things that can cause the skill to go wrong, so as to avoid doing these.
(d) to combine it with imagery to promote a better performance.

19. Referring to the diagram below, which of the following statements is correct regarding the performance of the tucked somersault? Position



(a) A has the greatest angular velocity and Position B has the greatest moment of inertia.
(b) A has the greatest moment of inertia and Position B has the greatest angular velocity.
(c) C has the greatest angular momentum and Position A has the greatest angular velocity.
(d) C has the smallest angular velocity and Position B has the greatest angular momentum.

See next page

20. Neil has been asked to coach an under-10 volleyball team. Most of the players are new to the sport. Which of the following statements **best** describes how Neil should provide the players with feedback?

(a) only focus on the errors of the players' performance and communicate these often
(b) wait until practice is over before giving feedback, so that the player is not embarrassed in front of their teammates
(c) provide feedback to the player as soon as possible, commenting on an aspect they did well followed by an aspect they need to correct
(d) comment on aspects the player did well and outline all corrections they need to implement

End of Section One

See next page

Section Two: Short answer **50% (69 Marks)**

This section has **seven** questions. Answer **all** questions. Write your answers in the spaces provided.

Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Suggested working time: 70 minutes.

Question 21 **(10 marks)**

Skeletal muscles contain three distinct layers of connective tissue.

(a) Identify and outline the **three** types of connective tissue found in skeletal muscle. (6 marks)

One: _____

_____

_____

_____

Two: _____

_____

_____

_____

Three: _____

_____

_____

_____

Question 21 (continued)

Sporting activities such as basketball, require short bursts of sprinting and jumping and sustained periods of running up and down the court.

(b) Name and explain the predominant muscle fibre type that would be most beneficial to a basketball player. (4 marks)

See next page

Question 22 **(5 marks)**

During a CrossFit training session, Meg completes 10 repetitions of slow squats, emphasising the concentric phase of the muscle contraction.

(a) With reference to the force–velocity relationship, describe a benefit of Meg slowing down the concentric phase of the squat. (2 marks)

(b) In the space provided below, draw and label a diagram that represents the relationship between the velocity of muscle contraction and force produced. (3 marks)

See next page

Question 23 **(13 marks)**

The table below shows a sample of a periodised training program for a local rugby team.

8-week periodisation program	
Meso cycle 1: weeks 1–4	**Meso cycle 2: weeks 5–8**
Goal • Increase aerobic fitness: all players to improve 1 km runs by 10% (high volume/low intensity)	Goal • Improve speed and game-specific skills: all players to improve timed 40 m sprints by 10% (reduced volume/increased intensity)
Micro cycle	**Micro cycle**
Monday • 200–400 m running with passing drills in between	Monday • Acceleration and footwork session • Passing and 2 v 1 skills • Body weight circuit to finish
Wednesday • 8 x 60 m sprints with skills between sets	Wednesday • Sprint and skills training: 4 x 20–60 m with extended rest • Passing as recovery
Friday • 8 x 60 m sprints with individual passing and tackling skills	Friday • Game development • Opposed and semi-opposed team moves, unit skills, high-intensity running with lots of rest

(a) Identify the phase of competition that is represented during meso cycle 1 in the training program above. (1 mark)

(b) Describe the process of periodisation and state **one** reason why a periodised training program is appropriate for the rugby players. (3 marks)

See next page

(c) Following meso cycle 2, one player decides to increase their training load in terms of volume and intensity. Explain why this would not be recommended at this stage of the season. (3 marks)

Inadequate recovery can often be the cause of overtraining.

(d) Apart from poor recovery strategies, suggest **two** reasons why overtraining may occur and name **two** psychological and **two** physiological symptoms of overtraining that these rugby players need to be aware of during the 8-week program. (6 marks)

Reasons for overtraining

One:

Two:

Psychological symptoms

One:

Two:

Physiological symptoms

One:

Two:

See next page

Question 24 **(6 marks)**

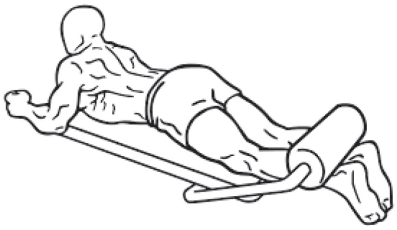


Figure 1

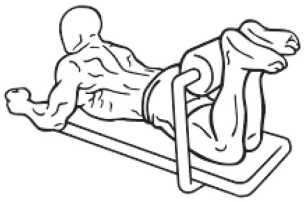


Figure 2

(a) Identify the class of lever used to move the lower legs from Figure 1 to Figure 2, shown above. (1 mark)

(b) Draw and label a diagram in the space below that shows the lever system above. (3 marks)

(c) Outline **two** ways the 'all or none' law applies to the athlete performing the lying leg curls, if they were to increase the weight lifted. (2 marks)

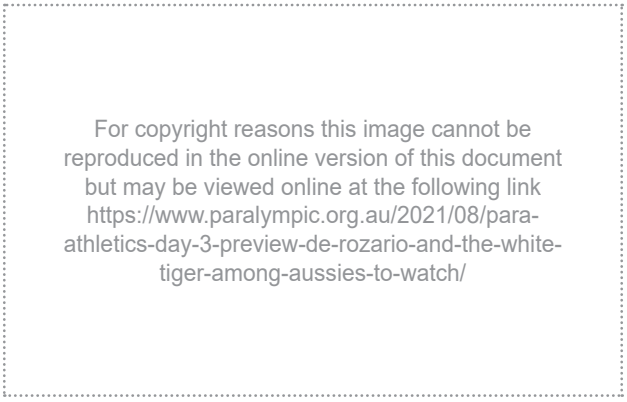
One:

Two:

See next page

Question 25 **(10 marks)**

Perth-born Madison de Rozario, is one of Australia's most decorated athletes. She specialises in wheelchair racing over middle, long and marathon distance events and has represented Australia at the World Athletics Championships and the Paralympics.



To improve her performance and increase her speed, the biomechanical principle of fluid mechanics was considered in the design and use of her racing wheelchair.

(a) Identify and define the type of drag that is reduced by Madison de Rozario leaning forward in her wheelchair. (2 marks)

(b) Discuss how the design of the wheelchair reduces drag. (4 marks)

See next page

Question 25 (continued)

Madison de Rozario's racing wheelchair has two large, slanted back wheels and a third smaller wheel extended out at the front via a long bar.

(c) Name and explain the biomechanical principle behind the third smaller wheel. (4 marks)

See next page

Question 26 **(6 marks)**

The State cross-country squad has been involved in a two-day workshop to develop their understanding of nutritional strategies in order to optimise performance on race day.

(a) Describe **two** nutritional requirements a cross-country runner would need to consider on the morning of a race due to start at noon. (4 marks)

One: _____

_____

_____

_____

Two: _____

_____

_____

_____

Sports drinks have been known to be recommended during or between races.

(b) Outline **two** advantages of consuming sports drinks. (2 marks)

One: _____

_____

Two: _____

_____

Question 27 **(19 marks)**

A coach of an under-8's soccer team implements a drill in which players must perform a high kick in its entirety with a stationary ball. Players experience varying levels of success with this drill.

(a) Name and define the training activity that the coach would have used during the drill and describe how it would have been implemented in this situation. (4 marks)

(b) Name the most appropriate leadership style for this coach to use and explain **two** reasons why this would be the most suitable style. (7 marks)

See next page

(c) Name and outline Steps One to Four of the Knudson and Morrison model that an under-8's soccer team coach could use to improve the players' performance. (8 marks)

Step One: _____

_____

_____

Step Two: _____

_____

_____

Step Three: _____

_____

_____

Step Four: _____

_____

_____

End of Section Two

See next page

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See next page

Section Three: Extended answer **30% (40 Marks)**

This section contains **four** questions. You must answer **two** questions. Write your answers in the spaces provided.

Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Suggested working time: 50 minutes.

See next page

Question 28 **(20 marks)**

Distance runner Joshua Cheptegei holds a double world record in the 5000 m and 10 000 m track events. His training camp is located 2000 m above sea level and provides athletes with a challenging hilly terrain at high altitude. Training programs are designed to include long slow runs at the highest altitude points, and faster, shorter runs at lower altitude points.

(a) Describe **three** physiological adaptations that Joshua Cheptegei would benefit from by training at a higher altitude. Explain **two** reasons why he would be able to train at a higher intensity closer to sea level. (12 marks)

See next page

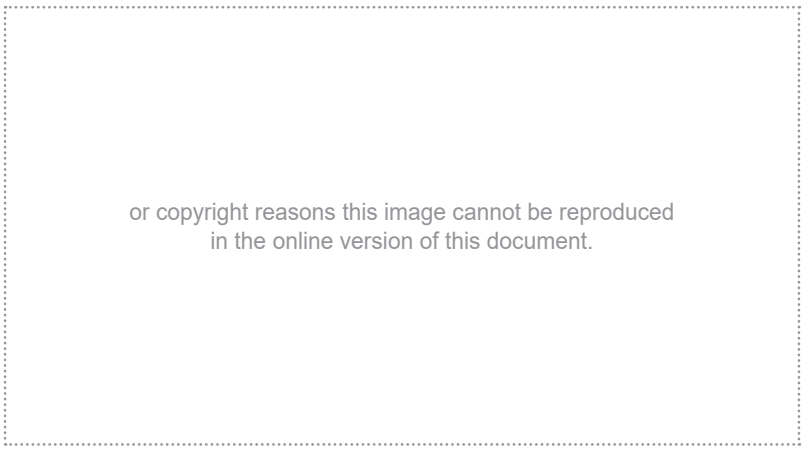
A nutrient-rich diet is a priority in any training program; however, altitude has a tendency to increase basal metabolic rate (burning more calories), while reducing appetite.

(b) Identify the major fuel source used for energy production by Joshua Cheptegei, including the role that the glycaemic index (GI) has, and justify the type of GI foods he may consume during and immediately post-performance, to ensure adequate energy is available and recovery maximised. (8 marks)

See next page

Question 29 **(20 marks)**

In a record-breaking 2023 season, Formula 1 driver Max Verstappen placed in the top three on 19 occasions. During the high-speed race, he must respond quickly to incoming stimuli as he navigates safely and strategically. When steering to avoid other vehicles, he receives incoming information via sensory neurons.



(a) Describe how each of the **four** main components of the neuromuscular system would be involved in the process described above. (8 marks)

See next page

During the Qatar Grand Prix race in October 2023, Max Verstappen had an additional challenge in terms of the extreme heat. Air temperatures were climbing to over 31 °C as the night race began, with a rising humidity of up to 75%.

(b) List **four** physiological effects of competing in extreme heat and describe the process of heat acclimatisation that Max Verstappen could have implemented in the weeks prior to arriving in Qatar. Identify **three** physiological adaptations that result from acclimatisation and outline the benefit of each. (12 marks)

See next page

Question 30 **(20 marks)**

At the 2023 Cricket World Cup, Glenn Maxwell scored Australia's first ever men's One Day International double century to help his team make the semi-finals. He used segmental interaction effectively to hit 21 fours and 10 sixes in his innings.

(a) Define 'segmental interaction' and analyse how Glenn Maxwell could have applied this concept during his innings to generate maximum velocity on the ball after he hit it.
(12 marks)

See next page

During his innings, Glenn Maxwell experienced constant cramping and could hardly walk, let alone run. After one over he even collapsed on the ground due to severe physical exhaustion, but he continued and led Australia to the win.

(b) Describe **four** strategies Glenn Maxwell could have used when batting to manage his concentration, motivation and stress levels. (8 marks)

See next page

Question 31 **(20 marks)**

In 2023, Australia and New Zealand hosted the FIFA Women's World Cup for soccer. Australia's team, the Matildas, showed a high level of group cohesion to finish fourth in the tournament, which included a quarter-final win against France via a 20-shot penalty shootout.

(a) Analyse the biomechanical principle the strikers would have used to kick a curve ball from left to right in order to avoid the goalkeeper and make the shot. (8 marks)

See next page

(b) Define 'social cohesion' and 'task cohesion' and describe the **five** strategies the Matildas' coach, Tony Gustavsson, could have used to ensure a high level of group cohesion within the team in the lead up to and during the World Cup. (12 marks)

End of questions

Supplementary page

Question number: _____

Supplementary page

Question number: _____

Supplementary page

Question number: _____

Supplementary page

Question number: _____

Supplementary page

Question number: _____

ACKNOWLEDGEMENTS

Question 11 Adapted from: sharkolot. (2022). [Photograph of a person walking in a wetsuit in water holding a kitesurfing board]. Retrieved May, 2024, from https://pixabay.com/photos/foilboard-hydrofoil-kitesurfer-7273936/

Question 14 Gerald_G. (2007). *Baseball Bat* [Clipart]. Retrieved April, 2024, from https://openclipart.org/detail/8299/baseball-bat

Question 22 Silva, F. (2018). [Photograph of woman squatting with a barbell on her shoulders in a gym]. Retrieved April, 2024, from https://pixabay.com/photos/gym-lift-training-bodybuilding-3516208/

Question 23 Adapted from: Cottrell, D. (n.d.). *Periodization Rugby Training Plan*. Retrieved April, 2024, from https://www.rugbycoachweekly.net/rugby-drills-and-skills/fitness-conditioning/periodization-rugby-training-plan/

Question 24 Everkinetic. (2016). *Lying leg Curl Machine 1* [Lineart]. Retrieved April, 2024, from https://commons.wikimedia.org/wiki/File:Lying_leg_curl_machine_1.svg
Used under Creative Commons Attribution-Share Alike 3.0 Unported licence.

Everkinetic. (2016). *Lying leg Curl Machine 2* [Lineart]. Retrieved April, 2024, from https://commons.wikimedia.org/wiki/File:Lying_leg_curl_machine_2.svg
Used under Creative Commons Attribution-Share Alike 3.0 Unported licence.

Question 25 McDonald, M. (2021). [Photograph of person wearing a helmet in a racing wheelchair]. Retrieved April, 2024, from https://www.paralympic.org.au/2021/08/para-athletics-day-3-preview-de-rozario-and-the-white-tiger-among-aussies-to-watch/

Question 28 Information from: NN Running Team. (2022). *The Mountainous and High-altitude Environment at the NN Running Team Training Camp in Kapchorwa has Provided the Ideal Breeding Ground for a Welter of World-class Ugandan Athletes*. Retrieved April, 2024, from https://www.nnrunningteam.com/news/2022-05-24-cruising-altitude-uganda/

Question 29

Adapted from: Stapff, A. (2018). *Formula One F1 - Mexican Grand Prix - Autodromo Hermanos Rodriguez, Mexico City, Mexico - October 26, 2018 Red Bull's Max Verstappen During Practice* [Photograph]. Retrieved April, 2024, from https://pictures.reuters.com/CS.aspx?VP3=SearchResult&VBID=2C0FCIX8KCLET0&SMLS=1&RW=1920&RH=919#/SearchResult&VBID=2C0FCIX8KCLET0&SMLS=1&RW=1920&RH=919&PN=2&POPUPPN=85&POPUPIID=2C0BF1QZ9I0A1

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