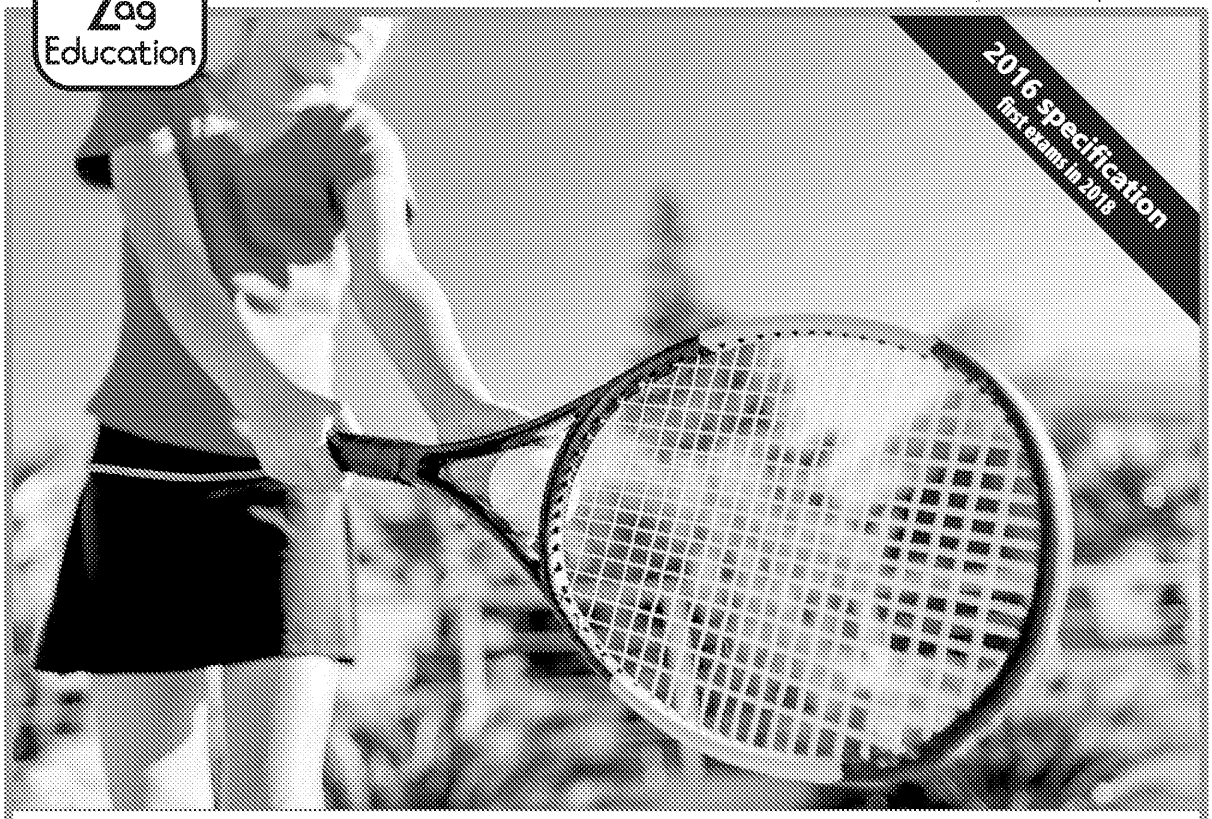
Zig Zag Education

PE

GCSE (9–1) | AQA | 8582



Structured Cover Lessons for GCSE AQA PE

Paper 1: The Human Body and Movement in Physical Activity and Sport

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zigzageducation.co.uk

POD 11865

Contents

Cover Setter's Introduction

This resource contains a series of 'pick up and go' cover lesson plans covering topics within the **AQA GCSE PE** specification. It is designed for use by any teacher, including non-specialists, who may be unfamiliar with the subject area of PE and Sport, as is commonplace in the event of covering for fellow teacher absence. Each lesson focuses on a different topic covering the entire range across **Paper 1**, ensuring that teachers will always have a cover lesson available to them that is relevant to the content they are teaching at that moment of time.

Remember!
Always check the exam board website for new information, including changes to the specification and sample assessment material.

Unlike most regular cover lessons, where students are aware that the work they are completing is unlikely to be marked, this resource incorporates the marking and feedback cycle within the lesson to ensure that students are still being exposed to the best learning opportunities despite the absence of their regular teacher. Some plenary activities suggest students self- or peer-mark their work, while other lessons may not directly instruct self- or peer-marking. Clear answers and mark schemes are provided and these should always be handed out to students on completion of the activities to mark their work either in class or as homework (if no time in the lesson).

Each of the lessons contains the following:

- ✓ Learning objectives to make learning outcomes easy to assess.
- ✓ Brief instructions for each lesson for the cover setter / cover teacher *(See outline of all cover lessons)*
- ✓ Self-guided student worksheets with clear and concise instructions, each containing:
  - Background information – engaging concepts in an approachable way, without giving away too much information that will be expected in the activities.
  - Starters and plenaries (non-write-on*) – engage students from the moment they enter the class to the moment they leave.
  - Varied and progressive write-on student tasks – stimulate students' interests and encourage knowledge comprehension.
  - Extension activities (non-write-on*) to ensure students don't run out of work (or could be given as homeworks), ensuring students stay motivated for the full lesson.
- ✓ Answers and mark schemes to allow self-/peer-marking if desired.

** Most starters, plenaries and extension tasks are non-write-on to save photocopying costs, but some may be write-on if deemed more suitable for the student, e.g. labelling diagrams. Students should complete these on a piece of A4 paper or in their exercise books. You could also print double-sided to save photocopying costs.*

Some starter activities utilise videos and/or links to YouTube or external websites. If completing as cover lessons, display these on the interactive whiteboard or on in-class devices such as iPads. The videos are intended to be optional, in case either of the above is not possible. If completing worksheets as homeworks, students can access these links at home on their personal devices.

The resource is designed for non-specialist use; however, depending on the cover teacher, opportunities have been included for variety, such as through diagrammatic representations, some YouTube links, and opportunities for group- and peer-marking that could be used for discussion.

D Embleton, December 2022

A web page containing all the links listed in this resource is conveniently provided on ZigZag Education's website at ***zzed.uk/11865***

You may find this helpful for accessing the websites rather than typing in each URL.

Specification Reference Tab

The reference table below shows in which cover lessons each area of the specific

Cover lesson	Topic	Spec ref.	Cover lesson	
1.	**Skeletal System** a) Bones b) Structure of the skeleton c) Functions of the skeleton	3.1.1.1	9.	**Planes and A** a) Planes b) Axes c) Sporting
2.	**Synovial Joints and Movement** a) Structure of a synovial joint b) Types of synovial joints c) Movements at joints	3.1.1	10.	**Health and Fi of Fitness** a) Health an b) Compone c) Sporting
3.	**Muscular Syste** a) Muscles b) Antagonistic pairs at joints c) Types of contraction d) Movement analysis	3.1.1.1 & 3.1.2.1	11.	**Fitness Testin** a) Measurin of fitness b) Collectin c) Reasons
4.	**Respiratory System** a) Pathway of air b) Gaseous exchange c) Mechanics of breathing d) Spirometer traces	3.1.1.2	12.	**Principles of T** a) SPORT pr b) FITT prin c) Applicati
5.	**Cardiovascular System** a) Structure and function of blood vessels b) Structure of the heart c) The cardiac cycle and pathway of blood d) Cardiac output, stroke volume and heart rate	3.1.1.2	13.	**Types of Trai** a) Types of b) Advanta
6.	**Anaerobic and Aerobic Exercise** a) Key terms b) Sporting examples c) EPOC d) The recovery process	3.1.1.3	14.	**Optimising Tr Injury** a) Calculati b) Consider c) High-altit d) Seasonal
7.	**Short- and Long-term Effects of Exercise** a) Immediate effects b) Short-term effects c) Long-term effects	3.1.1.4	15.	**Warming Up** a) Warm-up compone b) Benefits cooling d
8.	**Lever Systems** a) Lever systems b) Mechanical advantage	3.1.2.1	16.	**Use of Data** a) Quantita b) Collectin c) Presentin d) Analysing

Lesson Outline

Lesson No.	Lesson Title and Learning Objectives	Lesson Outline and Sug
1	**Skeletal System** • Identify the locations of the major bones in the body • Understand how the skeletal system provides a framework for movement • Desc[illegible]d a[illegible] fu[illegible] the[illegible]keleton to pe[illegible] in physical acti[illegible]	**Starter:** Work together in pairs to [illegible]bel[illegible] [illegible]ferent bones at different loca **Main:** • [illegible]plete the diagram by labelling the bones in the bo • [illegible]k 2 – Fill in the missing words to complete the paragraph or movement and how the shape and type of bones influence the • Task 3 – Match up the functions of the skeleton to their descri be applied to performance in physical activity. • Task 4 – Complete a table to show the functions of different ty bone type, and their uses in physical activity. **Plenary:** Self- or peer-marking of answers. **Extension:** Complete the exam-style questions on the skeletal system.
2	**Synovial Joints and Movement** • Identify the structures of a synovial joint and describe how they help prevent injury • Identify the different types of synovial joints at specific locations • Understand the different types of movement that are available at each joint	**Starter:** Complete a true or false quiz on synovial joints. **Main:** • Task 1 – Label the structures of the synovial joint then match u correct structures. • Task 2 – Write down a description o[illegible] different joint moven movement at the synovial j[illegible]ell[illegible] on a diagram. • Task 3 – Take turns t[illegible]act [illegible]fferent joint movements in **Plenary:** Cr[illegible]r[illegible]o/false questions to test a partner on the conten **Ex[illegible]on:** Provide a sporting example for each joint movement.

Lesson No.	Lesson Title and Learning Objectives	Lesson Outline and Sug
3	**Muscular System** • Identify the locations of the main muscles in the body • Understand the roles of muscles in antagonistic pairs • Describe the different types of muscle contraction • Analyse the major mu… groups … op… m… al j… the bo…	**Starter:** Complete the diagram to label the main mu…cles of the body and co… **Main:** • Task 1 – Comple… th… para… on the roles of muscles in an… the diffe… at e… joint. • T… n… demonstrate the different types of muscle co… dow… the table along with a definition of each. **Plenary:** Working in pairs to quiz the partner on the prime mover of differen… **Extension:** Provide different sporting examples for the actions of prime mover…
4	**Respiratory System** • Identify the pathway of air through the structures of the respiratory system • Describe the process of gaseous exchange and identify the features that assist with the process • Describe the mechanics of breathing at rest and during exercise • Draw, interpret and explain the different lung volumes from a spirometer trace	**Starter:** Complete the diagram on the structures involved in the pathway o… optional video if necessary. **Main:** • Task 1 – Answer the questions on gaseous exchange. • Task 2 – Complete the diagram to show the series of steps invo… changes that occur during exercise. • Task 3 – Use definitions of each of the lung volumes to label a … illustrate what happens at the onset of exercise. Write your re… **Plenary:** Compare responses to tasks with a pe… **Extension:** Answer a mock exam-style qu… on exhalation at rest and duri…

Lesson No.	Lesson Title and Learning Objectives	Lesson Outline and Sug
5	**Cardiovascular System** • Identify the different structures of the heart • Describe the cardiac cycle and the pathway of blood through the heart • Understand the relationship between heart rate, st… volume and ca… • In… aph… …ting the ch… …art rate during exe…	**Starter:** Answer the multiple-choice questions usi… …he background notes … to help. **Main:** • Task 1 – … …the …gram to label the structures of the h… … …sta… …n the pathway of blood. • Tas… 2 – Complete the table to show the different structures o… …eir unique structures relate to their different functions. Ther… vasoconstriction of an artery. • Task 3 – Answer the different exam-style questions linking carc… interpret the graphs showing sports/activities of different inte… **Plenary:** Self- or peer-marking of answers. **Extension:** Practise writing in prose by describing the pathway of blood, starti… and ending when it returns back to the heart.
6	**Aerobic and Anaerobic Exercise** • Understand the terms 'aerobic exercise' and 'anaerobic exercise' • Justify different practical examples of aerobic and anaerobic exercise • Explain the excess post-exercise oxygen consumption (EPOC) that occurs post-exercise • Evaluate the use of … meth… …sed … a… …ort… …activities	**Starter:** Work together in pairs to identify whether each of the listed activit… Venn diagram to categorise the answers. **Main:** • Task 1 – Complete the table on aerobic and anaerobic exercise • Task 2 – Tick the box to indicate wheth… each of the listed phy… justify why. • Task 3 – Use the graph … …ing … process of EPOC to describ… • Task 4 – Plac… …ch r… …so… …y different methods of recovery … recov… …m… **…nary:** …k answers to Tasks 1 and 2 and watch the optional video … background information. ***zzed.uk/11865-EPOC*** **Extension:** For each sporting activity given, evaluate which recovery method is…

Lesson No.	Lesson Title and Learning Objectives	Lesson Outline and Sug
7	**Short- and Long-term Effects of Exercise** • Describe the immediate effects of exercise that occur during the activity • Describe the short-term effects of exercise that last up to 36 hours post-exer • Under d th lo ffec t exercise or nts of fitness for spo xercise	**Starter:** In pairs, discuss the short-term effects of d erent types of exercise **Main:** • Task 1 – Comple a nell the short-term effects of exerc • Task 2 – fferent components of fitness to describe th hr y **Plenary:** Compare responses with a partner and add any short- or long-term **Extension:** Write an email to a client commencing a training programme with effects of training expected.
8	**Lever Systems** • Identify and draw linear versions of each of the three classes of lever system • Interpret sporting movements or actions to identify the lever system being used • Interpret the mechanical advantage of each lever system, including labelling effort and load arms on each class of lever	**Starter:** In pairs or small groups, create the three classes of lever system us the lever arm, a glue stick as the fulcrum, a rubber eraser as the loa effort. **Main:** • Task 1 – Draw and label the different lever systems created in or disadvantage of each. Also label effort and weight (resistanc • Task 2 – Identify two sporting examples for each lever system at each. **Plenary:** Watch the optional video to summarise ey systems in the human a partner. ***zzed.uk/11865-joints*** **Extension:** Identify the ns shown in the images, then draw each lev ar t

Lesson No.	Lesson Title and Learning Objectives	Lesson Outline and Sug
9	**Planes and Axes of Movement** • Identify the different planes of movement and axes of rotation • Apply sporting movements and actions to the different planes of movement and axes of rotation	**Starter:** In pairs, recap sporting actions for the diff nt joint movements th each other. **Main:** • Task 1 – ify the diff nt movement planes and categorise th ch a e. Add further examples to each. • Task 2 – Label the different axes of rotation and identify which • Task 3 – Complete the table to identify the plane of movement sporting actions. **Plenary:** Use the diagram in Tasks 1 and 2 to come up with a way of remem of rotation. **Extension:** Using the sport of gymnastics, list the different male and female ev axes of rotation that the performers use in each.
10	**Health and Fitness and Components of Fitness** • Define health and fitness and the different components of fitness • Understand the relationship between health and fitness • Justify which components are and aren't needed in different sports and physical activities	**Starter:** In pairs, discuss the reasons why you might perform exercise. **Main:** • Task 1 – Complete the paragraph to understand the terms 'hea the two. • Task 2 – Define the different components of fitness, plus ident each component. • Task 3 – Justify the compone ts ss which may or may n **Plenary:** Compare cas sp with a peer and suggest any additio have **Extension:** Answer the extended-answer exam-style question.

Lesson No.	Lesson Title and Learning Objectives	Lesson Outline and Sug
11	**Fitness Testing** • Describe the main procedures of the fitness tests for the different components of fitness • Identify the reasons for fitness testing and the limitations that exist • Understand th[illegible] br[illegible]alit[illegible] qu[illegible]data and how this dat[illegible]cted from fitness tests	**Starter:** Match up the different fitness tests with th[illegible]components of fitness **Main:** • Task 1 – Identify [illegible]mp[illegible]or fitness targeted by each fit protocol[illegible]fer[illegible]tests in the correct order. • [illegible]the coach by identifying any further reasons f[illegible] the [illegible] **Plenary:** Compare responses with a peer then each select a sport/activity an for that sport/activity. **Extension:** Create a fitness testing schedule for a hypothetical athlete and exp the chosen times.
12	**Principles of Training** • Identify the key principles of training and overload • Explain how the key principles of training bring about fitness improvements • Apply the principles of training to sporting examples	**Starter:** Students to provide definitions for the different training principles **Main:** • Task 1 – Annotate the principles of training that have been app • Task 2 – In pairs, use the template to apply the principles of tra **Plenary:** Self- or peer-checking of work and marking of answers. **Extension:** Design a six-week training programm[illegible]ply the key principles o

Lesson No.	Lesson Title and Learning Objectives	Lesson Outline and Sug
13	**Types of Training** • Understand the distinctions between the different types of training • Understand the principles that govern each type of training • Identify the advantages and disadvantages that ea[illegible] of trai[illegible] has [illegible]	**Starter:** Students to give a brief description of th[illegible]ferent training method **Main:** • Task 1 – Student[illegible] to [illegible]atch [illegible]e different training methods t suited f[illegible] • [illegible] [illegible]te the table to design a training session for eac of e[illegible] • Task 3 – Work in pairs to make a list of the advantages and dis play a game of verbal tennis where one person provides an ad each method. **Plenary:** Students to use a sport/activity of their choosing and justify the tra in that sport/activity. **Extension:** Evaluate two training methods for a given sports performer/activity
14	**Optimising Training and Preventing Injury** • Calculate intensities of training in order to optimise training effectiveness for different needs • Understand the different considerations for preventing injury • Understand the use of high-altitude training as a form of aerobic training • Identify the aims, characteristics and [illegible] the [illegible]rai[illegible] [illegible]nd a[illegible]les [illegible]different sp[illegible]	**Starter:** Students to use the equations for aerobic and anaerobic training zon **Main:** • Task 1 – Calculate the target heart rate and weight training loa • Task 2 – Complete the template to create a guidance sheet for injury during exercise. • Task 3 – Fill in the text using the missi[illegible] words to show how h aerobic training. • Task 4 – Complete th[illegible] [illegible]lat[illegible] [illegible]dentify aims of the three t individual sp[illegible] ac[illegible]vit[illegible] [illegible]entify the benefits. **Plen[illegible]** [illegible]r-ch[illegible]k[illegible]g of responses for each task. Recap the gap-fill for alti th[illegible]nefits outweigh the limitations, or vice versa. You should inc **Extension:** Design a circuit training session to show how the time, rest periods performer's muscular strength or endurance.

Lesson No.	Lesson Title and Learning Objectives	Lesson Outline and Sug
15	**Warming Up and Cooling Down** • Identify examples for the constituent parts of warm-ups and cool-downs • Understand the benefits of warming up and cooling down	**Starter:** Students to think about their experience with the warm-up and list they have experienced with their [illegible] the warm-up. **Main:** • Task 1 – [illegible] to design a warm-up for a sport of their choi [illegible] component. • Task 2 – Students to analyse graphs on the benefits of a cool-d constituent parts that achieve them. **Plenary:** Self- or peer-checking of work. **Extension:** Design a cool-down in the same sport or activity used for the warm
16	**Use of Data** • Understand the different types of data and methods for collecting each • Present data in tables and plot basic charts and graphs • Analyse and evaluate data in charts, graphs and tables	**Starter:** Students to complete true or false questions on the types of data i ***zzed.uk/11865-data*** **Main:** • Task 1 – Categorise the different examples of data in sport into • Task 2 – Students to collect their own quantitative and qualita questions regarding sports. • Task 3 – Students to present the data they collect in tables, ch **Plenary:** Comparison of work with peers who [illegible] different data and d **Extension:** Students to analyse the data presented by others in the class.

Lesson 1: The Skeletal Syst

Learning Objectives

By the end of this lesson, you should be able to:

- ✓ Identify the locations of the major bones in the body
- ✓ Understand how the skeletal system provides a framework for movement
- ✓ Describe and apply the functions of the skeleton to performance in physical activity

Background

The skeletal system is made up of the different bones that form at joints in vario locations in the body. It works alongside the muscular system as the musculoskeletal system, where muscles attach at bones and contract to cause movement at the joints. It allows us to perform the wide range of movements required in sports and physical activities.

Bones come in all shapes and sizes, and are categorised by type. It is the shape a type of bone that determines the amount of movement available at a joint. For example, short bones in the wrist allow for fine movements, such as that of a cricket bowler who applies spin to the ball. On the other hand, long bones such a the humerus at the shoulder allow for gross movement, such as the circular acti during the bowl to generate power.

It is important to remember that the skeletal system has several other functions shape and type of bone also plays a role in determining these. For example, the protects the brain from collisions in sport, such as a rugby tackle. These example the structure and function of the skeletal system will ensure good understanding system is to performance in physical activity.

Starter: Skeleton Post-it

This activity will require working in pairs. On separate Post-it notes, write the n (given below):

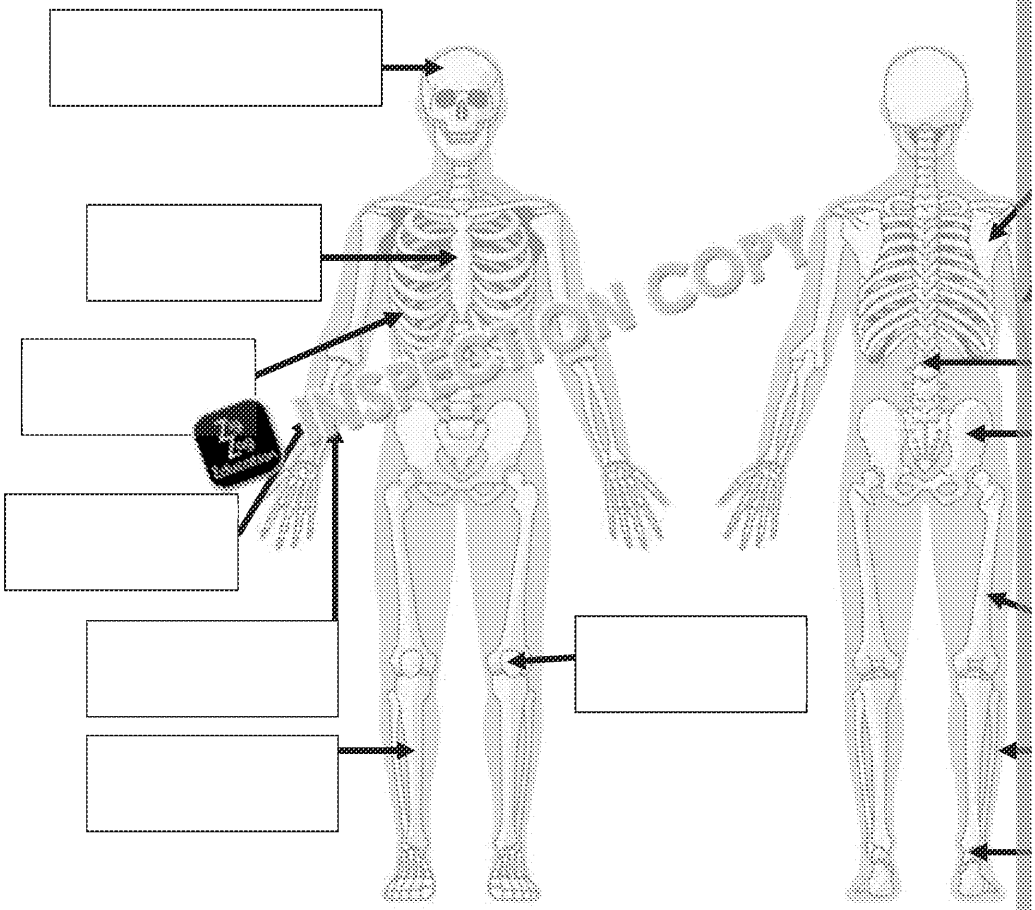
Radius	*Tibia*	*Humerus*
Fibula	*Scapula*	*Pelvis*
Ribs	*Cranium*	*Femur*
Patella	*Sternum*	

You should stick the Post-it notes on your partner's each location. Note that t specifies the number of bones. Some will operate at more than one joint

- Head/neck (2)
- Shoulder (2)
- Ches
- Elbow
- Hip (2)
- Knee (2) (Plus can you identify the additional bone that sits in front of the
- Ankle (3)

Task 1 – Bone Identification

Label the diagram below to show the locations of each of the following bones in



Task 2 – Fill in the Gaps

Fill in the gaps to complete the paragraph on how the skeletal system provides a
how the shape and type of bones influence their function. You should use words
avoid the red herrings!

fine	*organs*	*ranges*
free throw	*small*	*movement*
gross	*muscular*	*sternum*
large	*bones*	*hip*
contract	*cranium*	*attachment*
brain	*knee*	*stomach*

The skeletal system works alongside the _____ system to allow
_____ in the body. One of the functions of the skeleton is to p
_____ for skeletal muscles. When muscles _____ t
_____.

The shape and type of bones in the body determines the amount of movemen
_____ bones are found in the bones of the wrist, and enable _
during sporting actions that require accuracy, such as the _____ _____
manipulation of an object, such as the _____ _____ in cricket. Long b
the body, such as the femur at the _____, the femur and tibia a
the tibia and _____ at the ankle.

The shape and type of bones not only influence the amount of movement they
influence the role they play in the body. For example, flat bones such as the
_____ have a _____ surface area which covers m
_____ in the body. For example the _____ prote
and the _____ prot[illegible] heart.

As well a[illegible]ffe[illegible]nt types of bones in the body, there are also different t
varying _____ of movement, enabling them to perform specific

Task 3 – Function Match-Up

Match up the functions of the skeleton to their descriptions, then use an exampl
applied to performance in physical activity. One has been given for you.

Support	Long bones produce red blo white blood cells (for immune
Protection	Bones store minerals such as functions in the body.
Structural shape and points of attachment	ones form at joints and act
Mineral [illegible]	Bones provide a framework collapsing upon itself.
Movement	Bones shield internal organs, from direct impacts.
Blood cell production	The layout of bones determi to connect via tendons.

Application to performance in physical activity:

Support – *e.g. to hold the body upright during a rugby scrum, preventing it fr*

Protection .....

.....

Structural shape and point of attachment .....

.....

Mineral storage .....

.....

Movement .....

.....

Blood cell production .....

.....

Task 4 – Complete the table

For the different types of bones, complete the table to:

- Describe the function of each
- Name the different bones of each type in the body
- Give a sporting example for each

Type of bone	Function	Bones	
Short		*Carpals tarsals*	
Long			
Flat			

Plenary:

Self-mark your own work or swap and mark your peer's work.

Extension: Exam-style questions

Answer the following exam-style questions on a separate sheet of paper.

1. Which **one** of the following bones is found at the elbow?
   a. Scapula
   b. Femur
   c. Humerus
   d. Patella
2. Identify **two** functions of the skeleton.
3. Identify **one** long bone in th[illegible] describe its role in physical activity
4. Name [illegible] of injury if someone's forearm is trodden on in rug

Lesson 2: Synovial Joints and M

Learning Objectives

By the end of this lesson, you should be able to:

- ✓ Identify the structures of a synovial joint and describe how they help prevent injury
- ✓ Identify the different types of synovial joints at specific locations
- ✓ Understand the different types of movement that are available at each joint

Background

Joints are part of the skeletal system and are kno[illegible] site where two or mo[illegible] are a classification of joints in the body a[illegible] ch[illegible]acterised as being freely mov[illegible] movements in the body during sport [illegible]ysical activity. There are different typ[illegible] for different types of mo[illegible]

Flexion and [illegible]**sion** occur when there is either a decrease or an increase in th[illegible] the hip, knee, shoulder and elbow. When these movements take place at the an[illegible] **flexion** and **dorsiflexion**, where the angle between the toes and the shin either i[illegible] the toes at the ankle (plantar flexion), or decreases, leading to toes up at the ank[illegible] **adduction** are movements where the arm or leg moves either away from or tow[illegible] the shoulder or hip. A clever way to remember which is which is to remember *ab[illegible] abduct*, which means to take away, whereas *add*uction is to *add*. The final two m[illegible] the body part turns around its axis, and **circumduction**, where the body part / lim[illegible] in a circular motion around a joint in more than one plane.

The two main types of joints in the body are hinge joints and ball-and-socket join[illegible] Hinge joints only allow flexion and extension movements (or dorsiflexion and plantar flexion at the ankle), while ball-and-socket joints allow all of the moveme[illegible] mentioned above.

Joints are prone to injuries such as sprains (damage to the ligaments connecting bone to bone) and dislocations (misalignment of one or more bones at the joint). Therefore, it is also important to know the various structures of the synovial join[illegible] which help prevent injury.

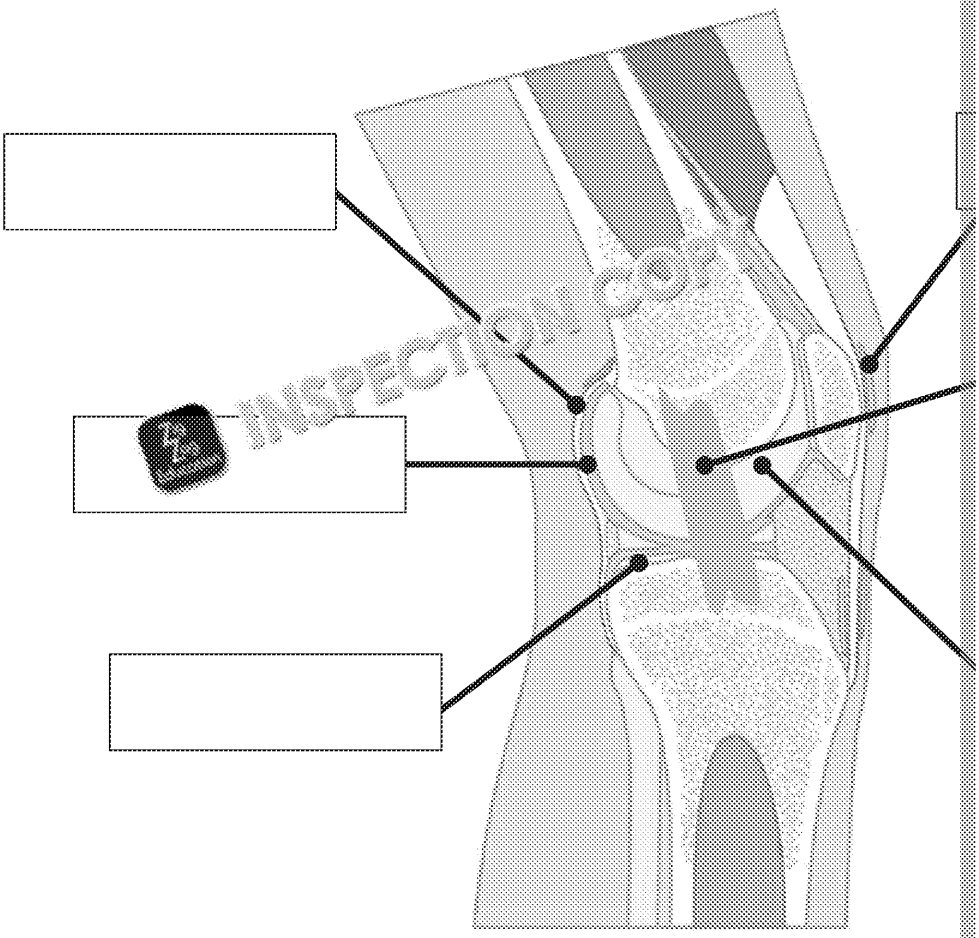
Starter: True or False

Answer the following true or false questions to warm up your knowledge on sy[illegible] Tick the correct answer for each.

1. The cartilage joins bone t[illegible]e) a joint.	
2. A ball-and-soc[illegible] [illegible] a type of synovial joint in the body that allow[illegible] m[illegible]me[illegible]	
3. S[illegible] joints are also known as freely moveable joints.	
4. The knee joint has a larger range of movement compared to the shou[illegible]	
5. Plantar flexion and dorsiflexion are movements that occur at the elbo[illegible]	

Task 1 – Joint Structure Label and Match-up

Label the diagram below to show the locations of each of the following structure
knee. Use the labels from the match-up activity below.



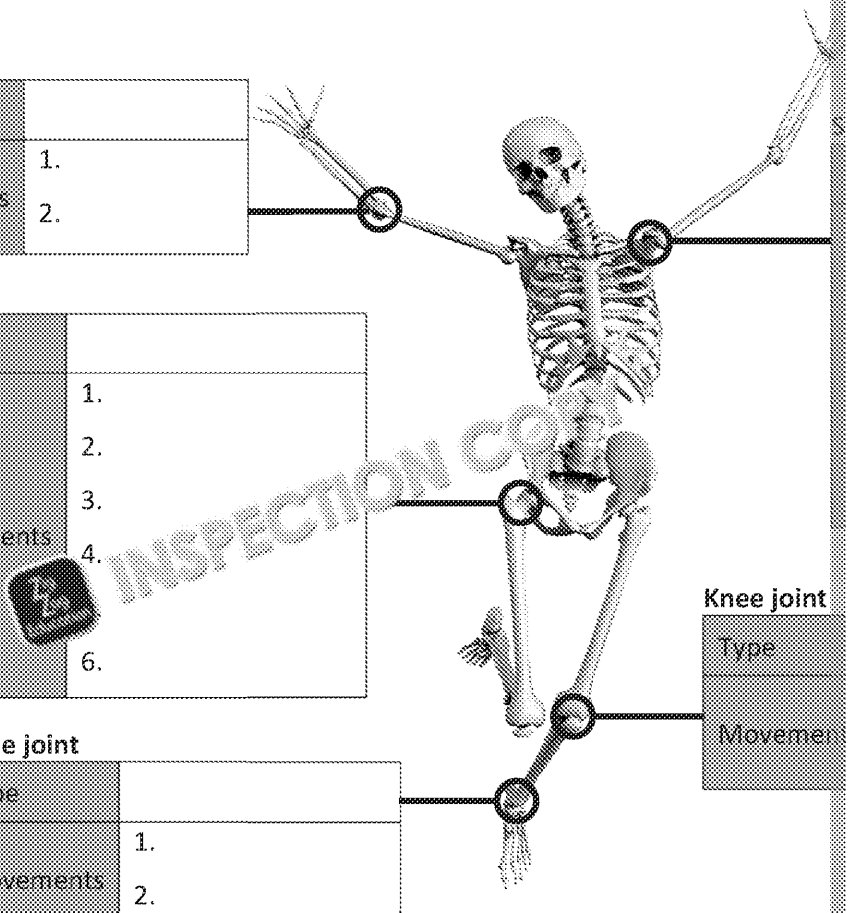
Match up each structure to the explanation of how it helps to prevent injury dur

Joint capsule	Small sacs of fluid located be reduce friction and increase th
Synovial membrane	Made of an inner synovial laye to protect the internal structures
Synovial fluid	P ents the ends of bones fro allowing for smooth articulatio
e	Joins bone to bone, providing forceful impacts.
Cartilage	Lines the inside of the joint cap releasing synovial fluid.
Ligaments	Lubricates the joint cavity, pre and increasing the articulation

Task 2 – Joint Types and Movements

Describe the different joint movements listed below, then use the diagram to ide
movement at the main synovial joints in the body.

Joint movement	Description
Dorsiflexion	
Plantar flexion	
Flexion	
Extension	
Abduction	
Adduction	
Rotation	
Circumduction	



Elbow joint

Type	
Movements	1. 2.

Hip joint

Type	
Movements	1. 2. 3. 4. 6.

Knee joint

Type	
Movemen	

Ankle joint

Type	
Movements	1. 2.

Task 3 – Act out the Movement

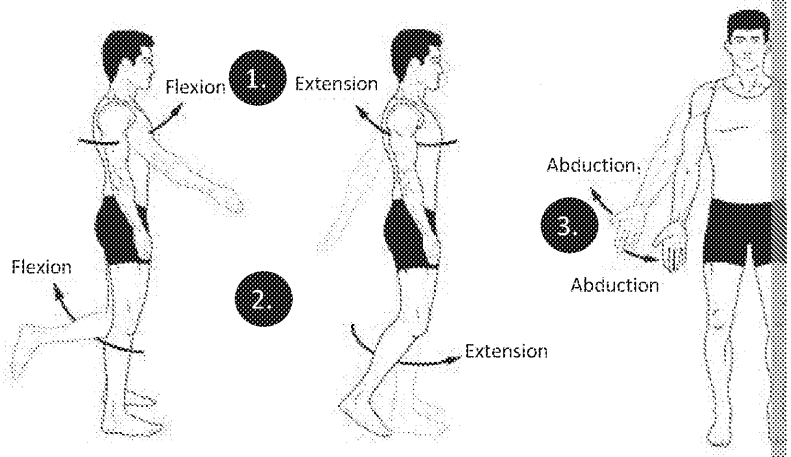
Now it's time to act out the joint movements you have described in Task 2. With
perform/mime a simple sporting action that displays each movement at differen

- Flexion/extension of the shoulder, hip, knee or elbow
- Abduction/adduction of the shoulder
- Rotation of the shoulder
- Circumduction of the shoulder
- Plantar flexion / dorsiflexion of the ankle

For example, the images below demonstrate the following:

1. Extension/flexion at the shoulder – e.g. preparing/executing an underarm c
2. Flexion/extension at the knee – e.g. preparing/executing a conversion in rug
3. Abduction/adduction of the shoulder joint – e.g. performing a star jump
4. Circumduction of the shoulder – e.g. performing the butterfly stroke in swim

Try to think of different actions from the ones given above. You can also analyse
one body pa



Plenary:

Create three true or false questions to test a partner on the content learnt fro

Extension: Apply it to sport

For each joint movement, give a practical exam e it might be used in
and complete the table in your noteb n lined paper.

Joint mo n	Example in sport or phys
Dors n	*e.g. to stay on the balls of the feet by po the shin when making contact with the*
Plantar flexion	
Flexion	
Extension	
Abduction	
Adduction	
Rotation	
Circumduction	

Lesson 3: The Muscular Sys

Learning Objectives

By the end of this lesson, you should be able to:

- ✓ Identify the locations of the main muscles in the body
- ✓ Understand the roles of muscles in antagonistic pairs
- ✓ Describe the different types of muscle contraction and the roles of muscles in antagoni
- ✓ Analyse the major muscle groups that operate at the main synovial joints in the body

Background

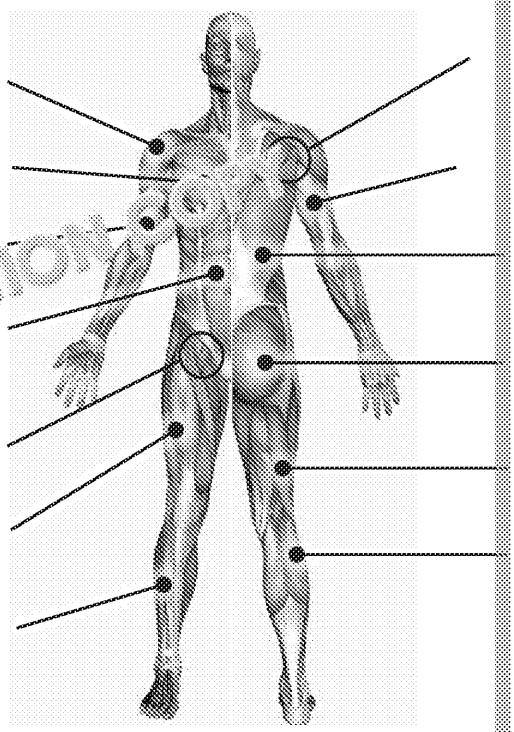
The muscular system works alongside th al system in the body to form th Muscles are attached to bones vi te and contract to pull on bones at join work together at joints in pairs known as an antagonistic pair. The prime move contracts a rt ause movement, while the antagonist muscle relaxes movement. tion of the agonist here is called a concentric contraction, whe cause movement. However, the agonist may also contract eccentrically, wherein An example of this is the biceps curl, where the biceps muscle contracts concent contracts eccentrically to control the movement back down.

Concentric and eccentric muscle contractions are known as isotonic contractions changes in length to cause movement. Eccentric contractions occur when an ath decelerating, whereas concentric contractions tend to be explosive movements. however, without resulting in movement, and this is known as an isometric cont not change in length. A useful way of remembering this is using the second part does not change in length wherever you are in the world, and so in the context o isometric contraction means the muscle doesn't change in length either.

Starter: Muscle Label

Label the main muscles on the diagram below: *Pectorals, Quadriceps group, Gl dorsi, Biceps, Gastrocnemius, Deltoid, Hamstring group, Hip flexors, Tibialis ant*

Compare your responses with a partner once you have finished.



Task 1 – Antagonistic Pairs

1. Fill in the missing words in the paragraph on the roles of muscles in antagon
provided. Each word may be used more than once.

hip	*antagonistic*	*relax*	*ar*
agonist	*agonists*	*relaxes*	*hi*

Muscles work in _____ pairs at synovial joints in the body,
_____ while the other _____. The prime move
_____, whereas the paired muscle which facilitates the mov
_____.
There will often be multiple muscles contributing to movement at the join
glute_____ _____ muscle group contribute to extension a
As these are both major muscle groups, they are both known as _____
groups that contribute a small degree to the movement are known as sy
Using the example above, the _____ _____ will _____
This means their role is as the _____ in the movement.

2. Use the different muscles and their roles and write them in the table to sho
operate at each joint. Each muscle may be used more than once.

Pectorals	*Quadriceps group*	*Gluteals*
Latissimus dorsi	*Biceps*	*Gastrocnemius*
Hamstring group	*Hip flexors*	*Tibialis anterio*

Joint	Movement	Agonist	
Shoulder	Flexion	*e.g. deltoid*	*e.g. l*
	Extension		
	Abduction		
	Adduction		
	Rotation		*A
	Circumduction	*[illegible] at the shoulder combine.*	*All m*
Elbow	Flexion		
	E[illegible]sion		
Hip	Flexion		
	Extension		
Knee	Flexion		
	Extension		
Ankle	Plantar flexion		
	Dorsiflexion		

*For your exam, you don't need to know what separate muscles contribute to internal and e
**You do not need to know about the erector spinae for your exam.

Task 2 – Types of Contraction

1. Write down a definition of the different types of muscle contraction in the t

2. Working in pairs, demonstrate the different types of muscle contraction usi
then come up with two exercises of your own for each – add these to the ta

Type of muscle contraction	Definition	
Concentric		1. The bi upwar 2. 3.
Eccentric		1. The qu gluteal 2. 3.
Isometric		1. The ab 2. 3.

Plenary:

In pairs take it in turns to name a sporting movement (e.g. extension of the elb
and your partner should aim to identify the prime mover. If they get it right, th
the most points.

Extension: Muscles in sporting actio

Give a sporting example for the differe ns the prime movers in the ta

Muscle action	Sport
Eccent ra ion of the pectorals	*e.g. at the shoulder w press-up*
Concentric contraction of the quadriceps	
Concentric contraction of the gastrocnemius	
Isometric contraction of the abdominals	
Concentric contraction of the latissimus dorsi	
Eccentric contraction of the triceps	
Isometric contraction of the gluteals	

Lesson 4: The Respiratory S

Learning Objectives

By the end of this lesson, you should be able to:

- ✓ Identify the pathway of air through the structures of the respiratory system
- ✓ Describe the process of gaseous exchange and identify the features that assist with the
- ✓ Describe the mechanics of breathing at rest and during exercise
- ✓ Draw, interpret and explain the different lung volumes from a spirometer trace

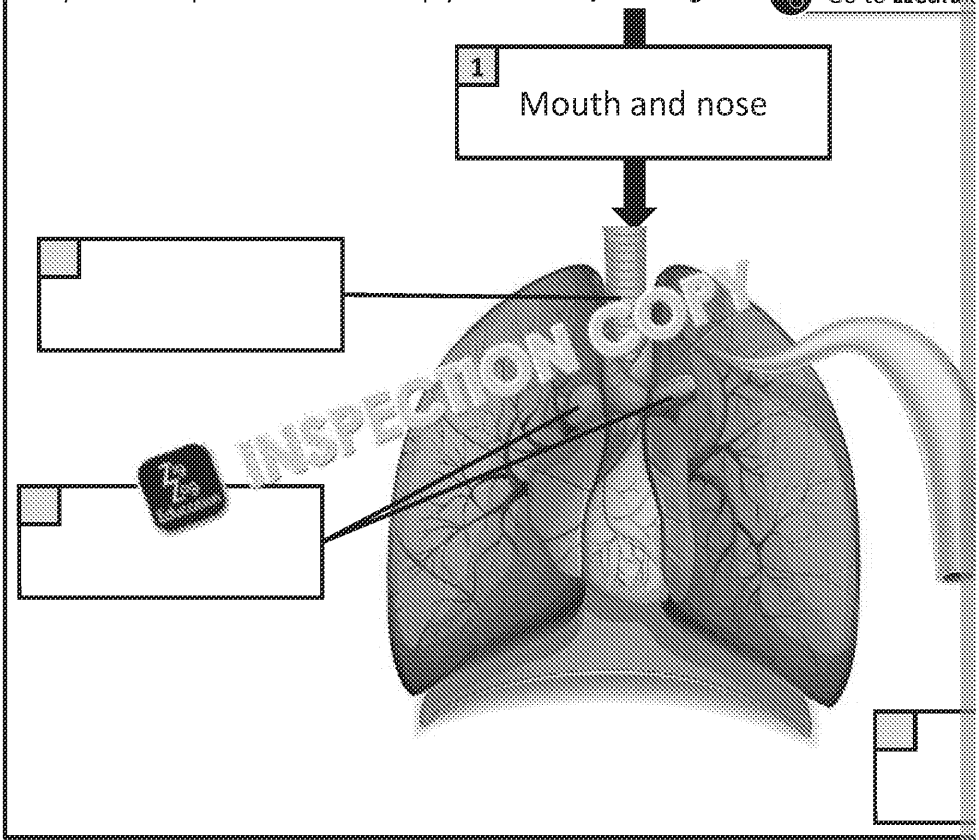
Background

The respiratory system consists of a num[illegible] different structures involved in th atmosphere through to the lungs [illegible]ed through the mouth and nose and are the site of gaseous e[illegible]. This is where oxygen in the lungs is exchanged through a p[illegible] k[illegible] diffusion. Oxygen is then transported by the cardiov muscles an[illegible]s, while carbon dioxide – which is considered a waste product the atmosphere.

Breathing seems quite simple, but in fact there are many muscles and structures inhalation (breathing in) and exhalation (breathing out) is known as the mechani different parts work together. Respiratory muscles such as the diaphragm and in breathing at rest, and additional skeletal muscles such as the sternocleidomasto during exercise. These muscles either contract or relax to pull on the ribcage and thoracic cavity, to allow the lungs either to fill and inflate with air or to empty an volumes can be presented on a spirometer trace, which provides a good represe system is responding to exercise.

Starter: Complete the Pathway

Complete the diagram to identify each structure and number the order in whic may use the optional video to help you: ***zzed.uk/11865-gas*** Go to zzed.u



Task 1 – Gaseous Exchange

1. Using your knowledge and the background information describe the proces
the lungs.

.....

.....

.....

.....

.....

2. Work together in pairs to exp[illegible] each of the following features of the
the process of gase[illegible]e. One has been done for you.

[illegible]ure	Explanation
Surface area of alveoli	*e.g. larger surface area offers more sites for oxy[illegible] alveolar wall into the capillary*
Number of capillaries	
Alveolar walls	
Diffusion pathway	
Blood supply	
Movement of gases	

3. Answer the questions below:
   a) Which molecule are oxygen and carbon dioxide bound to when they ar

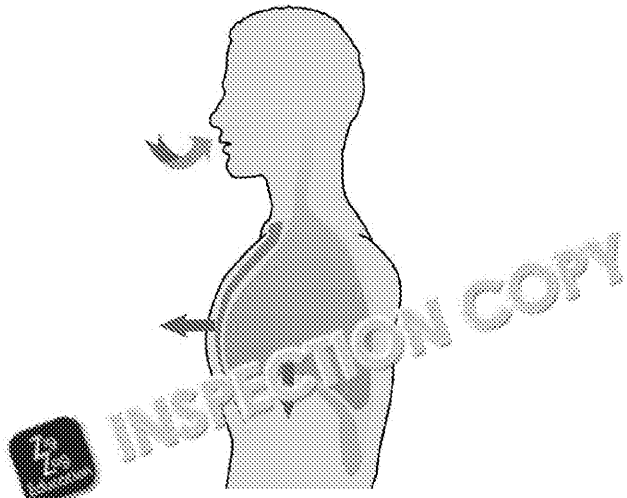
   .....

   b) What does this molecule become when oxygen binds to it?

   .....

Task 2 – Breathing Mechanics

Complete the diagram to show the series of steps involved in the mechanics of b
that occur during exercise.



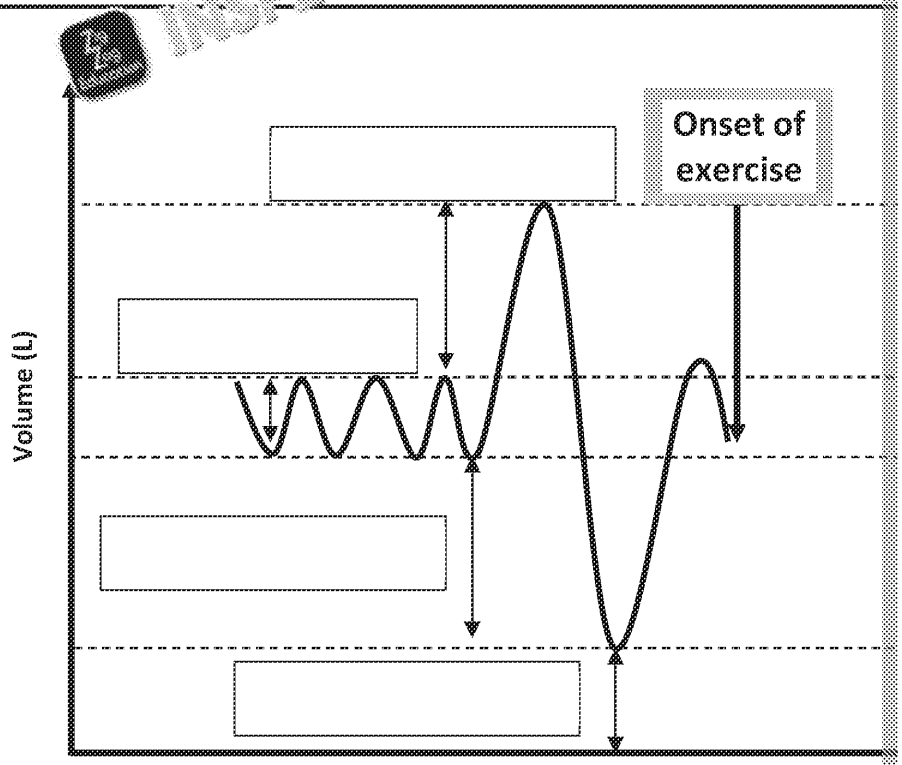
Inhaling E

	Rest	
Role of the diaphragm		
Role of the intercostals	*(Think about the movement of the ribcage)*	*(Think about*
Pressure in thoracic cavity		
Movement of air		
Change during exercise	*(Refer to assistance from skeletal muscles)*	*(Refer to assi*

Task 3 – Spirometer Trace

Use the definitions of each of the lung volumes to label the spirometer trace bel
drawing to illustrate the changes in the trace following the onset of exercise. Wr
in each lung volume during exercise.

Lung volumes	Definitions
Tidal volume	The volume of air inhaled or exhaled per breath.
Expiratory reserve volume	The maximum volume of air that can be exhaled following a normal breath.
Inspiratory reserve volume	The maximum volume of air that can be inhaled following a normal breath.
Residual volume	The volume of air remaining in the lungs after maximal exhalation.



Plenary:
Compare your responses to the tasks with a partner.

Extension – exam-style questions
Answer the following exam-style question on the mechanics of breathing:

Describe the process of exhalation at rest and during exercise.

Lesson 5: The Cardiovascular

Learning Objectives

By the end of this lesson, you should be able to:

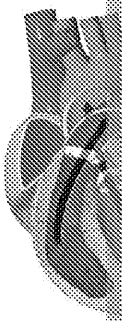
- ✓ Identify the different structures of the heart
- ✓ Describe the cardiac cycle and the pathway of blood through the heart
- ✓ Understand the relationship between heart rate, stroke volume and cardiac output
- ✓ Interpret graphs depicting the change in heart rate during exercise

Background

The cardiovascular system is made up of the heart, blood vessels and blood. The... oxygen and essential nutrients around the body to maintain the function of orga... such as the muscles. Each time the heart beats, blood is pumped through what is... During the cardiac cycle, deoxygenated blood returns from the working muscles ... through the vena cava (large vein). It then enters the right ventricle, before bein... pulmonary artery) for gaseous exchange (blood is oxygenated) and then returne... left atria and subsequently the left ventricle. Oxygenated blood is then pumped ... through the aorta (large artery) and is transported in arteries to working muscles.

There are two phases of the cardiac cycle – systole and diastole.

1. **Systole** is when the heart contracts and pumps deoxygenated blood to the lungs (for gaseous exchange) and oxygenated blood to the working muscles.
2. **Diastole** is when the heart is relaxed (after contraction) and fills with blood.



Syst...
(pump...

During the cardiac cycle, valves between the atria and ventricles and between the ventricles and the pulmonary vein and aorta open due to pressure allowing the blood to enter the next stage of the cycle. They are important in stopping backflow of blood.

Once blood leaves the cardiac cycle, there are three main blood vessels in the body ...

- **Arteries** carry blood away from the heart
- **Veins** carry blood towards the heart
- **Capillaries** are involved in gaseous exchange at the lungs and the muscle

Each have unique structures that relate to their function in the body.

There are three related terms used for the cardiovascular system:

- **Heart rate** – the number of times the heart beats per minute
- **Stroke volume** – the volume of blood ejected from the left ventricle per bea...
- **Cardiac output** – the volume of blood ejected from the left ventricle per min...

Cardiac output is calculated by multiplying stroke volume by heart rate. During e... and varies in response to the intensity of activity. Heart rate graphs are a good w... activity and how the body is responding to that activity.

Starter: Multiple-choice

Using the background notes, answer the following multiple-choice questions ab through the heart. Watch the optional video if you wish to help you.
zzed.uk/ 11865-cardiac

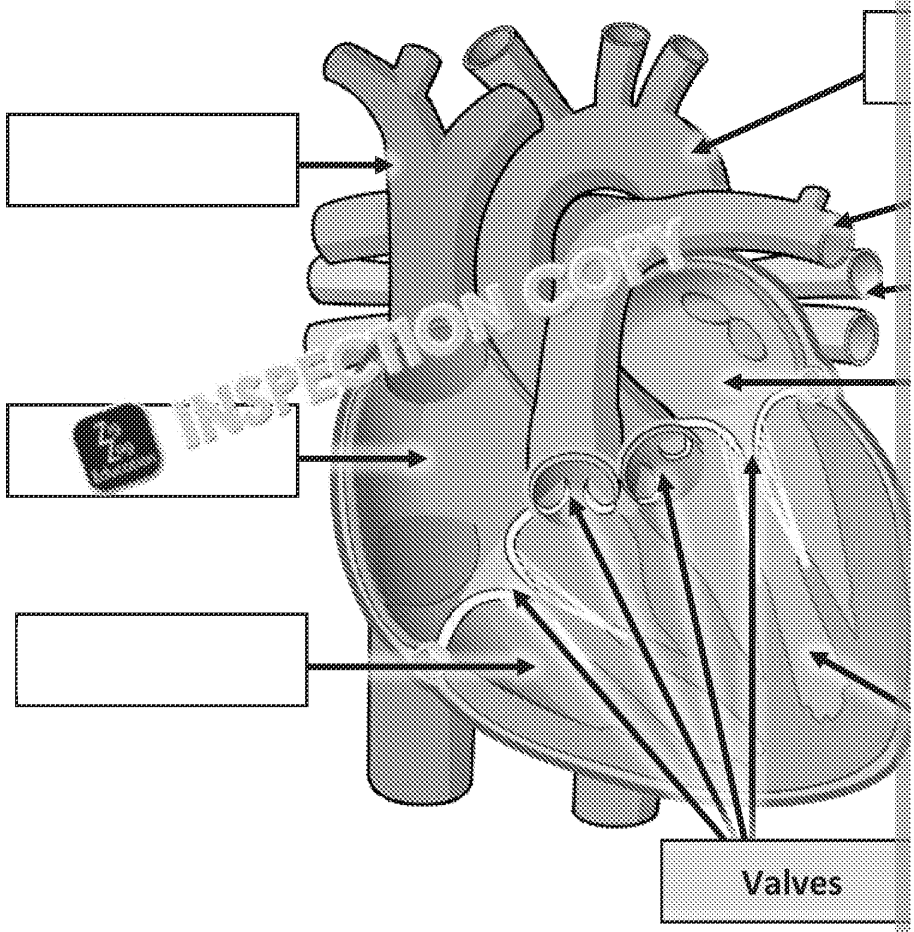
1. Which **one** of the following major blood vessels does deoxygenated blood right atrium? Tick a box to indicate your answer.
   - ❑ **A.** Pulmonary artery
   - ❑ **B.** Aorta
   - ❑ **C.** Vena cava
   - ❑ **D.** Pulmonary vein

2. Which **one** of the following best describes the role of valves in the heart? T your answer.
   - ❑ **A.** To force blood into the different chambers
   - ❑ **B.** To prevent the backflow of blood
   - ❑ **C.** To separate the right and left chambers
   - ❑ **D.** To force blood into the major arteries

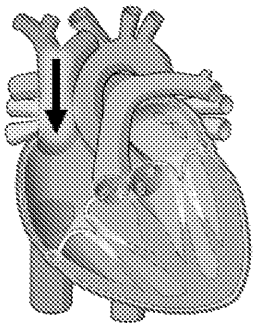
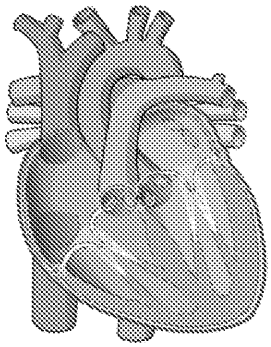
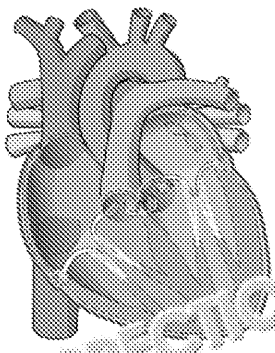
3. Which one of the following is the role of the pulmonary vein in the heart? T your answer.
   - ❑ **A.** To return oxygenated blood from the lungs to the left atrium
   - ❑ **B.** To eject oxygenated blood from the left ventricle to the rest of the
   - ❑ **C.** To eject deoxygenated blood from the right ventricle to the lungs
   - ❑ **D.** To return deoxygenated blood from the muscles

Task 1 – Heart Diagram and Pathway of Bloo

1. Using the background text as support, complete the diagram to label the str



2. Describe the different stages in the pathway of blood through the cardiovas
stage using arrows. The first one has been done for you.

	
Description: *Deoxygenated blood returns to the right atrium from the rest of the body via the vena cava* Systole ☐ Diastole ☐	**Description:** *Systole and diastole*
	
Description: Systole ☐ Diastole ☐	**Description:** Systole ☐ Diastole
	
Description: *Systole and diastole occur in this stage*	**Description:** Systole ☐ Diastole

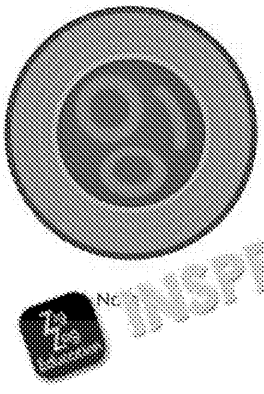
3. Identify whether each stage above is part of systole or diastole by ticking th

Task 2 – Blood Vessel Structure → Function

Complete the table below to describe the different structures of blood vessels a
their different functions.

	Arteries	Veins
Size/ diameter		
Wall thickness		
Valves	Yes ☐ No ☐	Yes ☐ No ☐
How the structures relate to the function		

Blood is redistributed during exercise from the non-active internal organs, such a
skeletal muscles. This is important to ensure enough oxygen is delivered to these
vasodilation of the arteries allows this to happen. Draw two images that would d



Vasoconstriction:

Task 3 – Exam Practice

Answer the following exam-style questions on the topic of heart rate, stroke volu

1. Define cardiac output.

.....

2. The table below shows a performer's stroke volume at rest and during exer

At rest	During exercise
80 mL	140 mL

Explain the change in stroke volume during e... ise

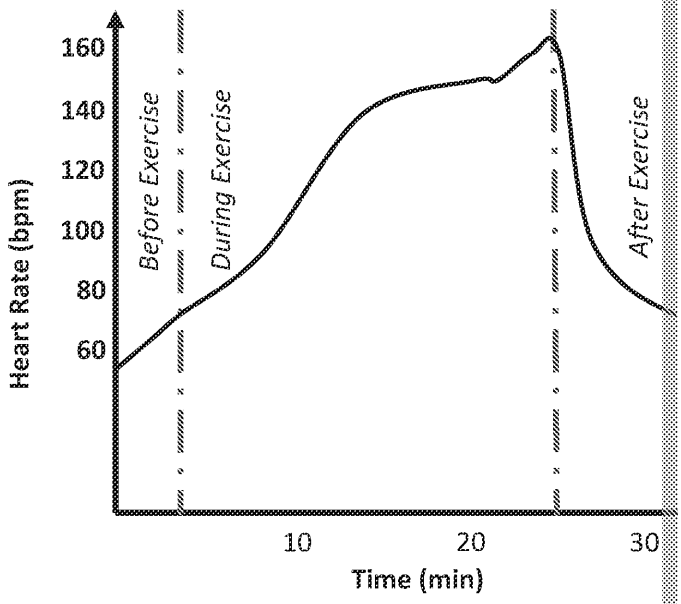
.....

.....

.....

.....

3. The graph below shows the heart rate of a performer before, during and aft



a) Name the term given for the increase in heart rate before exercise.

.....

b) Identify at which point during the race there was an increase in exercis

.....

c) Ca... the performer's cardiac output at the end of the exercise if th... was 150 mL. Show your working.

Plenary:
Self- or peer-mark the answers to the tasks.

Extension: Writing in prose
Describe the pathway of blood through the body, starting from when it leaves t
and ending when it returns back to the heart.

Lesson 6: Aerobic and Anaerobi

Learning Objectives

By the end of this lesson, you should be able to:

- ✓ Understand the terms 'aerobic exercise' and 'anaerobic exercise'
- ✓ Justify different practical examples of aerobic exercise and anaerobic exercise
- ✓ Explain the excess post-exercise oxygen consumption (EPOC) that occurs post-exercise
- ✓ Evaluate the use of different methods used to recover from a range of sporting activities

Background

All types of exercise involve a combinati[illegible]robic and anaerobic activity. The aerobic and anaerobic is simple:

- **Aerobic** exercise us[illegible] as a fuel source and relies on the presence of physical[illegible]ty, [illegible]side carbon dioxide and oxygen as waste products.
- **Anaero[illegible]**rcise also uses glucose as a fuel source, but does so without ox alongside the harmful by-product of lactic acid.

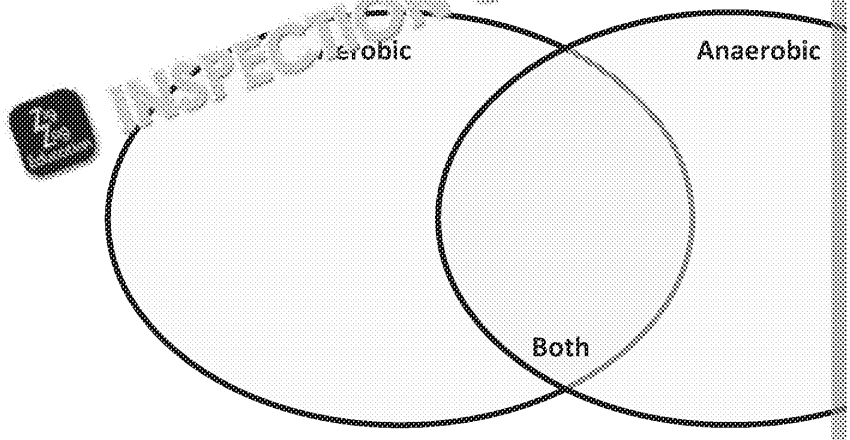
The duration and intensity of exercise are the two main factors that determine w predominant during an activity. On one end of the spectrum is high-intensity, lo 100 m sprint or the shot-put, whereas the other end of the spectrum features lo activities such as the marathon or the triathlon.

During all types of exercise, there is a lag in oxygen delivery to the working musc aerobically. Therefore, all exercise incurs some sort of oxygen debt at the beginn exaggerated by anaerobic activities, where the oxygen debt gets bigger and bigg no oxygen being present. This oxygen debt must be repaid following exercise an something known as excess post-exercise oxygen consumption (EPOC). EPOC use materials into less harmful products, such as lactic acid into glucose and carbon when we stop exercising, we breathe more deeply and quickly to get more oxyge

Starter: Aerobic or Anaerobic

Work together in pairs to identify whether each of the sports and activities bel anaerobic, or both. Place each on a Venn diagram like the one below.

400 m sprint	*Football match*	
Shot-put	*Long jump*	
Sailing	*Gymnastics*	



Task 1 – Aerobic and Anaerobic

Complete the table below on aerobic and anaerobic exercise.

	Aerobic	
Define each term		
Write an equation to summarise each term		
Exercise duration		
Exercise intensity		
Describe how both aerobic and anaerobic exercise might be used in the same sport or activity		

Task 2 – Justify Your Selection

For each activity discussed in the starter, tick the box to indicate whether you de
or both, and justify why. When justifying, think about the duration and/or intens

400 m sprint Aerobic ❑ / Anaerobic ❑

Justification:.....

.....

Football match Aerobic ❑ / Anaerobic ❑

Justification:.....

.....

Triathlon A ❑ / Anaerobic ❑

Justification:.....

.....

Shot-put Aerobic ❑ / Anaerobic ❑

Justification:.....

.....

Long jump Aerobic ❑ / Anaerobic ❑

Justification:.....

.....

Walking Aerobic ❑ / Anaerobic ❑

Justification:.....

.....

Gymnastics Aerobic ❑ / Anaerobic ❑

Justification:.....

.....

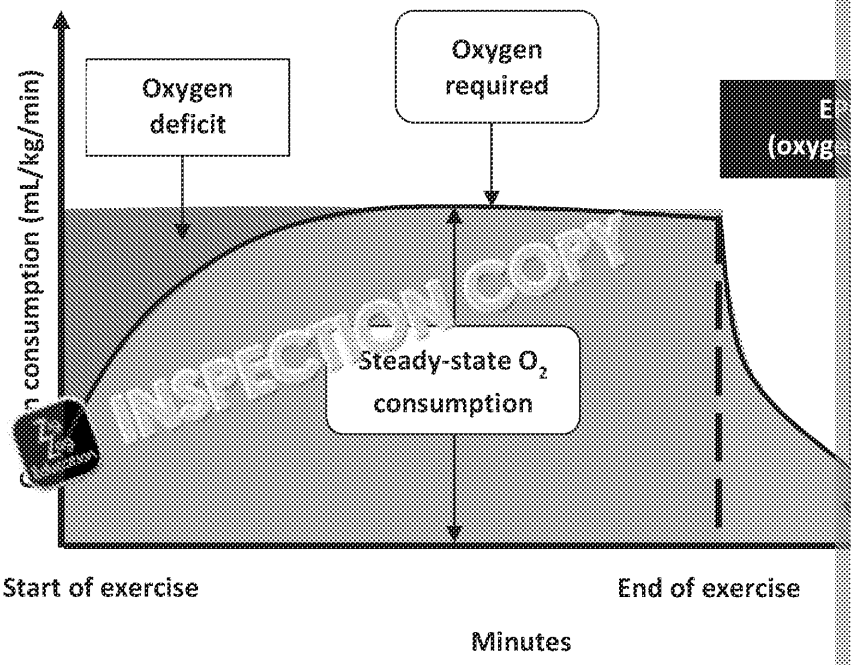
Tennis Aerobic ❑ / Anaerobic ❑

Justification:.....

.....

Task 3 – EPOC

Use the graph showing the process of excess post-exercise oxygen consumption describing the process.



Task 4 – Methods of Recovery

Cut out the reasons why the different methods of recovery from exercise are use
under the correct recovery method. Alternatively rewrite them into the table be

To maintain elevated breathing rate and repay the oxygen debt.	*To replenish the b consuming foods*
To reduce the severity of delayed onset muscle soreness (DOMs).	*To increase range of stiffness*
To rehydrate the body by replacing the water and electrolytes lost during exercise.	*maintain heart rat such as lactic a*

Cool down	
Manipulation of diet	
Ice bath / massage	

Plenary:

Peer-mark answers to Tasks 1 and 2. Then, later watch the optional video on E
the notes in the background information.

Video link for self-assessment Task 3: ***zzed.uk/11865-EPOC*** Go to **zzed.uk**

Extension: Which Method?

For each of the sporting activities below, evaluate which methods are most rele
from that activity.

1. Marathon
2. Weightlifting session
3. 80-minute game of rugby

Lesson 7: Short- and Long-term Effe

Learning Objectives

By the end of this lesson, you should be able to:

- ✓ Describe the immediate effects of exercise that occur during the activity
- ✓ Describe the short-term effects of exercise that last up to 36 hours post-exercise
- ✓ Understand the impact of long-term effects of exercise on components of fitness for sp

Background

As we exercise, the body immediately responds to cope with the demands of the activity. Typical immediate responses to exercise include hot, red and sweaty ski an increased heart rate, and an increase in depth and frequency of breathing.

In the period up to 36 hours post-exercise, the body undergoes various short-ter effects as it recovers from the exercise bout. These may include tiredness and fatigue, lightheadedness, nausea, and delayed onset muscle soreness (DOMS), cramp or aching.

After months and years of exercising, the body adapts to the activity being performed. The long-term effects of exercise include structural changes to the muscular and cardiovascular systems. A change in body shape, such as increased muscle and reduction in fat, can result in functional changes to various compone of fitness, such as an improvement in muscular strength and/or muscular endurance. The muscles also become suppler / more flexible, reducing the risk o injuries. The heart also increases in size (hypertrophy), which leads it to become lower resting heart rate. This change to the cardiovascular system can also lead t as improved cardiovascular endurance and stamina.

The effects of exercise depend on the type of activity being performed, so not al effects will be the same. For example, long-term continuous running, such as tra result in increased muscle size and strength, but will increase muscular endurance

Starter:

In pairs, discuss the short-term effects of different types of exercise on the body.

- Weight/resistance training
- Endurance training (e.g. long-distance running)
- Power training (e.g. sprinting)
- Sport-specific training (e.g. tennis, rugby

Task 1 – Timeline

Complete a timeline of the short-term effects of different types of exercise, both
Describe how each occurs and explain the impact on the body. One example has

Start of Exercise

Immediate effects:

- *e.g. the temperature of the skin increases and it turns red in a*
  blood flow to the skin which is needed to dissipate heat from
  and improve the regulation of internal body temperature.

End of Exercise

Short-term effects:

36 hours post-exercise

Task 2 – Long-term Effects of Components of

Describe the long-term effects of different types of exercise that improve the dif

Component of Fitness	Long-term Effec
Muscular strength – the ability of the muscle to exert force and overcome a resistance.	*e.g. the muscle increases in size (hy resistance training, allowing muscl*
Muscular endurance – the ability of the mu repeatedly contract fo prolonged duration, resisting fa	
Speed – the quickest the body is able to perform a movement or cover a predetermined distance.	
Cardiovascular endurance / stamina – the ability of the heart and lungs to deliver oxygen to the working muscles for a prolonged duration.	
Flexibility – the range of movement at a joint.	

Plenary

Compare ses with a partner and add any short- or long-term effects that

Extension: Email a client

Write a mock email to a client completing a training programme with a fitness
You should describe the long-term effects of training you expect them to exper

Lesson 8: Lever System

Learning Objectives

By the end of this lesson, you should be able to:

- ✓ Identify and draw linear versions of each of the three classes of lever system
- ✓ Interpret sporting movements or actions to identify the lever system being used
- ✓ Interpret the mechanical advantage of each lever system, including labelling effort and on each class of lever

Background

All types of body movements in sport may seem too dissimilar in terms of th in actual fact, the amount of effort required depending on the movement being pe movements are performed by one of three different lever systems, each oper mechanical advantage or disadvantage. This is calculated using the following for

Mechanical advantage = effort arm ÷ weight (resist

Each lever system consists of three components:

1. The fulcrum (often a joint in the body)
2. The effort (typically from a muscle contraction)
3. The load/resistance (the object being moved or the weight being overcome

The effort arm is the distance of the effort from the fulcrum, whereas the weigh of the resistance or load from the fulcrum. If the effort arm is longer than the we will operate at a mechanical advantage, but if the weight (resistance) arm is long will operate at a mechanical disadvantage.

First-class lever systems may operate at a mechanical advantage or disadvantage between the effort and the load/resistance.

Second-class lever systems operate at a mechanical advantage as the effort is alw the load/resistance; therefore, the effort arm is always greater than the weight (Conversely, third-class lever systems operate at a mechanical disadvantage as th between the fulcrum and the effort; therefore, the weight (resistance) arm is alw

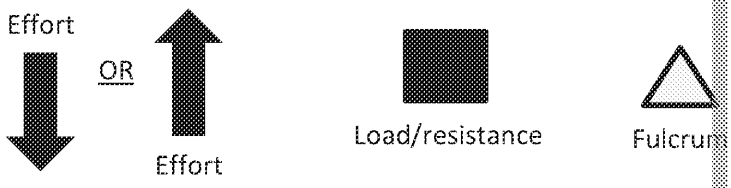
Starter:

In pairs or small groups, create the three classes of lever systems using differen For example:

- A ruler can be used as the lever arm
- A glue stick can be used as the fulcrum
- A rubber eraser could be used as the load/resistance
- Your hand could act as the effort

Task 1 – Draw, Label and Explain

1. Draw and label the different lever systems using the items below.



First-class lever system:

Mechanical advantage/disadvantage:

Second-class lever system:

Mechanical advantage/disadvantage:

Third-class lever system:

Mechanical advantage/disadvantage:

2. Add to the diagrams in part 1 by drawing and labelling the effort and weight the mechanical advantage or disadvantage of each.

Task 2 – Application to Sport

For each lever system, identify **two** sporting movements or actions that use each fulcrum, effort, and resistance/load at each. The sporting movements/actions sh

- Flexion or extension at the elbow
- Flexion or extension at the knee
- Plantar flexion or dorsiflexion at the ankle

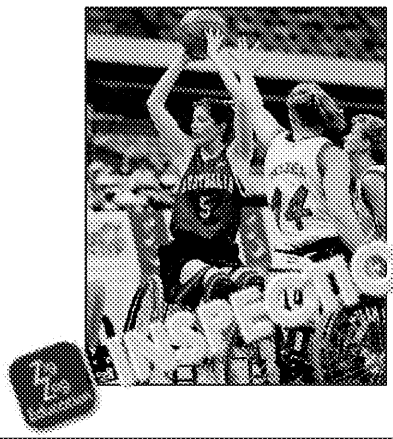
Lever system	Sporting movement/actions	Le
First class		Fulcrum: Load (resistance) Effort:
		Fulcrum: Load (resistance) Effort:
Second class		Fulcrum: Load (resistance) Effort:
		Fulcrum: Load (resistance) Effort:
Third class		Fulcrum: Load (resistance) Effort:
		Fulcrum: Load (resistance) Effort:

Plenary:

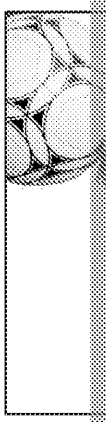
Either watch the optic[illegible] summarise lever systems in the human body the tasks [illegible]**zed.uk/11865-joints**

Extension: Identify and draw

Identify the lever system operating at each identified joint location below durin
Then draw a lever system to show the load (resistance), fulcrum and effort.

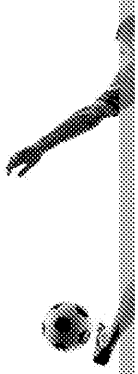


A. At the elbow when straightening the arm to throw a pass



B. At the neck whe
to m

C. At the ankle when pushing off from the blocks in a sprint start



D. At the knee whe
in prepa

Lesson 9: Planes and Axes of M

Learning Objectives

By the end of this lesson, you should be able to:

- ✓ Identify the different planes of movement and axes of rotation
- ✓ Apply sporting movements and actions to the different planes of movement and axes of

Background

Planes of movement and axes of rotation can be used when describing all sporting movements. Before we get into the different types of planes and axes, let's first look at what each means.

- Planes of movement refers to the direction in which joint actions occur.
- Axes of rotation refers to the pivot points at which joint actions occur.

Each joint movement occurs adjacent to its plane of movement. For example: flexion/extension and plantar flexion / dorsiflexion actions occur anteriorly (movement towards the front of the body), and posteriorly (movement towards the back of the body). This is adjacent to the sagittal plane, which you can imagine as a transparent rectangle cutting the body into right and left halves.

The other two planes cut the body into front and back halves (frontal plane), and top and bottom halves (transverse plane). Therefore, the joint movements that occur in the frontal plane include abduction (moving the body part away fro adduction (movement of the body part towards the midline of the body), and th the transverse plane include rotation and circumduction.

Movement also occurs around three axes of rotation. These are:

- Longitudinal axis – picture placing a pencil through an imaginary stick figure fr pencil – the stick figure should start to pirouette. This is the movement that o
- Transverse axis – now place the pencil through the stick figure from left to r figure should start to somersault. This is the movement that occurs in the tr
- Sagittal axis – finally, place the pencil through the middle of the stick figure figure should start to cartwheel. This is the movement that occurs in the sag

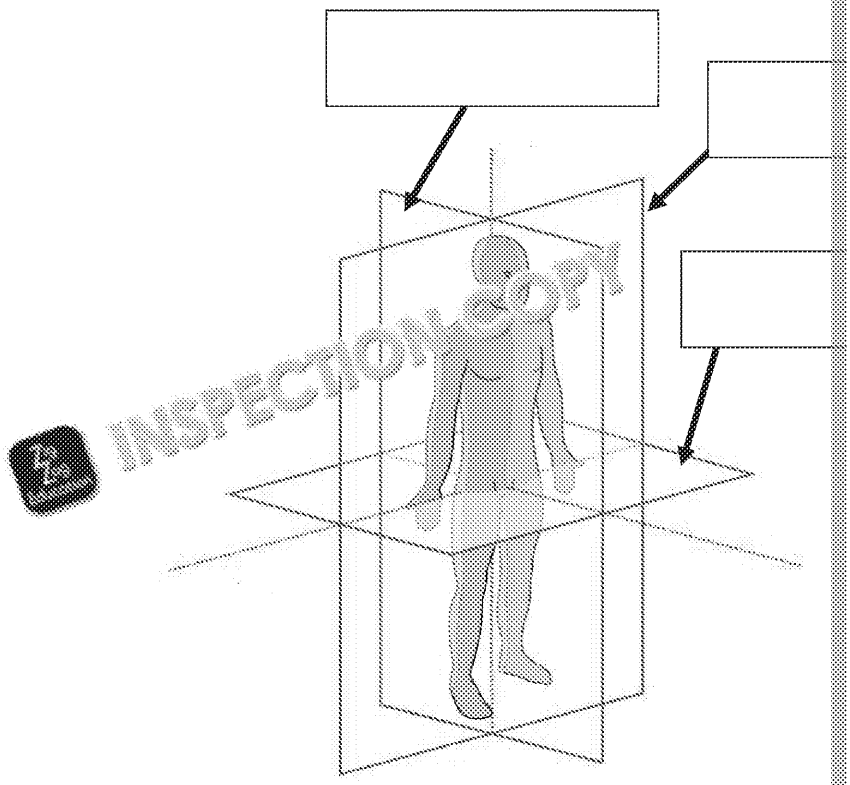
Starter:

In pairs, recap sporting actions for the different joint movements listed below t each other:

- Flexion/extension at the shoulder, elbow, hip and knee
- Abduction/adduction at the shoulder
- Rotation at the shoulder
- Circumduction of the shoulder
- Plantar flexion / dorsiflexion at the ankle

Task 1 – Planes of Movement

Label the different planes of movement and categorise the different joint movem
each plane. Add three further examples of sporting actions/movements that take

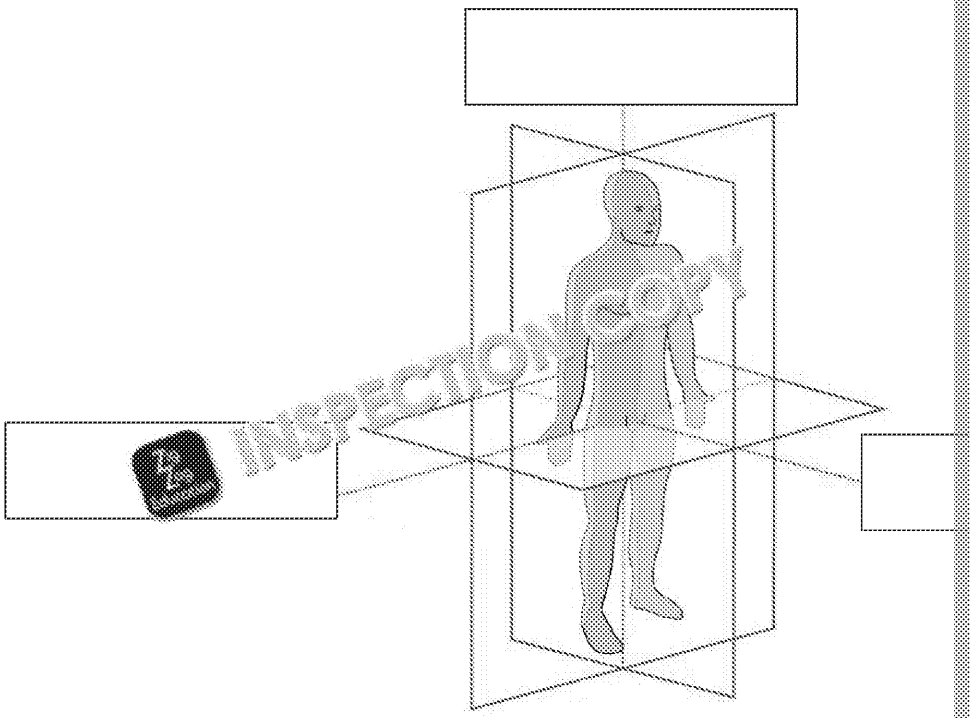


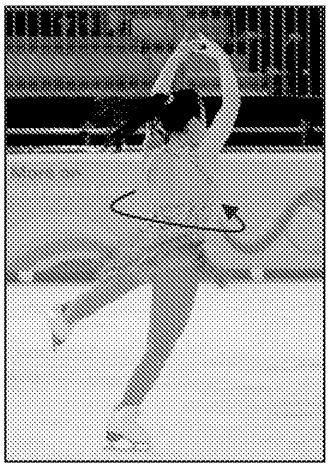
Flexion/extension	*Adduction/abduction*	*Rotation/circumducti*
Star jumping	*Forward running*	*Twisting the body during a golf swing*
Underarm bowl	*Sidesteps*	*Going on the tiptoes*

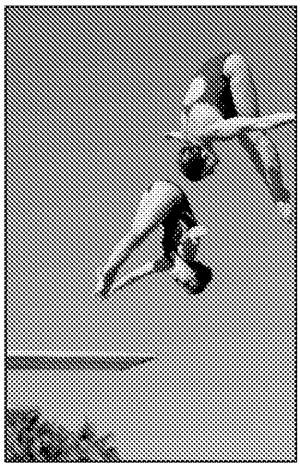
Frontal plane	Transverse plane	
Three furt an 1. 2. 3.	Three further examples: 1. 2. 3.	Thr 1. 2. 3.

Task 2 – Axes of Rotation

Label the different axes of rotation and identify the sporting action and axis in w
below occur.







....

Task 3 – Sporting actions

Complete the table below to identify the plane of movement and axis of rotation

Sporting action	Plane of movement
1. Bending of the arm when executing an underarm throw in cricket	
2. Preparing to throw a discus, by rotating in the circle to build up momentum	
3. A gymnast performing a forward roll	
4. Movement of the arms and legs when performing breaststroke	
5. A golf player twisting at the hips as they perform a drive	
6. A gymnast performing a full body twist in the va	
7. A swimmer performing the first part of a tumble turn (somersault in the water)	
8. A swimmer performing the second part of a tumble turn (twist in the water)	
9. A trampolinist performing a straddle jump	
10. A hockey player twisting their body as they perform a push pass	

Tip: Try acting out / miming these movements and comparing to your diagrams f

Plenary:

It can be quite tricky to remember the different planes of movement and axes
Tasks 1 and 2 to come up with a way of remembering the different planes of m

Extension: Gymnastic movements

Using the sport of gymnastics, list the different male and female events and de
movement and axis of rotation that the performers use in each. For example, a
routine is an example of movement about the transverse axis and flexion/exte
sagittal plane.

Lesson 10: Health and Fitness and th of Fitness

Learning Objectives

By the end of this lesson, you should be able to:

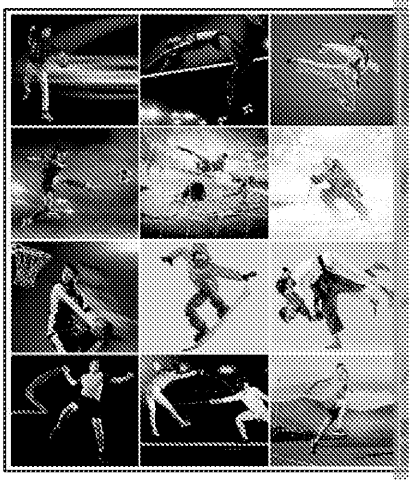
- ✓ Define health and fitness and the different components of fitness
- ✓ Understand the relationship between health and fitness
- ✓ Justify which components are and aren't needed in different sports and physical activit

Background

People perform exercise for a wh[illegible] of reasons, one of which is health. E physical health by impro[illegible]cy of the body systems, protecting against il also improve[illegible]nt [illegible]ocial health by providing opportunities to clear the he to establish[illegible]hips with others.

Exercise is also performed by groups of people to improve fitness, whether speci demands of the environment, such as aiding the ability to complete physical wor various components of fitness important to different sporting activities, and perf different components in order to be successful in their sports. The components o

- Agility
- Balance
- Cardiovascular endurance (also known as aerobic power)
- Explosive strength or power (also known as anaerobic power)
- Muscular endurance
- Flexibility
- Coordination
- Reaction time
- Speed
- Strength (of which there are numerous types, including: maximal, static, dynamic and explosive)



Increased fitness levels also, in turn, improve health; therefore, exercise plays a fitness together.

Starter:

With a partner, discuss the re[illegible]ons [illegible]ight perform exercise. Is it for health which aspect(s) of hea[illegible]h? Which sports/activities might you be improving fitn compone[illegible]fiti[illegible]which your exercise is likely to or aims to improve?

Task 1 – Health ∞ Fitness

Fill in the gaps in the paragraph below to understand the terms 'health' and 'fitn
the two.

Health is the complete state of physical, mental, and _____

_____, *not merely the absence of* _____

the ability to meet the demands of the _____. *In the co*

sport or activity being performed. If someone has _____

them from being able to _____. *This would result in a*

_____ *levels as a result of* _____

However, many fit performers are able to train despite _____

it may be a reason for the performer participating in sport or physical act

performer is _____ *but still able to* _____

improvement in their _____.

Task 2 – Define the Components

Write a definition for each of the components of fitness below and then give **one** would require high levels of each fitness component for successful performance.

Components of fitness	Definitions
Agility	
Balance	
Cardiovas… endurance… (aerobic power)	
Explosive strength / power (anaerobic power)	
Muscular endurance	
Flexibility	
Coordination	
Reaction time	
Speed	
Strength *(Explosive strength covered above)*	M… a…
	Static:
	Dynamic:

Check your answers with a partner and aim to improve you

Task 3 – Justify the Components

Use the different sporting case studies below to justify two components of fitnes
performer and two that would not.

Case Study 1:

Sarah is a long-distance cyclist who must be able to continually use her leg
maintain a good speed for the duration of each event. There are downhill
periods of the race where she can ease off the pedals and recover for hill
ascents, during which she must push really hard. She must also be careful
about the other riders who are often close by, and respond quickly if any
should swerve out in front of her. Once this happened, she had to shift
weight in order to stay upright on the bike and stop herself from falling o

Components that may be needed	Components
	

Case Study 2:

Mohesh is a basketball player who must be able to perform at a good
intensity for the duration of a match. In attack, he uses his ability to weave
and out of players using a variety of different tricks and feints. It is impor
for him to maintain control of the ball while being aware of the position o
opponent. In defence, he must make sure that he retreats quickly in order
support his teammates against the oncoming attack of the opponents. If an
opponent attempts a shot at the basket, he must be waiting nearby in case
hits the rim and the battle is on to recover possession.

Components that may be needed	Components
	

Case Study 3:

Kebira is a weightlifter who is competing in an upcoming competition. She herself a goal of lifting a personal best weight in the deadlift and squat. very important that she gets the correct range of movement in both to qua a valid performance. She also competes in the shot-put, where she uses he weightlifting strengths to her advantage. She is very good at executing th using all her effort in one go.

Components that may be needed	Component

Case Study 4:

Seamus is a gymnast who participates in a range of events such as the po horse, high rings, parallel bars and trampoline. For the pommel horse and rings, he must be able to support his body weight using just his arms. For th parallel bars and trampoline, he must be able to perform a range of mov in the air such as front flips, back flips, side twists and turns.

Components that may be needed	Component

Plenar

Compare udy responses with a peer and suggest any additional relevant may have missed.

Extension: Exam-style question

On a separate sheet of paper, answer the extended-answer exam-style questio

Evaluate the importance of cardiovascular endurance **and** power for a triathlet

Lesson 11: Fitness Testin

Learning Objectives

By the end of this lesson, you should be able to:

- ✓ Describe the main procedures of the fitness tests for the different components of fitne
- ✓ Identify the reasons for fitness testing and the limitations that exist
- ✓ Understand the difference between qualitative and quantitative data and how this data is c

Background

The various components of fitness can be measur[illegible] using bespoke fitness tests w have set procedures to ensure they are c[illegible]u[illegible] exactly the same way each or tester. Each test varies in the t[illegible]g [illegible]edures, as some require specialist eq conducted with simple [illegible] some may require different interpretations understandi[illegible]hc[illegible] are carried out, the type of data collected, and interp national av[illegible] will ensure the correct information is drawn from the results.

There are various reasons for fitness testing, and fitness testing can occur at vari training programme. Reasons for fitness testing include:

- Identification of strengths and weaknesses before beginning a training prog
- Monitoring improvements throughout the training programme
- To indicate baseline level of fitness
- To inform what training is required
- To compare against national averages and population norms
- To motivate the performer and allow goals to be set
- To vary the programme for the performer

However, fitness testing also comes with various limitations, and these are often example, some fitness tests are too generic and aren't specific enough to the act prone to inaccuracies in the data collection and, therefore, are questionable in th considered when putting performers through fitness tests and using the results t inform the training programme.

Starter:

Recap the different components of fitness by matching each component to its d

Agility	*A. The ability of the h[illegible]rt and lungs to deli muscles f[illegible]n[illegible]ended duration of tim*
Balance	*B. Th[illegible]ili[illegible]o maintain centre of mass o*
Cardiovascular endurance	*C. The time between a stimulus and respon*
Expl[illegible] strength[illegible]r	*D. The ability of a muscle to repeatedly co duration of time, resisting fatigue.*
Muscular endurance	*E. The quickest a performer is able to mov predetermined distance.*
Flexibility	*F. The ability to change direction quickly w*
Coordination	*G. Speed × strength*
Reaction time	*H. The ability to fluently and efficiently use the same time.*
Speed	*I. The ability of the muscle to apply a forc*
Strength	*J. The range of motion available at a joint*

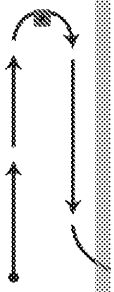
Task 1 – Fitness Test Procedures

Identify the component of fitness for each of the tests below (one has been give
next to the steps in the different fitness test procedures to rearrange each test i

Multistage fitness test

Component: _____	
When ti… …rmer misses the cone on three succ… …e beeps, they are out of the test and get given a stage and level number as the test score.	
An audio player plays the test recording, where each beep indicates when the performer needs to turn on a 20 m running track.	
The time between each beep decreases as the levels progress with the test.	

Illinc

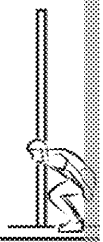


Component: *Agility*	
The test conductor ti… this is used as the… in s…	
A 10 × 5 metre course…	
The participant shou… laying on their front w… and need to comple… as …	

Sit-up bleep test

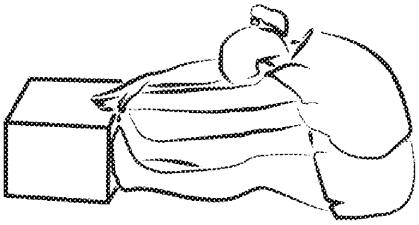
Component: _____	
They continue to perform sit-ups for as long as possible.	
In time with a metronome, the participant performs a sit-up by bringing their… …w to their knees and retur… …ei…nitial position – the… cou… …e full repetition.	
When the… …o longer keep up with the metron… …, the test will stop and the participant will record the length of time they managed, to use as the test score.	
The participant prepares for the test by lying on a mat on their back with their legs bent and feet flat on the floor.	

Vertica



Component: _____	
The participant then … and marks…	
The participant chalk… piece of chalk) and … placing both feet…	
The distance betwee… and the second mark (… used as the test …	
The participant marks… reaching as high as … while…	

Sit and reach test

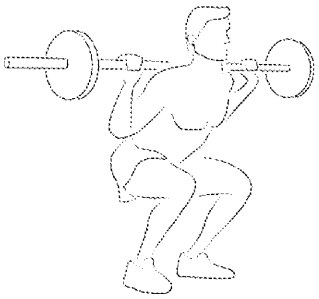


Component: _____	
A ruler measure on the sit and reach box allows them to measure how far they reached.	
The participant sits with their feet placed up against a sit and reach box and legs kept straight on the floor.	
They then stretch out in front of them and reach as far as possible on the sit and reach box.	
The test score is measured in centimetres.	

Stork s

Component: _____	
The participant adop *ot is raised off the* *the knee a*	
If the participant lose *foot comes off the st* *come off the waist, t* *stop the test and reco* *tes*	
Once the participant *conductor st*	
The participant sho *balance for a*	

One-rep max test

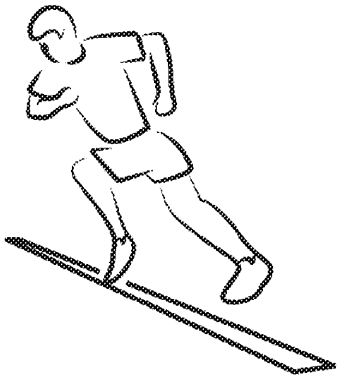


Component: _____	
The test score is given in kg with the last weight they managed to perform a successful rep with.	
They should perform a single rep with a *set, gradually increasing the weight loaded onto the bar each time.*	
The participant should warm up by practising performing the exercise they are testing the 1RM for, i.e. a squat.	
They should do this until they reach the maximal weight they can lift in one rep.	

Ruler

Component: _____	
The point on the ruler *the participant's* *test score (*	
The participant shou *possible by closing the* *making sure the hand*	
In the test conductor's *go of*	
The test conductor h *the top of the pa*	

30 m sprint test

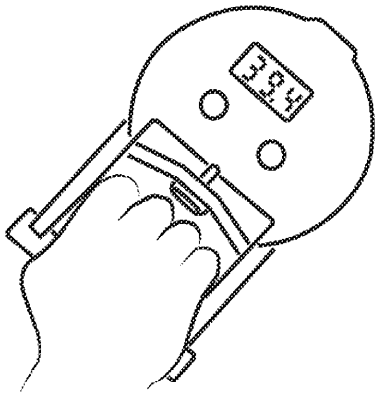


Component: _____	
They then sprint a pre-set out 30 metre distance as fast as they can.	
An assistant records the time with a stopwatch and uses it as the test score, in seconds.	
The participant starts from a stationary position behind a marked line.	

Wall

Component: _____
Once the time is up, t successful catches th and use it a
They do this as many s
On the command 'g throw a tennis ball a with the

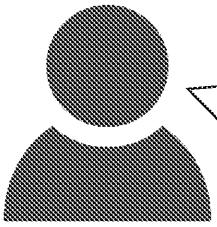
Handgrip dynamometer test



Component: _____	
The test score is displayed on the scre in kg.	
When they are ready, they squeeze the grip dynamometer with their dominant hand as hard as possible for five seconds.	
The participant adjusts the dynamometer so that it fits comfortably in their hand.	
They then stand in an upright position with their arms down parallel to their body.	

Task 2 – For and Against

Highlight the reasons why the coach below might use fitness testing and the limi
the way, then write your own reply to identify any more reasons why fitness test
further limitations.



There are a number of different reasons why I used fitne
components of fitness of my performers. But there are a
be cautious when collecting and using data. Fitness tests
starts the programme as they give a good understandin
can then be used as a comparison to monitor improveme
programme. However, it is important to take into consid
not be as motivated as they pre[illegible]y were with the te
the results.

Fitness t[illegible]help our performers to set goals and m
H[illegible]here are often times when fitness tests are too
[illegible]he sport, and, therefore, achieving a goal might not
performer has improved their ability to perform in that

Additional reasons why you may use fitness testing include:

However, there are also the following limitations that you may need to c

Plenary:

Compare responses with a peer then each select a sport / a[illegible] activity and evalu
fitness tests for that sport/activity.

Extensi[illegible]reate a fitness schedule

Create a fitness testing schedule for a hypothetical athlete and explain why you
selected at the chosen times.

Lesson 12: Principles of Tra

Learning Objectives

By the end of this lesson, you should be able to:

- ✓ Identify the key principles of training and overload
- ✓ Explain how the key principles of training bring about fitness improvements
- ✓ Apply the principles of training to sporting examples

Background

It is easy to say that training brings about improvements in fitness. But there are principles that must be applied in order to achieve it.

There are two acronyms associated with remembering the different principles of training:

SPORT

- Specificity – how relevant a training method is
- Progressive – steady increases in training load
- Overload
- Reversibility – fitness gains lost if training stops
- Tedium – variation in training to prevent boredom

FITT

- Frequency
- Intensity
- Time – how
- Type – what

These are applied to training programmes to both maximise fitness movements and avoid burning out. The progressive overload of training encompasses the FITT principles. Frequency, intensity, time and type of training can all be manipulated to bring about improvements.

Starter:

Define each of the SPORT and FITT principles of training below.

SPORT principles	FITT principles
Specificity	Frequency
Progressive Overload	Intensity
Reversibility	Time
Tedium	Type

Task 1 – Programme Annotation

Annotate the principles of training that have been applied in the example summary of a training progra

	Week 1	Week 3
	Rest	Speed training 6 × acceleration sprints (1 set) 8 × hill sprints (1 set)
Tue	Interval training 2 mins work at 80% race pace / 6 mins rest (6 sets)	Interval training 90 secs work at 90% race pace / mins rest (6 sets)
Wed	Rest	Rest
Thu	Rest	Rest
Fri	Interval training 4 mins work at 60% race pace / 6 mins rest (4 sets)	Interval training 5 mins work at 60% race pace / mins rest (4 sets)
Sat	Recovery swim	Recovery cycle
Sun	Rest	Rest

e.g. increase in the time of interval training sessions from Week 1 to
increasing the length of the work bout from 4 minutes to 5 min

Task 2 – Apply It!

In pairs, use the template below to suggest how each of the principles of training programme of a sports star of your choice.

Athlete:	
Sport:	
Training type:	
	How I will apply the principle to the athlete's
Specificity	
Progressive Overload – **Frequency**	
Progressive Overload – **Intensity**	
Progressive Overload – **Time**	
Progressive Overload – **Type**	
Reversibility	
Tedium	

Plenary:
Self- or peer-check work and mark answers to the tasks.

Extension: Six-week training programme

Using the template below, briefly design a six-week training programme for the sports star used in Tas
You should use the example in Task 1 as an example of the level of information required.

	Week 1	Week 3
Mon		
Tue		
Wed		
Thu		
Fri		
Sat		
Sun		

Lesson 13: Types of Train

Learning Objectives

By the end of this lesson, you should be able to:

- ✓ Understand the distinctions between the different types of training
- ✓ Understand the principles that govern each type of training
- ✓ Identify the advantages and disadvantages that each type of training has for the body

Background

The types of training that a performer chooses to use within their programme w fitness they are aiming to improve. Each type of training is designed to focus on a fitness components, so if the performer requires a wide range of fitness compon their sport, it is likely that they will use a range of training methods within their t added benefit of adding variety to training, which can reduce tedium – one of th which are the hallmarks of a successful programme.

The different types of training include:

- Circuit training – involving numerous stations with different exercises perfo
- Continuous training – constant intensity activity for longer than 30 minutes
- Fartlek training – varying the intensity of activity through changes in speed a
- Interval training (and high-intensity interval training; HIIT) – different intens with periods of rest and recovery that last for different durations
- Static stretching – stretching a muscle while stationary
- Weight training – using free weights and resistance machines to load the m
- Plyometric training – involves performing different explosive movements

Each type of training has several principles that govern the way it is delivered. Th must take into account the purpose and target intensity of training, including the to be needed. The various types of training also have their own advantages and effects on the body and the specific aims of the training programme. Therefore, must be appropriate for the fitness needs of the performer, whether that be aer focusing on any links that can be drawn to the specific sporting activity the perfo

Starter:

Working in pairs, discuss and give a brief description of what you think each of entail. Copy and complete the table below.

Training method	Brief description
Circuit training	
Continuous train	
Fart	
Inter aining	
HIIT	
Static stretching	
Weight training	
Plyometric training	

Task 1 – Match Up

Match up the different training methods to **one** of the components of fitness tha
training method may improve more than one component of fitness, but for this a
one. Then discuss with a partner to justify your choices.

Circuit training	Cardio (a
Continuous training	
Fa training	
Interval training	Mu
HIIT	
Static stretching	
Weight training	
Plyometric training	

Task 2 – Session Design

Complete the table to outline a training session for each training method, using th

Training method	Session Instruction
Circuit training	*e.g. for muscular endurance, set up six different ex press, station 2 – bent over rows, station 3 – biceps station 5 – shoulder press, station 6 – band assiste each station with 30 seconds recovery between ea with an additional 2-minute rest period between e*
Continuous training	
Fartlek tra	
Interval training	
HIIT	
Static stretching	
Weight training	
Plyometric training	

Task 3 – Fitness Test Procedures

1. Make a list of the advantages and disadvantages of the different training me

Training method	Advantages	
Circuit training		
Continuous training		
Fartlek training		
Interval training		
HIIT		
Static stretching		
Weight training		
Plyometric training		

2. Play a game of verbal tennis where one person provides an advantage and t particular training method. Whoever fails to provide a valid response or run game. Choose three training methods that you will be giving your responses

Plenary:

Use a sport of your choice to justify the training methods that will that sport effectively.

Extension: Evaluate the training method

Evaluate the appropriateness of two training methods of your choice for a perf activity. By evaluating, you should weigh up the advantages and disadvantages comparing continuous training and interval training could include interval train improvements in cardiovascular endurance and sessions are generally shorter, motivation as the intensity of exercise is typically higher.

Lesson 14: Optimising Traini
Preventing Injury

Learning Objectives

By the end of this lesson, you should be able to:

- ✓ Calculate intensities of training in order to optimise training effectiveness for different
- ✓ Understand the different considerations for preventing injury
- ✓ Understand the use of high-altitude training as a form of aerobic training
- ✓ Identify the aims, characteristics and benefits of the three training seasons and apply e

Background

Once an appropriate met[illegible]ining has been selected to improve a given co
variety of wa[illegible]at [illegible]ectiveness of training can be optimised. One such way
Two comm[illegible]hods are:

1. Percent[illegible] of maximum heart rate (HRmax) – used to calculate aerobic and
2. Percentage of one-repetition maximum (1RM) – used to calculate the load t
   strength/power or muscular endurance. For example, when training for stre
   1RM is higher than when training for muscular endurance. Moreover, fewer
   set, and the rest periods between each set are longer.

As well as applying different training principles to traditional training methods, d
also be adopted to optimise training effectiveness. One such popular training tec
carried out correctly, this results in training adaptations that benefit aerobic exe
improvements in the oxygen-carrying capacity of the blood.

To get the very best out of training, it is important to understand the different se
training season. These include pre-season (which acts as a period of preparation
fitness is maintained for peak performance), and post-season (where the perfor
training). The make-up of each of these periods will be specific to different physi
overarching aims and characteristics will remain the same:

Pre-season/preparation	Competitive/peak/playing season	
To prepare for the playing season by rebuilding any fitness lost during the off-season.	To maintain fitness levels through regular training, focus on specific skills and tactics, and taper for each competitive event or match.	T tra le re

Finally, as all effective training programmes [illegible] the performer staying free fr
factors that performers can take into [illegible]sideration to help with injury preventio

- Warming up to increas[illegible]exibility of muscles and range of movement at
- Wearing [illegible]ro[illegible]thing and footwear; for example, to reduce the risk
  clothi[illegible]ed
- Selecti[illegible]training method and intensity fit for the training purpose so that
  overworking themselves
- Taping and bracing weakened body parts to protect them during the activity
- Staying hydrated to avoid the consequences of dehydration, such as confus
- Allowing sufficient rest between sessions in order to recover and start each
- Using the correct technique to lift equipment safely, e.g. bending with the le

Starter:

Identify the equations to calculate the target heart rate for aerobic and anaero information below.

- HRmax = 220 (bpm) – age (years)
- Aerobic training zone = 60–80% of HRmax
- Anaerobic training zone = 80–90% of HRmax

Equations for aerobic training zone	Equations for
Lower limit:	Lower limit:
Upper limit:	Upper limit:

Task 1 – Calculations

Calculate intensities for each of the performers below to provide advice based o

Create another example for each and swap sheets with a partner to see if they c

Name	Sex	Age	Fitness goal	
Shona	F	16	To improve anaerobic performance in order to run a quicker 400 m.	
Jermain	M	39	To improve aerobic fitness in order to complete an upcoming 5 km run.	

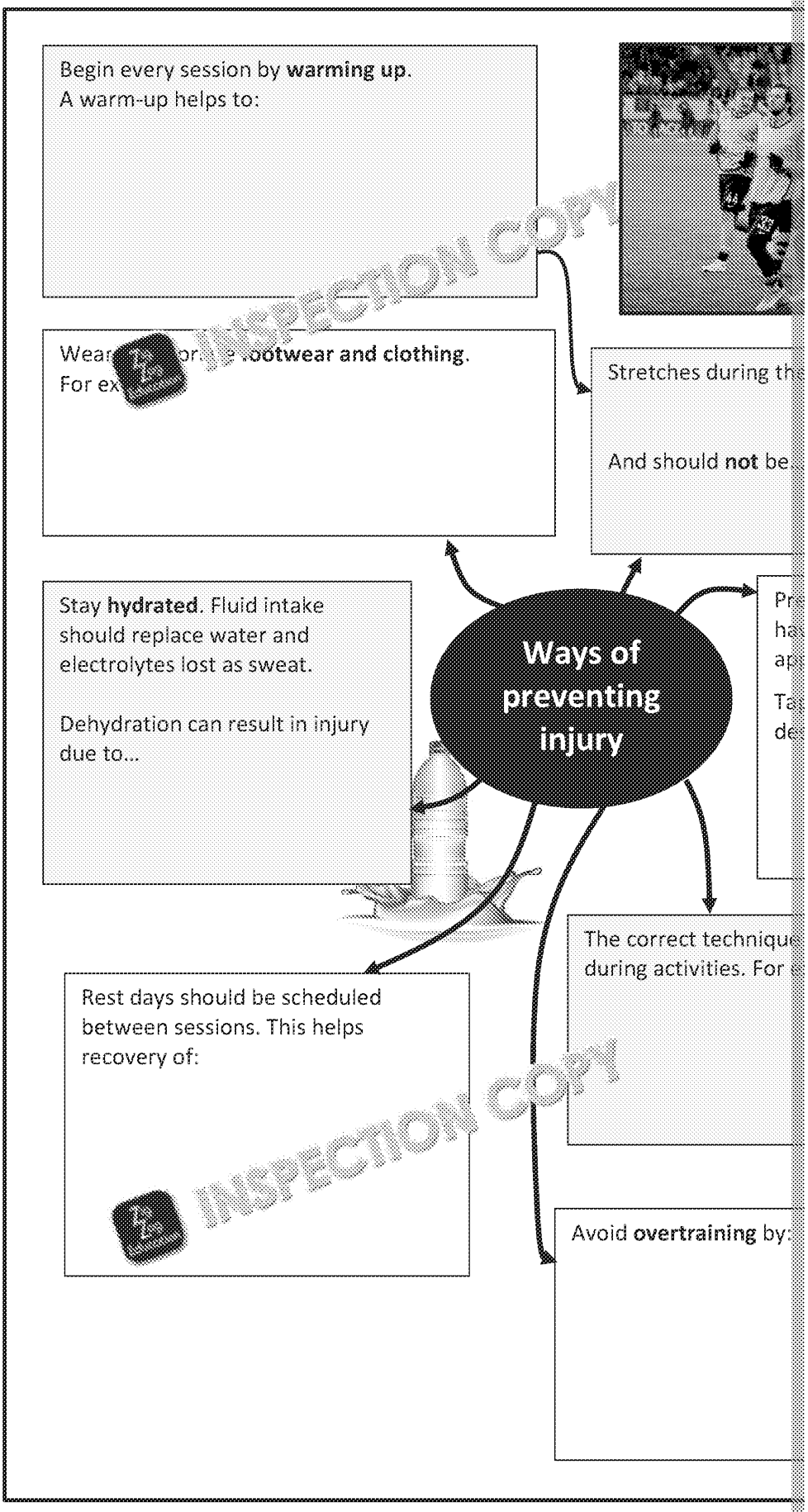
Name: *Dan*	**Sex:** *Male*	**Fitness goal**
Exercise	**1RM (kg)**	**Advice**
Back squat	125	
Bench press	105	
Standing shoulder press	80	

Name: *Fatimah*	**Sex:** *Female*	**Fitness goal**
Exercise	**1RM (kg)**	**Advice**
Deadlift	80	
Prone pull	55	
Quadriceps extension	75	

Name:	**Sex:**	**Fitness goal**
Exercise	**1RM (kg)**	**Advice**

Task 2 – Injury Prevention Guidance

Complete the template below to create a guidance sheet for a prospective client
ways that they can prevent injury during exercise. You should consider the follow



Task 3 – Paragraph Fill

Using the words provided, fill in the blanks in the paragraph below to show how as a form of aerobic training. Each word may be used more than once.

access	*oxygen*	*short*	*7*
heart	*advantage*	*2500 m*	*aero*
anaerobic	*red*	*Alps*	*spe*

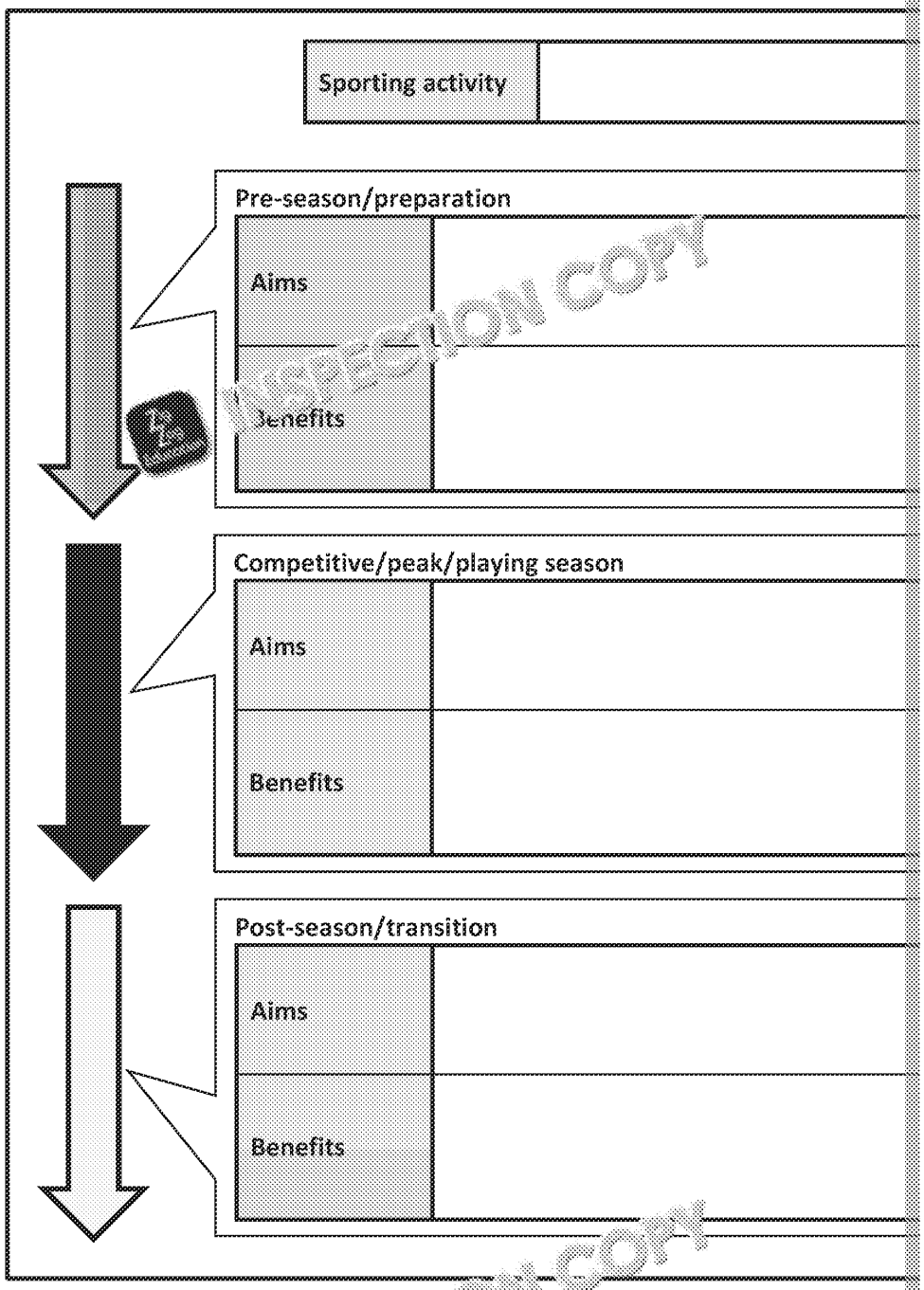
High-altitude training involves the performer training at an altitude typically _____ *m above sea level. The p* *is is that there* _____ *at altitud* *reduces the volume of* _____ *When the performer be* *exercise, the body is unable to transport o* *muscles* *w* *sea level. As a result, training* _____ _____ *must work harder to pump blood to transport ox*

However, over time the body adapts and produces more _____ *blo* *for transporting oxygen in the blood. This increases the* _____ *making the delivery of oxygen more efficient, thus improving* _____ *performance, such as long-distance running. It has no impact on* _____ *performance, such as sprinting, as the body does not rely on oxygen delive* *adaptation to high-altitude training persists for a* _____ *sea level, giving the performer a competitive advantage over fellow perfo* *altitude.*

The benefit of altitude training is that it can provide a real improvement to *within just* _____ *days. This gives the performer a competitive* _____ *athletes who have not explored this training technique. However, it is not wi* *must reduce their* _____ *of training due to it being too hard to* *they will miss out on the benefits of these sessions which could develop othe* _____. *Moreover, altitude tra* *ng* *not readily accessible* *requires access to an altitude* _____ *or an environment* _____ *T* *s that a barrier many performers will face*

Task 4 – It's the Season to be Training

Complete the template to identify aims of the three training seasons and apply e
sporting activity of your choice to identify the benefits.



Plenary:

Peer-chec nses for each task. Recap the gap-fill for altitude training and
the benefi tweigh the limitations, or vice versa. You should include referen

Extension: Design a circuit

Design a circuit training session to show how the time, rest periods and conten
to improve a performer's muscular strength or endurance.

Lesson 15: Warming Up and Coo

Learning Objectives

By the end of this lesson, you should be able to:

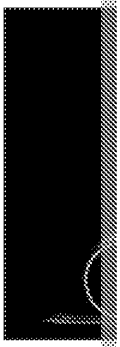
- ✓ Identify examples for the constituent parts of warm-ups and cool-downs
- ✓ Understand the benefits of warming up and cooling down

Background

Warm-ups and cool-downs are essential aspects of trainin[illegible]ssions. Each are made up of a number of constituent part[illegible]at [illegible]ve a range of benefits.

Warm-ups prepare the p[illegible]r the main activity and should include:

- A grad[illegible]e-raising activity
- Stretchin[illegible]
- Skill-based practice and familiarisation
- Mental preparation
- Increased oxygen delivery to working muscles



Cool-downs help transition the body back to rest. They include:

- Activities to maintain elevated breathing and heart rate
- Activities to reduce intensity
- Stretching

Each constituent part has a range of benefits, from increasing body temperature to injury prevention in the warm-up, to removing waste products and preventing delayed onset muscle soreness (DOMS) in the cool-down.

Starter:

Think about your experiences with warm-ups and list the positive effects they h[illegible] perform in the main activity.

Task 1 – Warm-up Design

Design a warm-up for a sport or an activity of your choice. You should provide in
identify the range of benefits that each has on the body. (Note: there are four pa
table below.)

For example, a 'pulse-raiser' activity in football may involve:

Instructions	
A light jog across the width of the pitch and back, followed by sidesteps alternating after every three, then alternating between high knees and heel flick finishing with alternating between forw an backwards running.	*Increased heart rate circulate blood and a increase in body environmental cond*

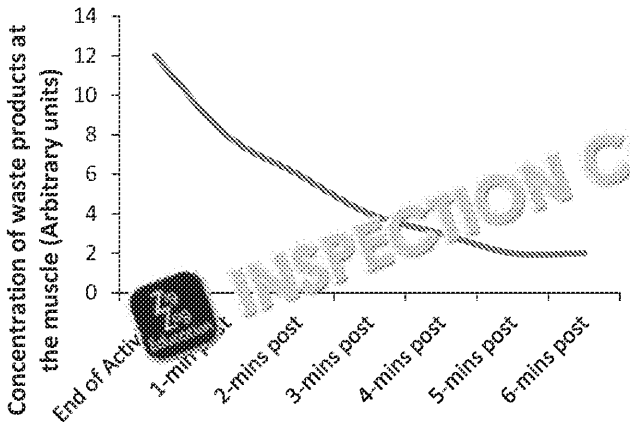
A	Instructions	
1.		
2.		
3.		
4.		

Task 2 – Cool-down Analysis

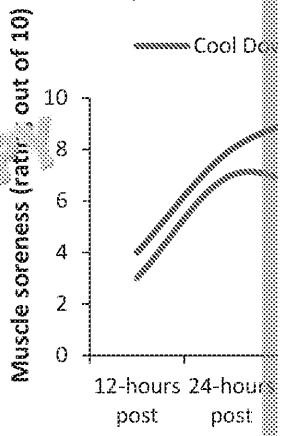
Analyse the graphs below to:

- Describe what is happening
- Describe the constituent parts of the cool-down that help achieve each ben
- Explain the importance of each benefit

Waste products removal



Delayed onset



What is happening in the graph?	What is happening
Constituent part that achieves this and its role:	Constituent part th
Importance of benefit:	Importance of bene

Plenary:

Self- or pe ck work against the answers.

Extension: Design a cool-down

Use the constituent parts of a cool-down (light activity that gradually reduces i design a cool-down in the sport or activity you used for the warm-up in Task 1.

Lesson 16: Use of Data

Learning Objectives

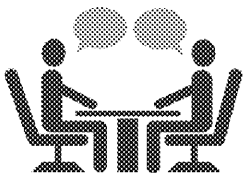
By the end of this lesson, you should be able to:

- ✓ Understand the different types of data and methods for collecting each
- ✓ Present data in tables and plot basic charts and graphs
- ✓ Analyse and evaluate data in charts, graphs and tables

Background

Data is prevalent throughout sport, from the match statistics that you see publicised to privatised types of data found in the likes of accounting reports and information from... Just from these two examples we can see that data is split into different types, with quantitative data and qualitative data.

Quantitative data is factual information that can be counted, such as the number of specific responses derived from questionnaires and surveys. For example, Sport England's Active Lives provides numerical data such as the percentage of the population participating in a certain sport. This is obtained from surveys that are sent out to a random sample of households across England. As it is numerical, it is quantitative data. Other examples include time in seconds or the number of points a team scores.



Qualitative data is formed by subjective opinions, such as those obtained from interviews and the notes drawn from observations, identifying barriers to participation in certain user groups. This is conducted with members of the population from each group to gain individual experiences. As they will describe their experiences in words. Data can be presented in a range of ways, some of the most common are bar charts, pie charts and line graphs. This allows the user to get a visual picture of the information presented and make evaluations based upon what it means.

Starter:

If you wish, watch the optional video below to help in answering true or false questions on sport. ***zzed.uk/11865-data***

1. Quantitative data uses descriptive language.
   ❑ **True** / ❑ **False**
2. An example of quantitative data is the number of individuals who ranked hockey as their No. 1 sport.
   ❑ **True** / ❑ **False**
3. An example of qualitative data is why someone ranked hockey as their No. 1 sport.
   ❑ **True** / ❑ **False**
4. The number of individuals who ranked each sport as their No. 1 is best represented by a bar chart.
   ❑ **True** / ❑ **False**

If true, then why? If false, then what graph or chart, and why?

Task 1 – Data Categories

Working in pairs, cut out the different examples of data below and categorise th
or quantitative types.

The heart rate of an individual before, during and after exercise	*Extrinsic feedback given to a performer by a coach*	*Th*
The percentage of people participating in a sport belonging to a particular social group	*The reasons why a coach uses fitness testing*	
The components included in a warm-up routine	*The reasons performers give for being involved in hooliganism*	*Th*
The results obtained from a range of fitness tests	*The tidal volume of an individual at rest and during exercise*	

Qualitative data	Qua

Task 2 – Data Collection

In this task, you are going to collect your own quantitative and qualitative data r

You will create a questionnaire or survey and then go around the class to collect
from classmates from their responses to your questionnaire/survey.

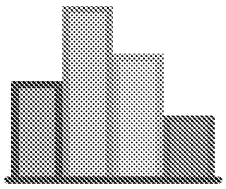
Examples of data you might collect are as follows:

Quantitative data	Qu
• *The main sport someone participates in, to create a frequency table or bar chart* • *Number of days or hours per week a perso participates in sport, to create r s chart* • *The number of differe rt each person partici in se a bar or pie chart*	• *Someone's negati sport (e.g. if they reason or why the participating in t* • *What would your engaging in sport*

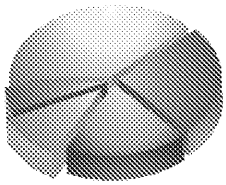
Questions	Answers/note

Task 3 – Data Presentation

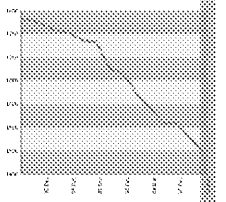
Present the quantitative data you collected in Task 2 using one (or more) of the f



Bar chart



Pie chart



Graph

Remember to provide a legend* if necessary and to label the y-axis and x-axis o

* A legend acts as a key for information included in a chart or graph to represent example, different graphical data may be presented as dashed and dotted lines o

Plenar

Compare y work with peers who collected different data. Discuss both of yo

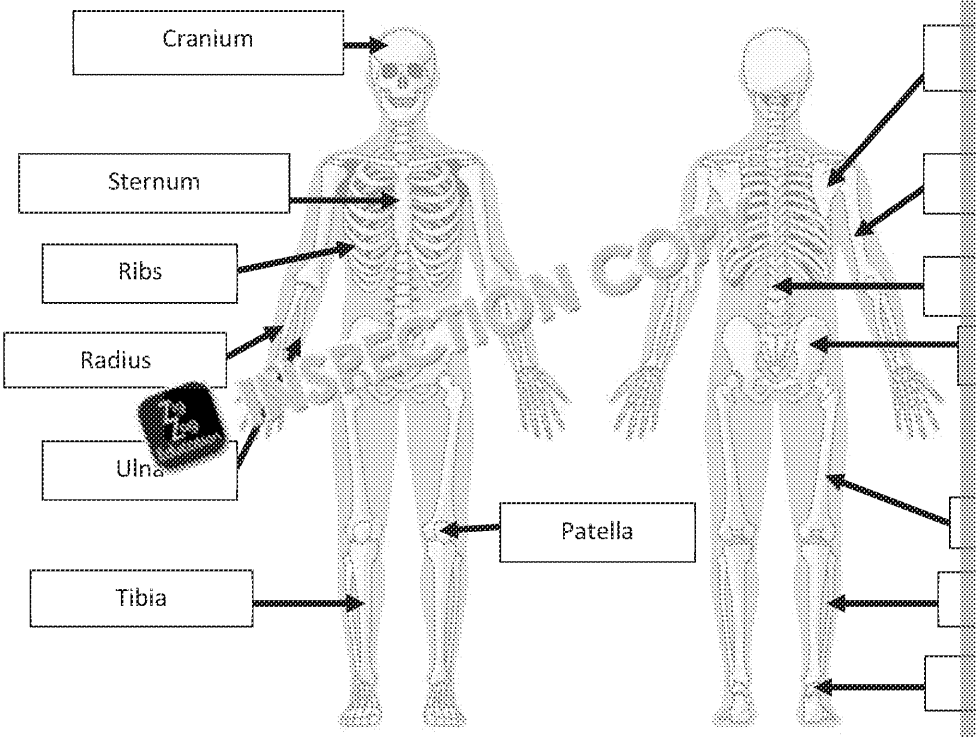
Extension: Swap and analyse

Swap worksheets for Task 3 with a partner and analyse the quantitative data p graph or table of choice.

Answers

Lesson 1: The Skeletal System

Task 1



Task 2

Students should identify the following missing words in the text.

The skeletal system works alongside the **muscular** system to allow movement at the diff
functions of the skeleton is to provide a point of **attachment** for skeletal muscles. When
bone to cause **movement**.

The shape and type of bones in the body determines the amount of movement available
of the wrist, and enable **fine** movements during sporting actions that require accuracy, s
or manipulation of an object, such as the **spin bowl** in cricket. Long bones are found in th
femur at the **hip**, the femur and tibia at the **knee**, and the tibia and **fibula** at the ankle.

The shape and type of bones not only influence the amount of movement they provide,
play in the body. For example, flat bones such as the cranium, the sternum and the **pelvi**
covers many important **organs** in the body. For example, the **cranium** protects the brain

As well as the different types of bones in the body, there ar[illegible] different types of joints
movement, enabling them to perform specific actions [illegible] activity.

Task 3

Students should match up the functions with their descriptions as below, and provide s function is applied in physical activity.

- ***Support*** *– Bones provide a framework to remain upright without the body collapsin*
- ***Protection*** *– Bones shield internal organs, such as the brain, heart and lungs, from d*
- ***Structural shape and points of attachment*** *– The layout of bones determines our fig via tendons.*
- ***Mineral Storage*** *– Bones store minerals such as calcium and phosphorus for other f*
- ***Movement*** *– Bones form at joints and act as levers in the body.*
- ***Blood cell production*** *– Long bones produce red blood cells (for carrying oxygen) an support) in the bone marrow.*

Application to performance:

- **Protection** – e.g. the ribs and sternum p[illegible] he[illegible]art and lungs from damage in someone is tackled around the [illegible]oy.
- **Structural shape and [illegible]chment** – e.g. connective tissue joins the body to body in r[illegible]ng [illegible] a loading of a barbell during a squat.
- **Minera[illegible]e** – e.g. calcium is stored in the bone and released when it is needed protect [illegible] fractures, such as stress fractures from excessive running.
- **Movement** – e.g. the quadriceps pulls on the tibia to cause extension at the knee jo
- **Blood cell production** – e.g. red blood cells provide oxygen to working muscles to u periods, such as during the marathon.

Task 4

Students should complete the table similar to the below:

Type of bone	Function	Bones	
Short	To enable fine movements	carpals, tarsals	e.g. to a
Long	To produce gross movements	e.g. femur, tibia, humerus, ulna, radius	e.g. to h high jum
Flat	To protect vital organs	e.g. cranium, scapula, sternum, pelvis	e.g. to p when he

Extension:

1. **1 × AO1 mark for:**
   c) Humerus (1)

2. **2 × AO1 marks from:**
   - Support
   - Movement
   - Mineral storage
   - Protection of vital or
   - Structural shape and
   - Blood cell productio

3. **1 × AO1 mark from:**
   - Tibia
   - Femur
   - R[illegible]
   - Fibula
   - Ulna
   - Humerus

4. **1 × AO2 mark for:**
   - Radius (1) **OR** ulna (1)

Lesson 2: Synovial Joints and Movement

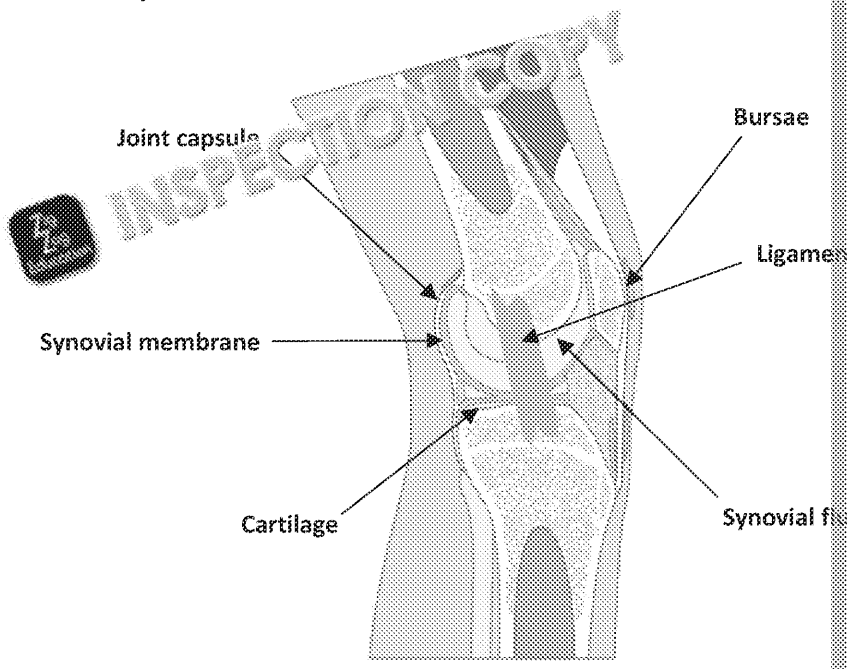
Starter

Correct answers to the True or False quiz are as follows:

1. False (Ligaments join bone to bone)
2. True
3. True
4. False (The knee joint can only allow extension and flexion, the shoulder joint allows
5. False (Plantar flexion and dorsiflexion occur at the ankle joint)

Task 1

Students should correctly label each structure.



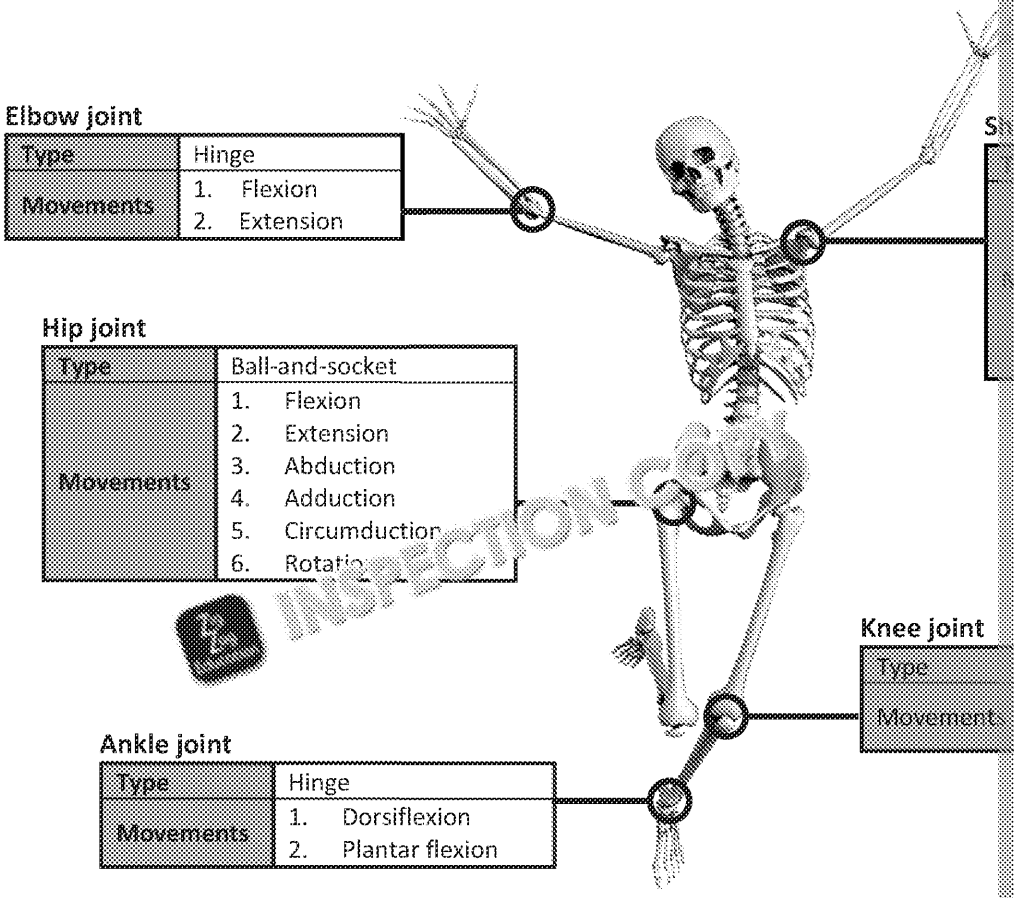
Students should correctly match up each structure

- ***Joint capsule*** *– Made of an inner synovial layer and outer fibrous layer in order to p joint during exercise.*
- ***Synovial membrane*** *– Lines the inside of the joint capsule and is responsible for rele*
- ***Synovial fluid*** *– Lubricates the joint cavity, preventing friction between bones and incr*
- ***Bursae*** *– Small sacs of fluid located between tendons and bones which reduce friction a*
- ***Cartilage*** *– Prevents the ends of bones from rubbing together at the joint, allowing for s*
- ***Ligaments*** *– Joins bone to bone, providing stability at the joint during forceful impa*

Task 2

Students to describe the different types of movements and id the types of joint a each location.

- **Dorsiflexion** – Decrease in the angle bet e and the toes
- **Plantar flexion** – Increase in the ang een the shin and the toes
- **Flexion** – Decrease in th ween two bones in the sagittal plane
- **Extension** – re angle between two bones in the sagittal plane
- **Abducti** oving of a body part away from the midline of the body
- **Adductio** oving of a body part towards the midline of the body
- **Rotation** – Turning of a body part about its axis
- **Circumduction** – Combination of movements in two or more planes resulting in a co



Elbow joint

Type	Hinge
Movements	1. Flexion 2. Extension

Hip joint

Type	Ball-and-socket
Movements	1. Flexion 2. Extension 3. Abduction 4. Adduction 5. Circumduction 6. Rotation

Knee joint

Type	
Movements	

Ankle joint

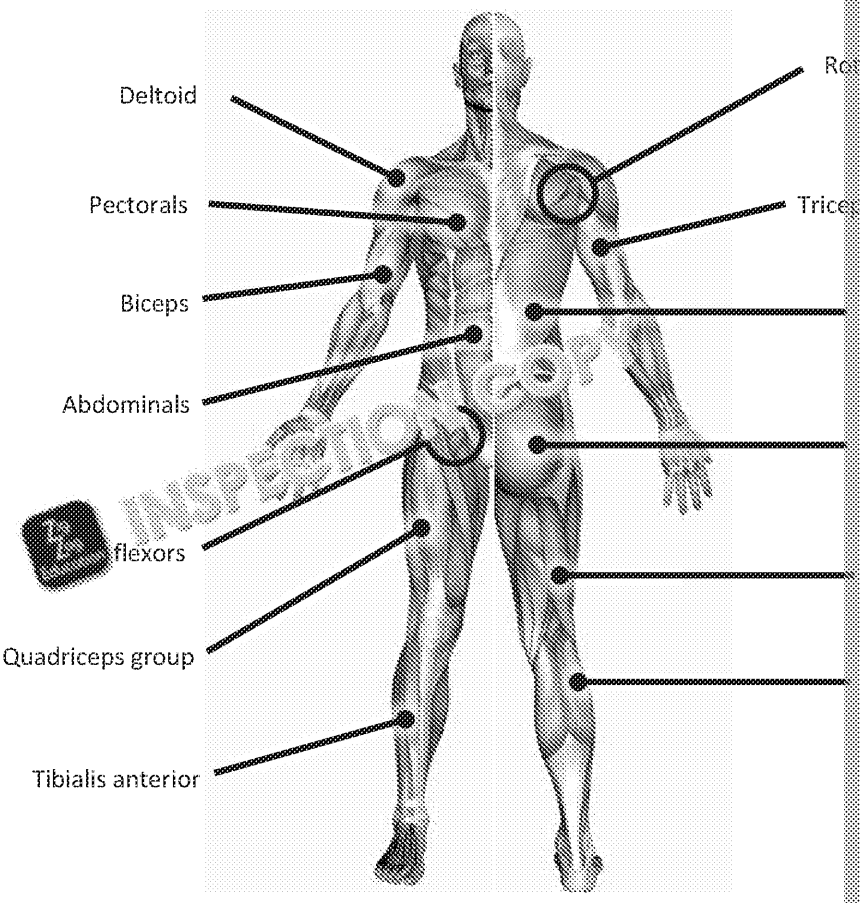
Type	Hinge
Movements	1. Dorsiflexion 2. Plantar flexion

Task 3

Students to perform a range of sporting actions that display each of the movements fo

Lesson 3: The Muscular System

Starter



Task 1

Students to fill in the blanks with the words below and then correctly identify the agon joint movements.

1. Muscles work in **antagonistic** pairs at synovial joints in the body, where one muscle The prime mover at the joint is known as the **agonist**, whereas the paired muscle w known as the **antagonist**.

   There will often be multiple muscles contributing to movement at the joint. For exa **hamstring** muscle group contribute to extension at the **hip** joint. As these are both known as **agonists**. Other muscle groups that contribute a small degree to the mov

   Using the example above, the **hip flexors** will **relax** to facilitate the movement. This in the movement.

2.

Joint	Movement	Agonist	
Shoulder	Flexion	Deltoid / pectoral	Latiss
	Extension	Latissimu	Delto
	Abduction		Pecto
	Adduction	ectorals	Delto
	Rotation	Rotator cuffs	
	Circumduction	*All muscles at the shoulder combine.*	*All*
Elbow	Flexion	Biceps	Tricep
	Extension	Triceps	Bicep
Hip	Flexion	Hip flexors	Glute
	Extension	Gluteals / hamstring muscle group	Hip fl
Knee	Flexion	Hamstring muscle group	Quad
	Extension	Quadriceps muscle group	Hams
Ankle	Plantar flexion	Gastrocnemius	Tibial
	Dorsiflexion	Tibialis anterior	Gastr

Task 2

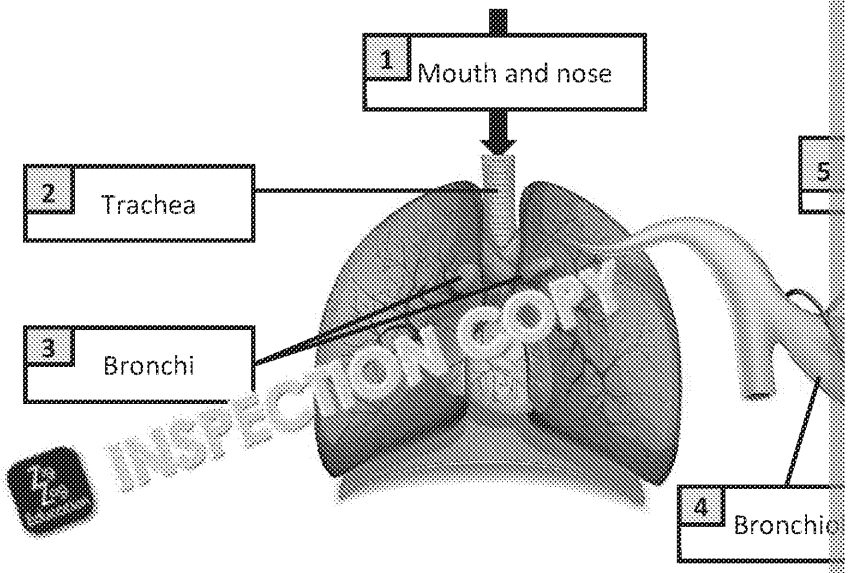
Students to define the types of muscle contraction and provide two additional exercise

Type of muscle contraction	Definition	Exercise exam
Concentric	The muscle shortens when it contracts.	e.g. • The quadriceps and gluteals during the • The pectorals and triceps in the upward • The quadriceps when straightening at th
Eccentric	The muscle lengthens when it contracts.	e.g. • The quadriceps and gluteals during the • The pectorals and triceps in the downw • The latissi or in the downward ph
Isometric	The muscle remains the same length whe contracted.	e.g. • The quadriceps and gluteals when holdi • The quadriceps and gluteals when perfo • The deltoids when holding the downwa

Lesson 4: The Respiratory System

Starter

Students to correctly label and number the order of events in which the pathway of air th



Task 1

Students to describe the process of gaseous exchange, explain the different features w
the questions.

Gaseous exchange involves the movement of oxygen from the alveoli in the lungs into th
same time, carbon dioxide – which is a by-product of exercise – diffuses from the capilla
exhaled from the body into the atmosphere. The movement of these gases occurs down
high concentration of oxygen in the lungs to the low concentration of oxygen in the capil
carbon dioxide.

Feature	Explanation
Surface area of alveoli	*Larger surface area offers more sites for oxygen to diffuse capillary.*
Number of capillaries	High number of capillaries increases the number of sites a
Alveolar walls	Moist walls allow gases to easily dissolve and are only one diffusion pathway.
Diffusion pathway	Short distance between alveoli and capillaries provides a
Blood supply	Large blood supply surrounding the capillary allows oxyge carbon dioxide to diffuse out into the alveoli.
Movement of gases	Oxygen and carbon dioxide diffuse down a concentration concentration in the alveoli to a low concentration in the

a) Haemoglobin
b) Oxyhaemoglobin

Task 2

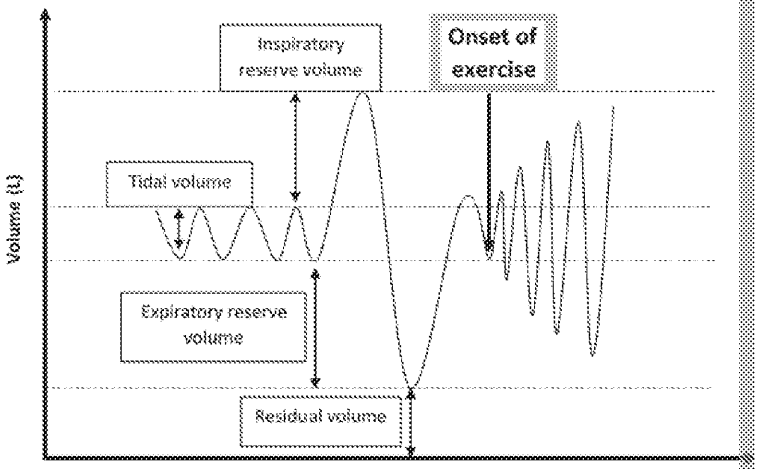
Students to describe the mechanics of breathing at rest and during exercise.

	Inspiration	
Role of the diaphragm	Contracts/flattens to allow the volume of the thoracic cavity to increase and the lungs to fill with air from the atmosphere	Assumes its r… the volume of… expired from …
Role of the intercostals	External intercostals contract to pull the ribcage up and out to allow the volume of the thoracic cavity to increase	External interc… contract to pu… decrease the v…
Pressure in the thoracic cavity	Decreased due to the actions of the diaphragm and external intercostals increasing the volume of the thoracic cavity	Increases due… and internal i… of the thoraci…
Movement of air	From the atmosphere into the l… during inhalation	From the lung… during exhala…
Changes during exercise	The pectorals, sternocleidomastoid contract to pull the ribcage up and out more quickly and increase the volume of the thoracic cavity to increase with greater speed	The abdomina… and in more q… thoracic cavity…

Task 3

Students to label the lung volumes on the diagram, identify the change in each lung vo… continue the trace on the diagram.

- Tidal volume – Increases
- Inspiratory reserve volume – Decreases
- Expiratory reserve v…
- Residual volume – S…



Extension:

4 × AO1 marks from:

At rest (sub-max. 2 marks)

- Diaphragm relaxes / assumes a dome shape / (ext… …costals relax
- Ribcage moves up and out
- Volume of thoracic cavity decre…

During exercise (sub-max. 2 marks):

- Abdomi… …cles contract
- Ribcage i… …d down and in more quickly
- Pressure inside the lungs increases
- More air is forced out to the atmosphere

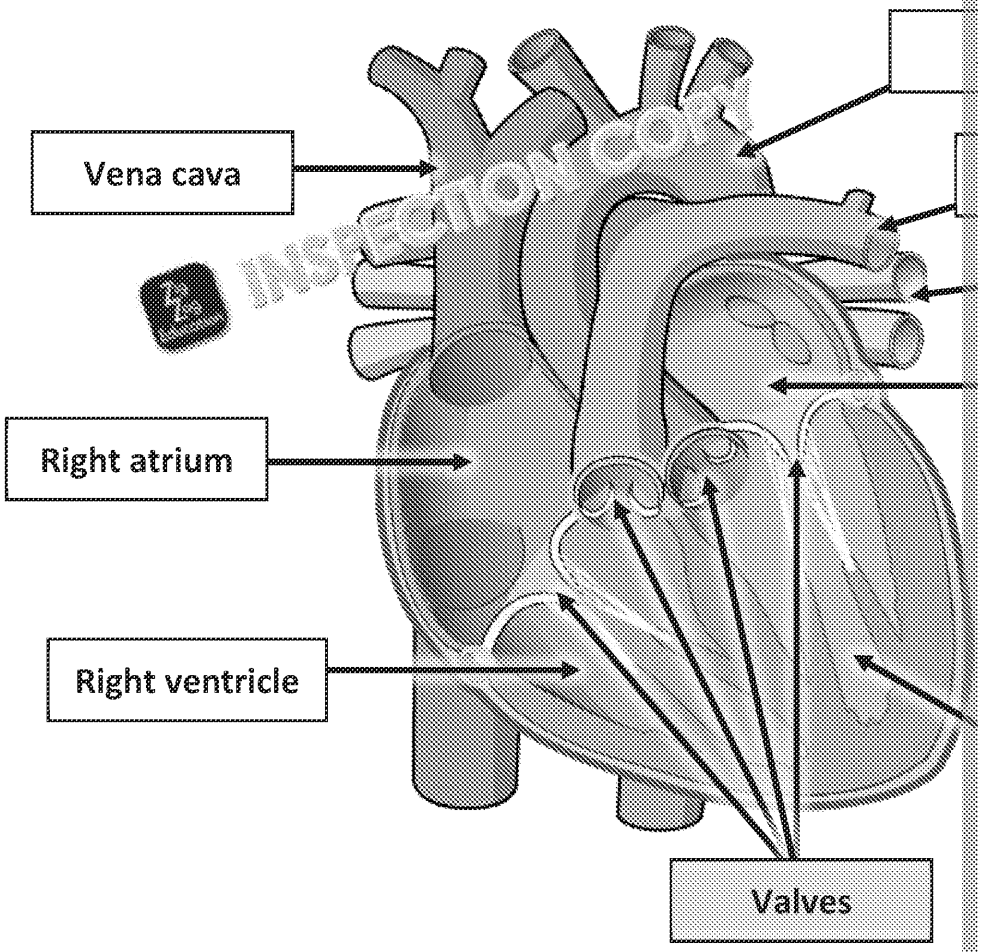
Lesson 5: The Cardiovascular System

Starter

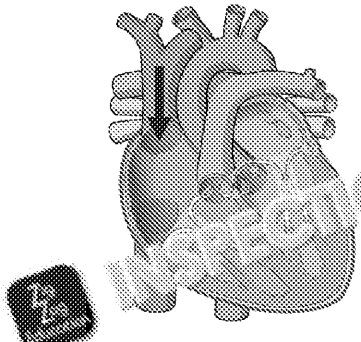
1. C – Vena cava
2. B – To prevent the backflow of blood
3. A – To return oxygenated blood from the lungs to the left atrium

Task 1

1. Students to label the structures of the heart and illustrate the pathway of blood th

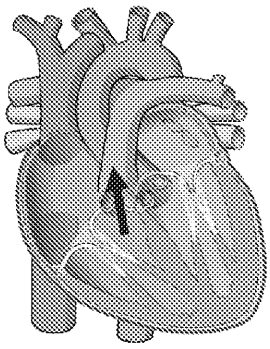
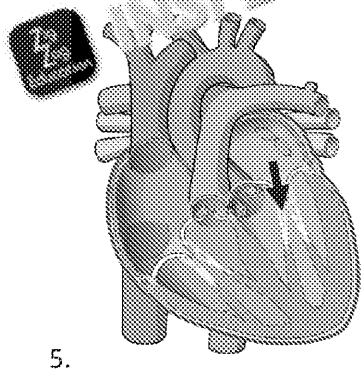


2. and 3.



2.

Description: *Deoxygenated blood returns to the right atrium from the rest of the body via the vena cava.* ***Diastole*** ✓	**Description:** Deoxygenated blood is p right ventricle through t the atria contract.

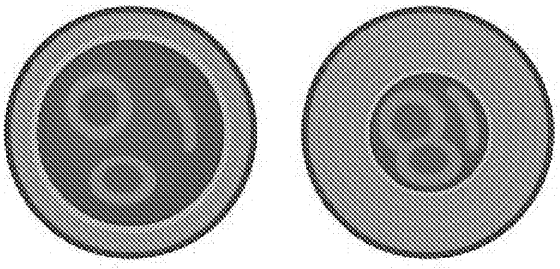
 3.	 4.
Description: Deoxygenated blood is ejected from the right ventricle, a[illegible] contracts, to the lungs for gaseous exchange, via the pulmonary artery. ***Systole*** ✓	**Description:** [illegible]xygenated blood return[illegible] enters the left atrium via[illegible] ***Diastole*** ✓
 5.	 6.
Description: Oxygenated blood is pushed from the left atrium to the left ventricle as the atrium contracts through the valve between the chambers.	**Description:** Oxygenated blood is eje[illegible] rest of the body via the [illegible] ***Systole*** ✓

Task 2

Students to describe each structure and explain how it relates to the function of each b

	Arteries	Veins
Size/ diameter	Large in size, mainly due to thick muscular wall. Narrow lumen	Small in size but have a large lumen
Wall thickness	Thick, elasticated walls	Thin, fibrous walls
Valves	None	Has valves
How the structures relate to the function	Thick muscular walls allow blood to be transported under high pressures, preventing [illegible] Narrow [illegible] so supports [illegible]d to be transported under [illegible]ure. Elasticity supports arteries to transport blood at high pressure without them bursting.	W[illegible]de [illegible]en to reduce resistance [illegible]f blood as it travels under low pressure back to the heart. Valves prevent the backflow of blood. Thin walls can be squeezed through muscle contractions to help return blood to the heart.

Blood redistribution – students to draw two images to show the effects of vasodilation a



Vasodilatation Vasoconstriction

Task 3

Students to peer-mark their respons[illegible] mark scheme below:

1. **1 × AO1 mark for [illegible]efinition of cardiac output:**
   - Th[illegible]e of blood ejected from the left ventricle per minute

2. **2 × AO2 marks from:**
   - Increased demand for oxygen at the muscles during exercise
   - The heart must eject more blood per beat to meet the oxygen demands of exe

3. a) **1 × AO1 mark for:**
      - Anticipatory rise before exercise

   b) **1 × AO3 mark for:**
      - After 20 mins

   c) **2 × AO2 mark for:**
      - Heart rate (160 bpm) × stroke volume (150 mL) = cardiac output
      - Cardiac output = 24 L/min

Lesson 6: Aerobic or Anaerobic Exercise

Starter

Students should categorise the sports and activities as predominantly aerobic,

Aerobic	Anaerobic	
• Sailing • Triathlon • Walking	• 400 m sprint • Shot-put • Long jump	• • •

Answers may vary if students provide suitable justification, e.g. some gymnastic ... predominantly anaerobic, such as the vault.

Task 1

Define each term	Producing ... energy using oxygen	Producing e...
Equation	Glucose + oxygen → energy + carbon dioxide + water	Glucose → ...
Exercise du...	Long	Short
Exercise inte...	Low; steady state	High
Describe how both aerobic and anaerobic exercise might be used in the same sport or activity	For example, in intermittent team sports such as rugby, there a... required to perform anaerobic efforts, such as sprinting to bea... specific actions such as tackling, kicking, passing, jumping, liftin... same time, players must use the aerobic energy system to cont... of the match, sometimes for the full 80 minutes. There are also... play where the performers must use the aerobic energy system... debt from anaerobic bouts.	

Task 2

Students should justify their choice for each activity. Accept other suitable justifications

- **400 m sprint** – Anaerobic as it is performed at a maximal intensity throughout and t...
- **Football match** – Aerobic and anaerobic as involves periods of low intensity (e.g. wa... and periods of high intensity (e.g. sprinting, shooting, and jumping)
- **Triathlon** – Aerobic as it is completed at a low intensity and lasts for a long duration
- **Shot-put** – Anaerobic as it involves one maximal muscle contraction to generate pow...
- **Long jump** – Anaerobic as it involves a maximal run-up and jump and is over within a...
- **Walking** – Aerobic as it is performed at a low intensity and can continue for a long d...
- **Gymnastics** – Aerobic and anaerobic as it involves intense actions (e.g. tumbling), bu... recovery between each movement
- **Tennis** – Aerobic and anaerobic as it involves intense actions (e.g. during the rally), b... between games and sets

Task 3

Students to describe EPOC similar to the following. Accept other suitable answers.

During anaerobic exercise, the muscles ... energy without oxygen. This creates an ... after exercise. This is achieved by the performer maintaining breathing rate to repay the ... exercise, the body is able to meet the body's demand for oxygen, meaning that oxygen d... exercise also ... build-up in lactic acid, which must also be cleared. The greater th... the oxygen d... and the greater the oxygen debt that needs to be repaid following ex...

Task 4

Cool-down:

- To maintain elevated breathing rate and repay the oxygen debt.
- To increase range of motion and reduce muscle stiffness by stretching.
- To maintain heart rate and flush waste products such as lactic acid from the muscle.

Manipulation of diet:

- To replenish the body's glycogen stores by consuming foods high in carbohydrate.
- To rehydrate the body by replacing the water and electrolytes lost during exercise.

Ice bath / massage:

- To reduce the severity of delayed onset muscle soreness (DOMs).

Extension

Students to evaluate the recovery methods for different sports and activities.

Marathon:

- Lactic acid build-up should be minimal with a marathon, which predominantly uses aerobic energy, so performing a cool-down is likely to have a negligible impact on recovery
- Running a marathon is likely to fully deplete glycogen stores, so consumption of carbohydrate is very important
- Running a marathon is likely to lead to severe DOMS, especially if the performer is not used to these distances; therefore, an ice bath and massage would be effective recovery methods

Weightlifting:

- Stretching the muscles in a cool-down following a weightlifting session will help facilitate recovery
- Protein is essential for muscle growth and recovery following a weightlifting session
- Weightlifting results in muscle damage, so massage and an ice bath are useful recovery methods to minimise the DOMS that may occur, especially if slow eccentric muscle actions are used

Rugby:

- Rugby taxes both anaerobic and aerobic energy systems, so a cool-down is vitally important for maintaining and clearing lactic acid from the muscle
- Playing a full 80-minute game of rugby is likely to deplete glycogen stores, so carbohydrate consumption is important. Also, rugby involves a lot of strength work, so protein consumption follow
- Competing in a rugby game is likely to lead to severe DOMS and muscle stiffness as i ice baths and massage would be effective recovery methods to minimise the severit

Lesson 7: Short- and Long-term Effects of Exercise

Task 1

Students to describe the immediate (during) and short-term (36 hours post) effects of e
their impacts.

Immediate effects (during exercise):

- Hot, red, sweaty skin as a result of blood flow being directed towards the skin to aid sweat evaporates it helps to cool the skin.
- Increased heart rate so that more oxygen can be delivered to the working muscle as during exercise for muscle contraction.
- Increased depth and frequency of breathing so that more air can be inhaled and oxy gaseous exchange. More carbon dioxide produced as a waste product from exercise

Short-term effects (up to 36 hours post-exercise):

- Tiredness and fatigue due to repeated m[illegible]tivity and depletion of the body's en from performing the same level [illegible]ntil it has fully recovered.
- Light-headedness/nau[illegible] of less blood being directed to the stomach or a the perfo[illegible]fr[illegible]pating in further activity until the body has fully recovered
- Delayed [illegible]uscle soreness (DOMs) / aching as a result of acute muscle damage of muscle [illegible]action until muscle fibres are fully repaired.
- Cramp can be caused by dehydration or repetitive muscle activity. It is a sign that th forces the performer to reduce their level of activity until they are fully recovered.

Task 2

Students to describe the long-term effects of exercise which result in improvements in t

Muscular strength:

- Increase in muscle size (hypertrophy) following regular resistance training, allowing m

Muscular endurance:

- Increase in the number of capillaries (capillarisation) supplying muscles with oxygen
- Increase in the size and density of mitochondria which act as the site of aerobic resp

Speed:

- Increased force and speed of muscle contraction allow the body to cover a greater d

Cardiovascular endurance / stamina:

- Increase in the size of the heart (cardiac hypertrophy), allowing the left ventricle to increasing stroke volume and oxygen delivery to the working muscles
- Lower resting heart rate (bradycardia when below 60 bpm), allowing the heart to be blood around the body and giving it a greater heart rate range so athletes have mor

Flexibility:

- Increased suppleness, allowing the body to move with greater freedom and adopt b previously have had the range of movement for

Extension

Students to write an email for the client of t[illegible]ice. For example:

Dear Client,
Upon commenc[illegible]th[illegible]training programme to improve your cardiovascular end some expect[illegible]wit[illegible]you regarding the long-term changes we will hope to make to im duration, low[illegible]ity activities.

To start off, there are certain structural changes we expect to occur to the heart, the main one thickness surrounding the left ventricle, also known as cardiac hypertrophy. This change resul heart muscle, allowing a greater volume of blood to be delivered to the working muscles per b

Another change we expect to see is a lower resting heart rate. This is because the heart h transporting blood around the body due to the increased stroke volume, meaning it is ab output (volume of blood ejected per minute) with fewer beats.

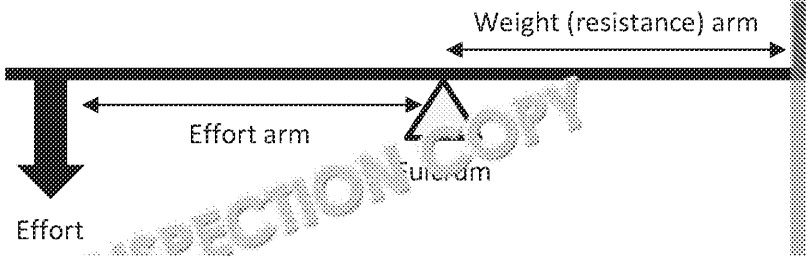
All these changes will translate to a greater exercise performance, whereby you will notic harder (e.g. run at a greater speed), without it feeling too uncomfortable.

Lesson 8: Lever Systems

Task 1

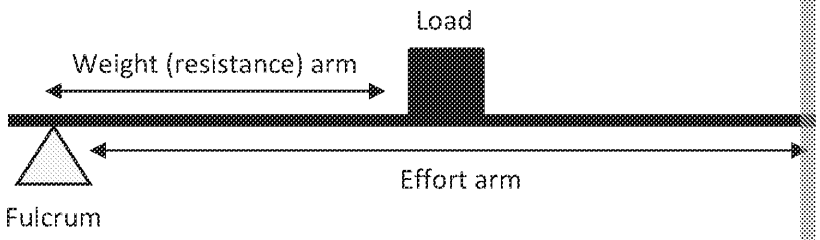
1. *Students to draw and label the diagrams for each lever system as they are below.*
2. *Students to add the effort arms and weight (resistance) arms, and explain the me of each.*

First-class lever system:



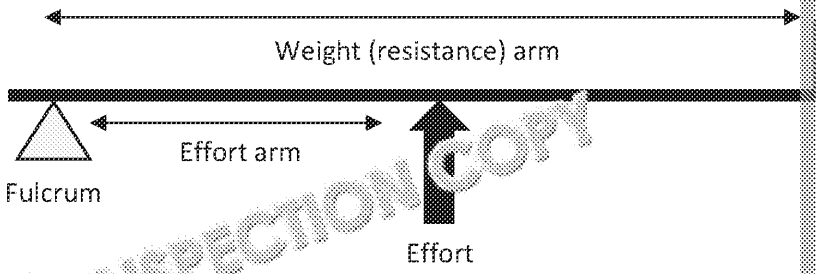
Mechanical ge/disadvantage: A first-class lever system can work at either a mec disadvantage. This is because the fulcrum is between the effort and load, so if it is furthe works at a mechanical disadvantage, but if it is closer to the effort then it works at a mec

Second-class lever system:



Mechanical advantage/disadvantage: A second-class lever system has a high mechanical a than the resistance arm (Effort arm ÷ resistance arm). Second-class levers can lift heavy loa

Third-class lever system:



Mechanical isadvantage: A third-class lever system works at a mechanical d always longe he effort arm. Third-class levers are able to move loads fast across a require a large input of effort.

Task 2

Students to identify the fulcrum, effort, and resistance/load for two sporting movemen

First class – Any two movements that display extension at the elbow, e.g.

- Extension at the elbow when throwing a javelin at release (Load/resistance: javelin,
- Extension at the elbow when executing a shot in basketball (Load/resistance: ball, F

Accept examples relating to the neck as a first-class lever

Second class – Any two movements that display plantar flexion at the ankle, e.g.

- Plantar flexion when leaving the ground in the high jump (Fulcrum: metacarpophala
  Load/resistance: body weight, Effort: gastrocnemius)
- Performing a push-up (Effort: triceps, Load/resistance: body weight, Fulcrum: metac

Third class – Any two movements that display flexion at the elbow or flexion/extensio

- Elbow flexion when performing a biceps curl (Fulcrum: elbow joint, Effort: Biceps, Lo
- Knee flexion when preparing to shoot in football (Fulcrum: knee joint, Effort: hamstr
  leg / foot)

Extension

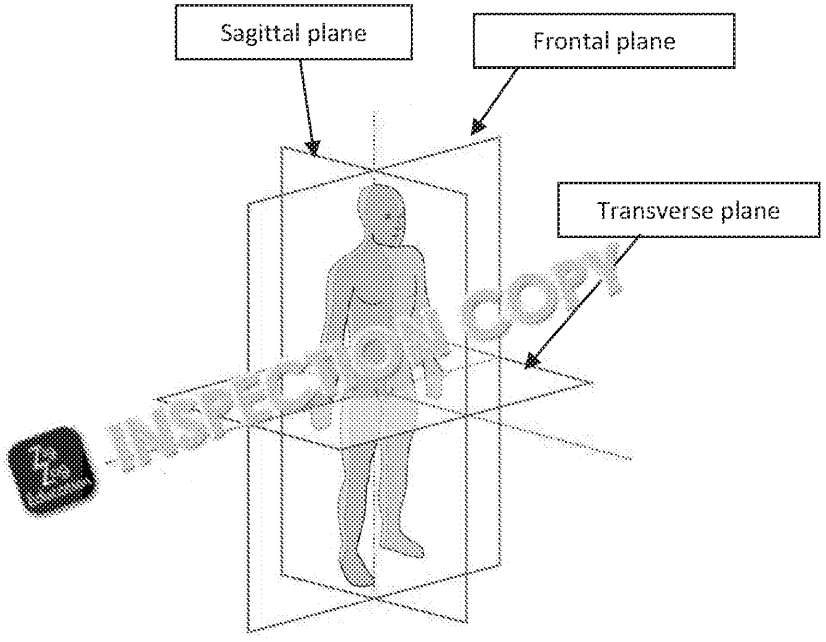
Students to identify levers from given examples and then draw the levers (see Task 1 a

A. (Extension at the elbow when throwing a basketball pass) – First-class lever
B. (Flexion at the neck when heading a football) – First-class lever
C. (Plantar flexion at the ankle when pushing off the starting blocks) – Second-class lev
D. (Flexion at the knee when preparing for a shot) – Third-class lever

Lesson 9: Planes and Axes of Movement

Task 1

Students to correctly label the planes of movement on the diagram and then categorise sporting movements. Students also to provide three further movements / sporting actio

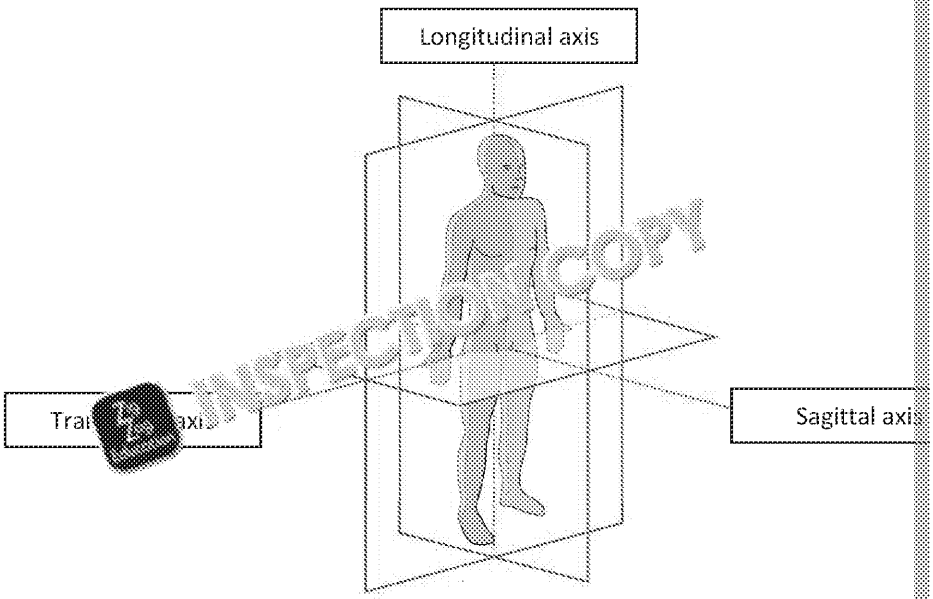


Sagittal plane	Transverse plane	
• Flexion/extension • Dorsiflexion/plantar flexion • Forward running • Underarm bowl • Going on the tiptoes	• Rotation/circumduction • Twisting the body during a golf swing • Overarm motion of a cricket bowl • Pivot during a shot-put	•

Students' sporting actions given for each plane should reflect the movements categoris

Task 2

Students to correctly label the axes of rotation on the diagram and the movement and



- Ice skating pirouette – Longitudinal axis
- Somersault – Transverse axis
- Cartwheel – Sagittal axis

Task 3

	Sporting action	Plane of mo
1.	Bending of the arm when executing an underarm throw in cricket	Sagitt
2.	Preparing to throw a discus, by rotating to build up momentum	Transve
3.	A gymnast performing a forward roll	Sagitt
4.	Movement of the arms and legs when performing breaststroke	Front
5.	A golf player twisting at the hips as they perform a drive	Transve
6.	A gymnast performing a full-body twist in the vault	Transve
7.	A swimmer performing the first part of a tumble turn (somersault in the water)	Sagitt
8.	A swimmer performing the second part of a tumble turn (twist in the water)	Transve
9.	A trampolinist performing a straddle jump	Front
10.	A gymnast rotating around a high bar	Sagitt

Plenary

Students to come up w... way of remembering the different planes of movemen

Planes of mo... – The frontal plane, as shown on the diagram, can only be seen if lo... the front. Flexion and extension movements occur in front of and behind the body. The s... the side, e.g. abduction and adduction.

Axes of rotation – Imagine the lines through the person on the diagram as sticks. If each ... movement would the person in the diagram perform? For example, twirl the sagittal axis ... spin in the direction of a cartwheel – this is the movement that occurs about the sagittal ...

Lesson 10: Health and Fitness and the Components of Fitness

Task 1

Students to correctly fill in the gaps as follows:

Health is the complete state of physical, mental, and **social well-being**, not merely the ab
is the ability to meet the demands of the **environment**. In the context of sport, this is the

If someone has **ill** health, it may prevent them from being able to **train**. This would result
a result of **reversibility** from lack of training. However, many times performers are able t
may be the reason for the performer participating in sport or physical activity. In this cas
still able to **train**, enabling an improvement in their **fitness**.

Task 2

Students to provide the definitions for the compo[illegible] of fitness below and identify on[illegible] levels of each fitness component for suc[illegible] rmance (Accept other suitable exa[illegible]

- ***Agility*** – The ability to change direction quickly without losing control. *(e.g. basketb*
- ***Balance*** – The ability to maintain centre of mass over the body's base of support. *(e*
- ***Cardiovascular endurance (aerobic power)*** – The ability of the heart and lungs to d
  for an extended duration of time. *(e.g. long-distance running)*
- ***Explosive strength / power*** – speed × strength *(e.g. 100 m sprint start)*
- ***Muscular endurance*** – The ability of the muscle to repeatedly contract for a prolon
  (e.g. triathlon)
- ***Flexibility*** – The range of motion available at a joint. *(e.g. badminton – stretching to*
- ***Coordination*** – The ability to fluently and efficiently use two or more body parts at
- ***Reaction time*** – The time between a stimulus and response initiation. *(e.g. football*
- ***Speed*** – The quickest the body is able to perform a movement or cover a predeterm
  (e.g. 50 m freestyle swim)
- ***Maximal strength*** – The ability of the muscle to apply a maximal force to overcome
- ***Static strength*** – The ability of the muscle to apply a force while there is no change
  rugby – in a scrum)
- ***Dynamic strength*** – The ability of the muscle to apply a force when moving. *(e.g. tr*

Task 3

Students to provide suitable components of fitness and justifications, similar to the bel

Case Study 1:

May be needed:

- Muscular endurance to repeatedly contract the quadriceps when cycling
- Power to push at a greater intensity through the hilly ascents
- Reaction time to avoid colliding with other riders
- Balance to maintain her position on the bike

Not needed:

- Flexibility as the range of motion at a joint is limited when cycling
- Agility is not required as a cyclist does not have to change direction quickly

Case Study 2:

May be needed:

- Cardiovascular endurance to work hard for the entire match
- Agility to get past opposition players
- Coordination to keep control of the ball at the same time as being aware of the oppo
- Speed to get back into position quickly and support his teammates
- Reaction time to respond to the ball coming off the rim

Not needed:

- Strength as basketball is a non-contact sport

Case Study 3:

May be needed:

- Strength to lift as heavy a weight as possible
- Flexibility to get a full range of motion in the squat and deadlift
- Power to throw the shot as far as possible

Not needed:

- Cardiovascular endurance as weightlifting is a short-duration, high-intensity activity
- Reaction time as weightlifting is done in the performer's own time

Case Study 4:

May be needed:

- Strength to support his body weight on the high rings and pommel horse
- Balance to maintain centre of gravity over the pommel ho[illegible]d stop him from falli
- Flexibility to get the full range of motion on the pa[illegible] b[illegible] and trampoline
- Coordination to perform movements on th[illegible]al[illegible]ar while being aware of body p

Not needed:

- Cardiovascular endura[illegible] gymnastics event don't last for prolonged periods
- Agility as a gymna[illegible] required to change direction quickly

Extension

1 × AO1 mark from knowledge of cardiovascular endurance and power:

- Cardiovascular endurance – the ability of the heart and lungs to deliver oxygen to th prolonged duration
- Power – speed × strength

2 × AO2 marks from application to the triathlon:

- Cardiovascular endurance is essential in the triathlon because the athlete relies on t oxygen to the working muscle for a long duration as it is a predominantly aerobic ev
- Power is not as important for the triathlon it is a predominantly aerobic event

3 × AO3 marks from analysis/evaluation of importance of cardiovascular endurance an

- The athlete might rely on power on a few occasions where anaerobic activity is invol a climb
- Depending on how competitive the triathlon is, the performer may rely more on pow to close a gap, they may rely more on power than if they have a comfortable lead
- Cardiovascular endurance is the main component of fitness required by the athlete
- Cardiovascular endurance is needed in order for the athlete to maintain exercise int
- The triathlon is a long event so the performer needs to maintain the supply of oxyge
- Without cardiovascular endurance, it is very unlikely the athlete will be able to comp
- Technique may be important to conserve energy for both aerobic and anaerobic pow

Levelled mark scheme

Level 3	5–6 marks	• Knowledge is accurate and responses are well detailed. • Application to sport is ap[illegible]at in most places. • Evaluation is in-dept[illegible]an[illegible]aches valid, justified concl • The answ[illegible]is [illegible]and concise and uses relevant term
Level 2	3–4 marks	• [illegible]owle[illegible]is showing but is inconsistent. • [illegible]plication to sport lacks relevance in some places. • Evaluation is present but conclusions are not well-roun • The response is sometimes incoherent, but some relev
Level 1	1–2 marks	• Knowledge is very limited. • There is either no application to sport or it lacks releva • Little evidence or few reasoned conclusions. • The response is unclear and has many inaccuracies, an
Level 0	0 marks	Answer not worthy of credit.

Lesson 11: Fitness Testing

Starter

- *Agility – F*
- *Cardiovascular endurance – A*
- *Muscular endurance – D*
- *Coordination – H*
- *Speed – E*
- *Balance – B*
- *Explosive strength /*
- *Flexibility – J*
- *Reaction time – C*
- *Strength – I*

Task 1

Students to reorder each fitness test.

Multistage fitness test – cardiovascular endurance (aerobic power)

1. An audio player plays the test recording, where each b[illegible]dicates when the perfo[illegible] running track.
2. The time between each beep decreases as [illegible]vels progress with the test.
3. When the performer misses the [illegible] three successive beeps, they are out of the [illegible] number as the test sc[illegible]

Illinois agilit[illegible] A[illegible]lity

1. A 10 × 5 [illegible]ourse is marked out with cones.
2. The participant should start on the start cones laying on their front with their arms b[illegible] the course as quickly as possible.
3. The test conductor times how long it takes and this is used as the test score, measur[illegible]

Sit-up bleep test – Muscular endurance

1. The participant prepares for the test by lying on a mat on their back with their legs b[illegible]
2. In time with a metronome, the participant performs a sit-up by bringing their elbow[illegible] initial position – that counts as one full repetition.
3. They continue to perform sit-ups for as long as possible.
4. When they can no longer keep up with the metronome, the test will stop and the pa[illegible] time they managed, to use as the test score.

Vertical jump test – Power / explosive strength (anaerobic power)

1. The participant chalks their fingers (or holds a piece of chalk) and stands side-on to a[illegible] the ground.
2. The participant marks the wall with the chalk by reaching as high as they can with th[illegible]
3. The participant then jumps as high as they can and marks the wall again.
4. The distance between the first mark (standing) and the second mark (jumping) is cal[illegible] in centimetres.

Sit-and-reach test – Flexibility

1. The participant sits with their feet pressed up against a sit-and-reach box and legs ke[illegible]
2. They then stretch out in front of them and reach as far as possible on the sit-and-rea[illegible]
3. A ruler measure on the sit-and-reach box allows them to measure how far they reac[illegible]
4. The test score is measured in centimetres.

Stork stand test – Balance

1. The participant adopts the stance where one f[illegible]ot is r[illegible]d off the ground and placed[illegible]
2. Once the participant is in this positi[illegible]e [illegible]onductor starts a stopwatch.
3. The participant should try to m[illegible]ntai[illegible]eir balance for as long as possible.
4. If the participant lose[illegible] [illegible]ic[illegible]y falling, their foot comes off the standing leg, or th[illegible] conduct[illegible]ld [illegible]e test and record the time for use as the test score.

One-rep max[illegible] Maximal strength

1. The performer should warm up by practising performing the exercise they are testin[illegible]
2. They should perform a single rep with each set, gradually increasing the weight load[illegible]
3. They should do this until they reach the maximal weight they can lift in one rep.
4. The test score is given in kg with the last weight they managed to perform a success[illegible]

Ruler drop test – Reaction time

1. The test conductor holds a 1 m ruler level with the top of the participant's open han
2. In the test conductor's own time, they should let go of the ruler.
3. The participant should respond as quickly as possible by closing their hand to catch t
   held in the same place.
4. The point on the ruler which is level with the top of the participant's closed hand is us

30 m sprint test – Speed

1. The participant starts from a stationary position behind a marked line.
2. They then sprint a pre-measured 30 metre distance as fast as they can.
3. An assistant records the time with a stopwatch and uses it as the test score, in secon

Wall toss test – Coordination

1. On the command 'go', the participant must throw a tenni[illegible]t a flat wall and catc
2. They do this as many times as possible within 30 s[illegible]ds.
3. Once the time is up, they count the numbe[illegible]ful catches they managed in t

Handgrip dynamometer test – St[illegible]gth

1. The participant adjust[illegible]mometer so that it fits comfortably in their hand.
2. They the[illegible] i[illegible]ght position with their arms down parallel to their body.
3. When t[illegible]eady, they squeeze the grip dynamometer with their dominant hand
4. The test s[illegible]e is displayed on the screen in kg.

Task 2

Students to highlight the following reasons for, and limitations of, fitness testing, and e

Reasons for:

- Indication of baseline fitness
- To monitor improvements throughout the training programme
- To set goals and to motivate the performer

Additional reasons:

- To identify strengths and weaknesses in performance
- To judge the overall success of the programme
- To inform training requirements
- For use as a comparison with the rest of the group / normative data
- To provide variety to the training programme

Limitations:

- Influenced by motivation
- Too general / not sport-specific enough

Additional limitations:

- Do not replicate movements in the activity
- Do not replicate competitive conditions
- Some use sub-maximal measurements
- Procedures may not be carried out correctly, leading to lack of validity

Extension

Students' fitness testing schedules may differ, but ex[illegible]m[illegible]asons for fitness testing a

Before a fitness training programme t[illegible]

- Provide an indication of b[illegible]ess
- Identify str[illegible]ths[illegible]nesses in performance
- For use [illegible]mpa[illegible]ison with normative data
- Set goals fo
- Inform train

At regular inte[illegible]als during a fitness training programme to:

- Monitor improvements throughout the training programme
- Give the performer confidence that their fitness is improving
- Inform any adjustments to the training programme
- Motivate th
- Reassess go

Following a training programme to:

- Judge the overall success of the programme
- Provide feedback that can be applied to the design of future programmes

Lesson 12: Principles of Training

Starter

SPORT principles:

- ***Specificity*** *– the relevance of training methods and activities for the specific perform the sport or activity*
- ***Progressive Overload*** *– the steady increase in the frequency, intensity, time or type*
- ***Reversibility*** *– the decline in fitness levels if training ceases for a prolonged period o*
- ***Tedium*** *– the boredom associated with a lack of variety in training*

FITT principles:

- ***Frequency*** *– how often training is scheduled*
- ***Intensity*** *– how hard training is performed*
- ***Time*** *– the duration of training sessions*
- ***Type*** *– the different methods of training performed*

Task 1

Students' annotation should include the following:

- Increase in the frequency of training sessions from two in Week 1 to three in Weeks
- Increase in the intensity of Tuesday interval training sessions from 80% race pace in through to race pace in Week 6.
- Increase in the time of Friday interval training session work bouts from 4 mins in We to 6 mins in Week 6.
- Variation in the type of training (speed and interval training).

Task 2

Students' answers will vary dependent on sport/activity chosen, but should be similar t

e.g. running/athletics *(accept other suitable examples)*

When designing the training programme for the partner's sport/activity, I would apply th

- **Specificity** by training for the specific running event they perform. For example, if th would perform low-intensity, long-duration runs.
- **Progressive Overload** by gradually increasing the amount of training, performing more
  - For example, I might increase the **frequency** of training sessions from three pe
  - I might increase the **intensity** of certain sessions to a greater % of heart rate m
  - I might extend the duration **(time)** of sessions by 10 minutes
  - I might vary the **type** of training, e.g. performing interval and continuous runs
- **Reversibility** by ensuring that there aren't large gaps between training sessions for i
- **Tedium** by adding exciting incentives to sessions such as beating personal bests.

Lesson 13: Types of Training

Starter

- ***Circuit training*** *– numerous stations where different exercises performed at each fo*
  before rotating stations
- ***Continuous training*** *– constant-intensity activity that is performed at a steady state*
- ***Fartlek training*** *– varying the intensity of activity through changes in speed and/or te*
- ***Interval training*** *– moderate to high intensity work periods interspersed with period*
- ***HIIT*** *– high-intensity work periods interspersed with longer periods of rest and recov*
- ***Static stretching*** *– stretching a muscle while in a stationary position (isometric hold)*
- ***Weight training*** *– using free weights and resistance machines to load the muscle fo*
- ***Plyometric training*** *– performing different explosive movements which involve an e*
  powerful concentric contraction

Task 1

Students should draw a line from ea[illegible]ethod to one or more of the compone
Accept any of the following:

- **Circuit trai[illegible]** – [illegible] muscular endurance / power / cardiovascular endurance
- **Continu[illegible]ni[illegible]** – Cardiovascular endurance / muscular endurance
- **Fartlek t[illegible]** – Cardiovascular endurance / speed / power
- **Interval training** – Cardiovascular endurance / speed / power
- **HIIT** – Speed / power
- **Static stretching** – Flexibility
- **Weight training** – Strength / muscular endurance / power
- **Plyometric training** – Power

Accept any other suitable answers. Students should be able to justify their answers.

Task 2

Students' answers will vary due to the range of sessions that can be designed for each

- **Continuous training** – Running for 10 km at a steady 6 minutes per kilometre pace (
- **Fartlek training** – Running a course which includes flat terrain and hills
- **Interval training** – Working on a treadmill for 4 minutes and resting for 1 minute, re
- **HIIT** – Performing a 30-second high-intensity effort on an exercise bike, and resting f
  times (12 minute session)
- **Static stretching** – Selecting a range of upper and lower body muscles and stretchin
  stretch the hamstrings, flexing the leg and pulling the foot behind the body to stretc
- **Weight training** – Training the lower body through a range of exercises such as squa
- **Plyometric training** – Training the upper body using exercises such as sled pulls, medic

Task 3

Advantages and disadvantages may include:

Circuit training

Advantages	D
• Intensity and duration of each s[illegible]e tailored to different fitness needs • Types of e[illegible]ises [illegible]ltered to improve different compo[illegible]s fi[illegible]ess • Range o[illegible]ises provides variety, which helps prevent tedium • Exercises can target the whole body or isolate different areas used in the sporting activity • Exercises can be made sport-specific (e.g. use of treadmills for running, exercise bikes for cycling) • Can be performed in large groups	• May require specialis and exercise machin • May take a long time • Requires a large spac • Not wholly sport-spe separately and are n • Inappropriate work- may lead to fatigue-

Continuous training

Advantages	D
• Minimal equipment required • Can be done in simple environments • Can be performed for a variety of modes (e.g. running, swimming, cycling, rowing, skiing) • Easy to gauge intensity • Easy to overload • Improves cardiovascular endurance • Can be performed in a group or on one's own	• Tedious • May result in overus • Requires motivation • Not sport-specific • Little room for adapt • Doesn't develop any

Fartlek training

Advantages	D
• Performer can adjust intensity throughc • Improves aerobic and anaerobic • Develops a range of fitn • No equip • Uses n • Specific as football and tennis • Can be performed in a group or on one's own	• Not wholly specific t around fitness and n • Athletes may fatigue sprint intervals • Some terrains may in • Changes in intensity • Most sports are perf • Difficult to overload

Interval training

Advantages	D
• Requires minimal equipment • Can be done in many environments • Work-to-rest ratios can be manipulated to mimic specific fitness needs • Improves aerobic fitness • Easy to apply progressive overload	• Requires experience rest ratio • Increased risk of fati • Requires time to rec

HIIT

Advantages	D
• Requires minimal equipment • Can be done in many environments • Work-to-rest ratios can be manipulated to mimic specific fitness needs • Improves anaerobic fitness • Improves speed endurance • Easy to apply progressive overload • Sessions are quick	• Requires experience rest ratio • Increased risk of inju • Requires high levels

Static stretching

Advantages	D
• Simple to perform • Can be performed • Suitabl • Can be • Effective • Can focus on specific muscle groups	• Tedious • Performer may lose • Risk of going through • Doesn't involve spor • Performer may over technique is used

Weight training

Advantages	D
• A variety of exercises can be performed • A variety of equipment can be used • A number of different exercises can be used • Can target isolated muscle groups and perform whole-body movements • Easy to apply progressive overload • Can manipulate load, sets and reps to target a range of fitness components	• A spotter or guide m 1RM • Correct technique m • Increased risk of mus • May require access t • Not sport-specific • Requires motivation

Plyometrics training

Advantages	D
• Can use sport-specific movement • Uses a range of equipm • Effective for dev lower • Traini or is usually quick	• High risk of injury • Correct technique • Performer must be • May require access • Only develops pow

Lesson 14: Optimising Training and Preventing Injury

Starter

Aerobic training zone:
Lower limit – HRmax × 0.6 **OR** (HRmax /100) × 60
Upper limit – HRmax × 0.8 **OR** (HRmax /100) × 80

Anaerobic training zone:
Lower limit – HRmax × 0.8 **OR** (HRmax /100) × 80
Upper limit – HRmax × 0.9 **OR** (HRmax /100) × 90

Task 1

Students should calculate the intensities of exercise for each performer and use them in performance. They should then provide another example for their partner.

- **Shona** – To train at 80–90% of HRmax, a training range of 163 to 184 bpm.
- **Jermain** – To train at 60–80% of HRmax, in the range of 109 to 145 bpm.

Danny
To complete three sets of 4 to 8 reps at the following weights (above 70% of one rep max):
- Above 87.5 kg in the back squat
- Above 73.5 kg in the bench press
- Above 56 kg in the standing shoulder press

Fatimah
To complete three sets of 12 to 15 reps at the following weights (below 70% of one rep max):
- Below 56 kg in the deadlift
- Below 38.5 kg in the prone pull
- Below 52.5 kg in the quadriceps extension

Task 2

Students to provide guidance on the different factors, similar to:

- Warming up helps to prepare the body for the main activity and allows the performer to gradually increase game/match intensity to safely transition into the demands of the main activity.
- Appropriate clothing and footwear includes:
  - Waterproofs in wet weather conditions
  - Insulating layers in cold conditions
  - Light, moisture-wicking materials in hot and humid conditions
  - Studded footwear for muddy pitches
  - Spikes for athletics tracks
  - Grip for indoor surfaces
- Stretches during the warm-up should be performed with control and not overstretched.
- Dehydration can result in injury due to impaired concentration leading to loss of balance, falling over or rolling an ankle. It can also cause cramp.
- Taping and bracing help stabilise a joint or body part to prevent re-injury while exercising.
- Rest days help with recovery as they allow the body's systems to repair before the next session.
- Examples of using the correct technique include lifting heavy weights with the legs, keeping specific techniques and skills important for injury prevention, such as head position when heading.
- Overtraining can be avoided by applying the principles of training and overload correctly and in between training sessions.

Task 3

Students to identify the missing words in bold below.

High-altitude training involves the performer training at an altitude typically regarded as sea level. The premise is that there is a greater atmospheric **pressure** at altitude, which r air. When the performer begins to exercise, the body is unable to transport as much oxy would at sea level. As a result, training **intensity** is reduced, as the **heart** must work hard oxygen around the body.

However, over time the body adapts and produces more **red** blood cells, which are respo blood. This increases the **oxygen**-carrying capacity of the blood, making the delivery of o **aerobic** exercise performance such as long-distance running. It has no impact on **anaero** sprinting, as the body does not rely on oxygen delivery to the working muscles. The adap persists for a **short** period of time upon return to sea level, giving the performer a compe performers who have not trained at altitude.

The benefit of altitude training is that it can r improvement to aerobic exerc This gives the performer a competiti over other athletes who have not exp However, it is not without li the performer must reduce their **intensity** of train perform at alti they will miss out on the benefits of these sessions which components **speed**. Moreover, altitude training is not readily accessible to all pe to an altitude **ber** or an environment at high altitude such as the **Alps**. This means t face is **access**.

Task 4

Students to identify the aims and benefits of each training season for the sporting activ

Examples may include:

Pre-season/preparation aims

- To prepare for the competitive season
- Focus on general fitness
- Build up a strong aerobic base
- Tune in on specific fitness needs (e.g. cardiovascular endurance)

Pre-season/preparation benefits

- Ensures the performer is 'match fit' for the start of the season
- Allows the performer to iron out any weaknesses identified in the previous training s
- Allows the performer to prepare for the specific demands of upcoming competition (e.g

Competitive/peak/playing season aims

- To maintain fitness levels
- To avoid injury
- To work on specific sporting skills

Competitive/peak/playing season benefits

- Allows the performer to identify weaknesses identified in the last game and improve
- The performer is able to reap the rewards from their pre-season preparation
- Allows the performer to taper for peak performance for competition/match/ev

Post-season/transition aims

- To transition to lighter aerobic train
- To maintain a general level fitness to avoid reversibility
- To unwind from a psychological perspective

Post-season/transition benefits

- To allow the performer to recover both physiologically and psychologically
- To reflect on the competitive season
- To create goals for the next season

Extension

The exercises that students select will vary, but the general principles for strength or en follows:

- Longer duration of stations for muscular endurance training
- Greater number of reps for muscular endurance training
- Longer rest periods between stations for muscular strength training

Lesson 15: Warming Up and Cooling Down

Task 1

Students to include activities for each component in a sport of their choice.

1. Gradual pulse-raising activity:
   e.g. light jog to the other side of a pitch and back to increase heart rate, breathing r
   circulate oxygen around the body

2. Stretching:
   e.g. someone in the middle leading static stretches of major muscle groups to incre
   pliability of ligaments and tendons

3. Skill-based practice / familiarisation
   e.g. shooting in football, bowling in cricket, or pr tis a sprint start in athletics, i
   effort to full pace and practise the wh le of movements

4. Mental preparation
   e.g. visu s performance to psychologically prepare for the main activ

Task 2

Students to provide the following analysis points on each graph.

Waste products removal

What is happening?

- Lactic acid and other waste products (such as CO_2) are flushed from the muscle

Constituent part:

- Light activity helps to maintain breathing rate and circulation of oxygen

Importance:

- The body recovers more quickly following exercise

DOMS

What is happening?

- Performing a cool-down reduces the severity of DOMS
- DOMS reaches a peak earlier when performing a cool-down
- DOMS returns to baseline more quickly when performing a cool-down

Constituent part:

- Stretching helps return the muscle to its resting length

Importance:

- Performing a cool-down may help to prevent or reduce the severity of DOMS

Lesson 16: Use of Data

Starter

1. False – **qualitative data** uses descriptive language whereas **quantitative data** uses n
2. True
3. True
4. False – discrete data (i.e. countable whole numbers) is best represented in a bar cha

Task 1

Students to categorise data as quantitative or qualitative.

Quantitative data:

- The heart rate of an individual before, during and after exer
- The strength of an individual as a result of long-term t
- The percentage of people participating in a sport belonging to a particular social gro
- The intensity of a strength training session
- The results obtained from a battery of fitness tests
- The tidal volume of an individual at rest and during exercise

Qualitative d

- Extrinsic feedback given to a performer by a coach
- The reasons why a coach uses fitness testing
- Whether an exercise is easy, moderate, hard, or very hard
- The components included in a warm-up or cool-down
- The reasons performers give for being involved in hooliganism
- The recovery methods used in different sports

Task 2

Students to create a questionnaire or survey using the question prompts in the activity. quantitative and qualitative data.

Task 3

Students to create a chart, graph and/or table to display the quantitative data they ha