Qualification Accredited

OCR
Oxford Cambridge and RSA

GCSE (9–1)

PHYSICAL EDUCATION

J587
For first teaching in 2016

Physical Training

1.2.b. Applying the principles of training

PRINCIPLES OF TRAINING

LEARNING OUTCOMES

BY THE END OF THIS TOPIC YOU SHOULD …

- **know the following definitions of principles of training and be able to apply them to personal exercise/training programmes**
  - **specificity**
  - **overload**
  - **progression**
  - **reversibility**

Applying the principles of training

TASK:
WORKING IN GROUPS OF 3 OR 4 MATCH THE 'PRINCIPLES OF TRAINING' LISTED BELOW TO THE DESCRIPTION GIVEN ON THE TASK CARDS….

Specificity

Progre…

…erload

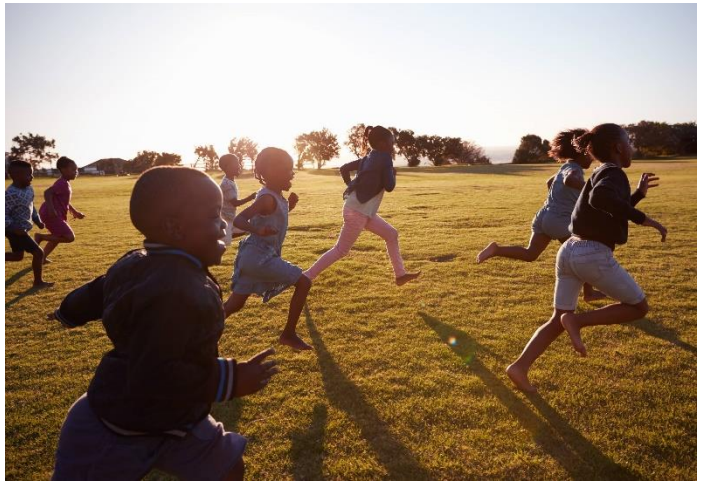
Reversibility

How you Did you Do

How can we remember these principles of training easily?

For Fitness

Send
Pupils
On
Runs



Specificity
Progressive
Overload
Reversibility

Task: Come up with your own Acronym!

Applying the principles of training

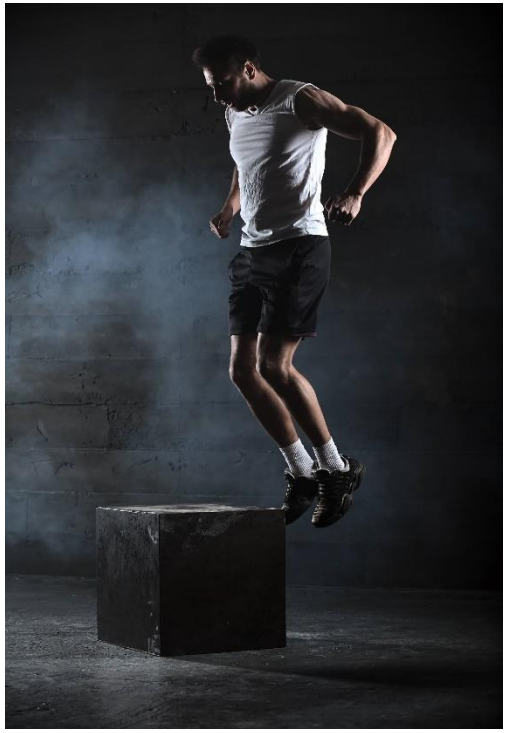
1. Specificity: The training must be matched to the needs of the sporting activity and individual.

Example – A sprinter would carry out more anaerobic training because the event is mostly anaerobic in nature.

It is not just energy systems that need to be Specific – muscle groups and actions involved in the training also have to be as Specific as possible.

TASK: Can you come up with another example?

How about the game of rugby?
Think of different positions



Plyometrics for basketball players
WHY?

Why should you NEVER use someone else's training programme?

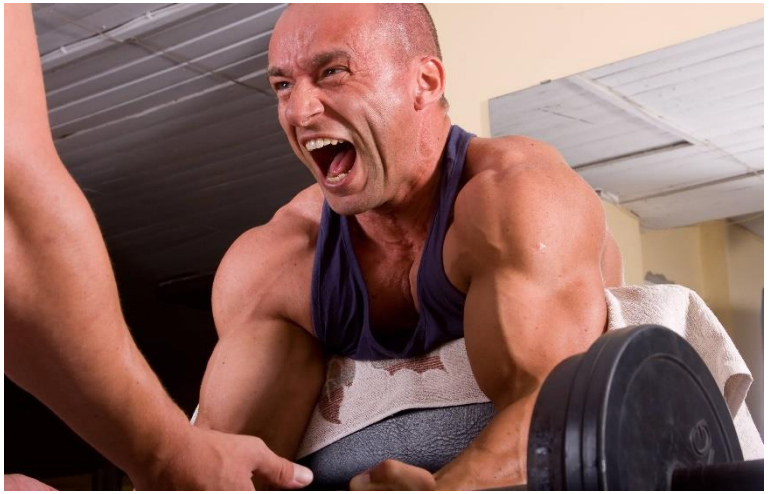
Applying the principles of training

2. Overload: The body must work harder than normal so there is some stress and discomfort.

Adaptation and progress will follow Overload because the body will respond to the stress.

Example – in weight training the lifter will eventually attempt heavier weights or increase reps in order to create Overload.

Overload can be achieved by increasing Frequency, Intensity and the duration (Time) of the activity.



Task: Can you come up with another example?

How about on the field of play?

Applying the principles of training

3. Progression: Not only do we need to include Overload in our training, it must also become gradually more difficult.

Example a Weight Lifter will be able to increase the weight they can lift over time as they increase their intensity, duration and frequency of training.

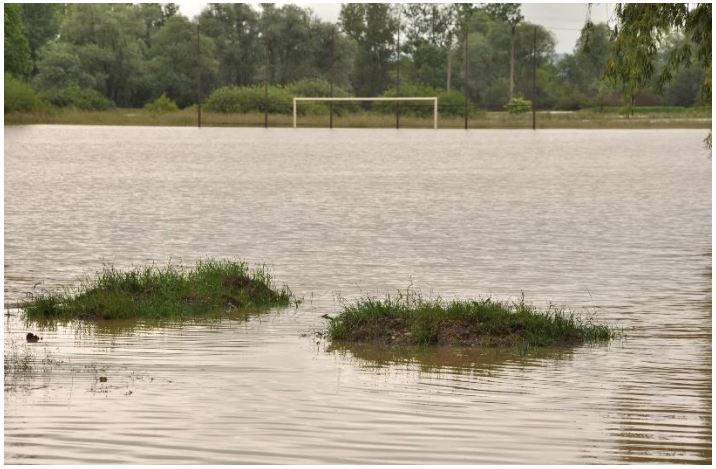
Caution – it is important not to ‘over do it’ otherwise no training benefit will happen!

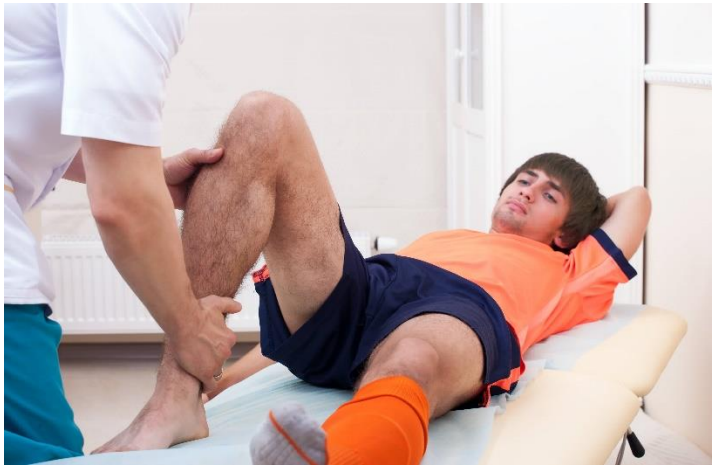
Applying the principles of training

4. Reversibility: Any adaptation that takes place as a result of training will be lost if you stop training.

Use it or Lose it!!!!!!

Example - a track athlete's VO2max and Strength will decrease if they injure themselves and are unable to train for a period in time.





Task: Can you come up with another example of how and when reversibility may set in?

Applying the principles of training

TASK:
IN TEAMS PICK A SPORT AND WRITE A PLAN TO OUTLINE A SIX-WEEK PROGRAMME AND JUSTIFY YOUR ACTIVITIES BY REFERRING TO ALL THE PRINCIPLES OF TRAINING LISTED BELOW.

Specificity
Progression
Overload
Reversibility

Week Number	Session 1 Monday	Session 2 Wednesday	Session 3 Friday	Session 4
1	??	??	??	??
2	??	??	??	??
3	??	??	??	??
4	??	??	??	??
5	??	??	??	??
6	??	??	??	??

So How Did We Do?

Applying the principles of training

- **These are ‘rules’ which if followed, allow your training programme to be more effective.**

- **This should have a positive impact on your performance.**

Applying the principles of training

TASK:
WORKING IN GROUPS OF 3 OR 4 MATCH THE FOLLOWING LISTED BELOW TO THE DESCRIPTION GIVEN BY THE TEACHER…. [PUT YOUR ANSWER ON A POST-IT NOTE AND STICK IT TO THE BOARD]

FREQUENCY
INTENSITY
TIME
TYPE

Important Note:
These are NOT principles of training, merely elements to consider in your training programme.

Applying the principles of training

TASK: STICK YOUR POST-IT NOTE IN THE CORRECT COLUMN….

Frequency	Intensity	Time	Type

Optimising Training - FREQUENCY

Frequency: The Number of Training Sessions Each Week

How often you exercise or train depends on your ability level and fitness level.

Example: an elite athlete may train every day whereas a lower level club player may train once a week.

Task: Come up with your own example of how frequency of training may differ in your sport

Optimising Training - INTENSITY

Intensity: How Hard you Train!

The individual needs of the performer need to be taken into consideration as optimal training zones for distance athletes are different to sprint athletes.

Example: a Sprinter might work really hard using HITT training for a short period of time whereas a lone distance athlete will work at a lower intensity but over a longer period.

Task: Come up with your own example of how intensity of training may differ in your sport

Optimising Training - TIME

Time: How Long you Train for!

This is the length of the training session and not part of it (as in circuits)

This should definitely take into account the intensity of which the athlete is training and their chosen sport.

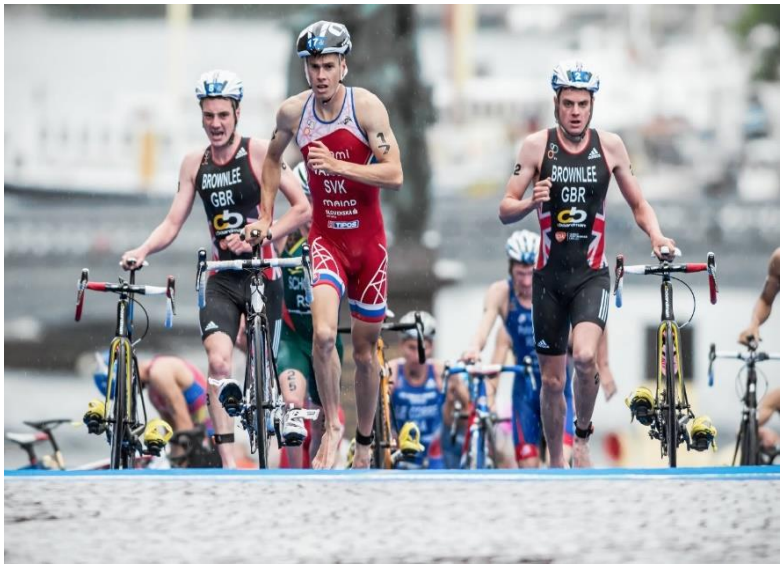
Task: Come up with your own example of how length of training may differ in your sport

Optimising Training - TYPE

Type: Which method of Training you Use!

You MUST consider the needs of your chosen sport and what you want to get out of your training before you choose what type of training to use.

Example: The Brownlee Brothers (triathlon) – will train all areas of fitness but pay particular attention to aerobic and muscular endurance because of the nature of their sport.



Task: Come up with your own example of how intensity of training may differ in your sport

Applying the principles of training

TASK:
IN TEAMS COMPLETE THE FOLLOWING…

So How Did We Do?

	Cardiovascular Endurance	Muscular Endurance	Speed	Strength	Flexibility
Frequency	Whole body exercise 3-5 days per week	Each major muscle group should be trained 2-3 days per week	2-3 days per week	Each major muscle group should be trained 2-3 days per week	Daily (a minimum of 3 days per week)
Intensity	Moderate to vigorous (6085% maximum heart rate)	Light to moderate (less than 50% 1RM)	90-100% maximal speed	Frequency	Frequency
Time	30-60 minutes/day	15–20 repetitions 1-2 sets Rest intervals of 2–3 min between each set A rest of at least 48 h between sessions.	Less than 10 seconds 4-20 repetitions Work : rest ratio of at least 1:6	8-12 repetitions 2-4 sets Rest intervals of 2–3 min between each set A rest of at least 48 h between sessions	Static Stretched 10–30 s 2-4 repetition
Type	Continuous	Weight training	Interval /HIIT	Weight training	Stretching
Progressively Overload	by increasing time, frequency, and/or intensity	by increasing resistance, and/or repetitions per set, and/or frequency	by increasing frequency, intensity and/or number of repetitions	by increasing resistance, and/or repetitions per set, and/or frequency	by stretching to the point of feeling tightness.

Applying the principles of training

OPTIMISING TRAINING

LEARNING OUTCOMES

BY THE END OF THIS TOPIC YOU SHOULD …

- **Know the definition of the elements of FITT (Frequency, Intensity, Time, Type)**
- **Apply these elements to personal exercise and training programmes.**
- **Know different types of training, definitions and examples of:**
  - **continuous**
  - **fartlek**
  - **interval**
  - **circuit training**
  - **weight training**
  - **plyometrics**
  - **HIIT (High Intensity Interval Training)**

Types of Training - Continuous Training

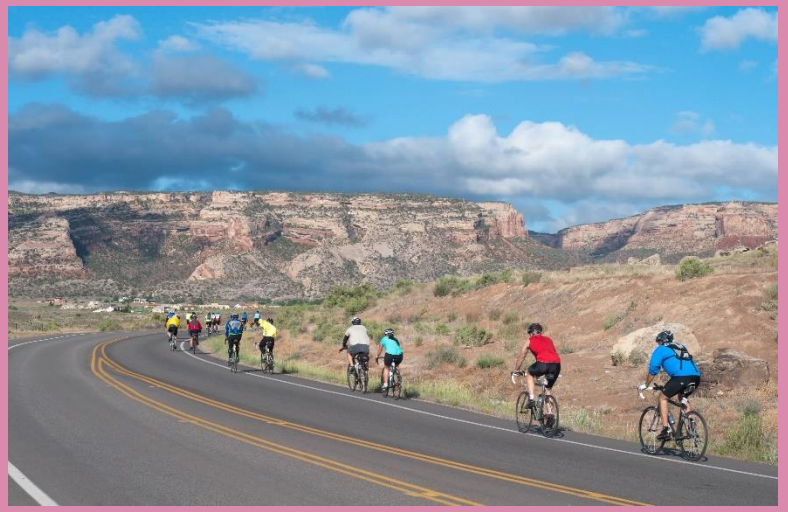
Continuous Training

A method of training that seeks to maintain or improve Cardiovascular Endurance.

Features:
- Activity that continues for an extended period of time without rest.
- Stresses the AEROBIC System.
- Carried out at a steady rate with low intensity.

Adaptions:
- Heart will get bigger and stronger allowing greater delivery of blood (& O2) to the working muscles

Example:
- Long distance Running, Cycling or Swimming (30min-2hrs @ low intensity)



Types of Training – FARTLEK training

Fartlek Training

Also known as 'SPEED PLAY' (Swedish) often used to maintain or improve aerobic endurance

Features:

- The Speed, Intensity and often Terrain (gradients & surface – sand, mud etc.) are varied throughout the training session
- Can train both Aerobic and Anaerobic systems
- Can often add enjoyment to otherwise tedious training sessions with variations in speed, intensity and terrain.

Adaptions:

- Can force the body to adapt in a way that it can better delay the onset of lactic acid build up

Example:

- Ideal for team sports as it replicates the efforts of a player / athlete in a game like situation (run, walk, jog, sprint, rest, repeat)

Types of Training – INTERVAL training

Interval Training

A type of training which features distinct periods of work followed by periods of rest

Features:

- One of the most popular forms of training for both anaerobic and aerobic endurance.
- Adaptable to the individuals needs and sports
- The following must be taken into consideration when designing an Interval training session…
  - Duration
  - Speed / Intensity
  - Number of Sets / Repetitions
  - Duration of rest periods
  - Type of training used (aerobic / anaerobic)

Example:

- Ideal for team sports such as football, hockey and rugby (sprint 30m, rest, repeat 5 times)

Types of Training – Circuit training

Circuit Training (Interval Training)

A method of training that incorporates different stations to stress / overload different muscle groups

Features:

- Involves a number of *'exercise stations'* arranged in a particular way called a circuit
- Can use either repetition number (20 press-ups) or timed periods for each station (30 secs)
- Can be adaptable to any performers activity / sporting needs
- NO muscle group should be worked on two stations consecutively.
- Can incorporate skills as well as exercises
- Usually 11 – 15 stations in each circuit
- Easily changed as individuals progress
- Individuals can complete different circuits at same time as each other.

Example:

- Skipping – Press Ups – Squats – Dips – Crunches – Rest – Repeat

Types of Training – Weight training

Weight Training (Interval Training)

A form of training that involves the use of resistance to overload muscle groups and force adaptions that grow muscle tissue

Features:

- Weighted exercise are performed in a circuit
- 6-8 Reps (High Weight 70Kg) = Muscular Strength
- 10-12 Reps (Lower Weight 15Kg) = Muscular Endurance
- Muscle groups are overloaded / stressed forcing the body to adapt

Adaptions:

- Micro tears occur in the muscle fibres which then, through suitable rest time and diet) grow back larger in size and there fore collectively stronger.

Types of Training – Plyometrics

Plyometrics (interval training)

A form of training that involves rapid and repeated stretching and contracting of muscles designed to increase strength and power

Features:

- Sometimes called depth jumping
- Type of training used to develop Power and dynamic strength
- Improves the speed in which muscles contract (Power)
- Involves bounding, hopping and jumping.

Example:

- Any sport that involves sprinting, throwing and jumping will benefit from this type of training such as Basketball, netball or rugby

Types of Training – HIIT training

High Intensity Interval Training (HIIT)

A Cardiorespiratory training technique that alternates brief speed and recovery intervals to increase the overall intensity of a work out.

Features:

- Training at a high exertion level typically performed over 30 sec - 3 min interval
- The higher the intensity (80-90% max HR) the shorter the speed interval
- Recovery intervals are shorter or equal to speed intervals
- Typically lasts no longer than 30mins

Adaptions:

- This type of training not only improve performance but also improves the ability the muscles to burn fat.

Applying the principles of training

OPTIMISING TRAINING (contd …)

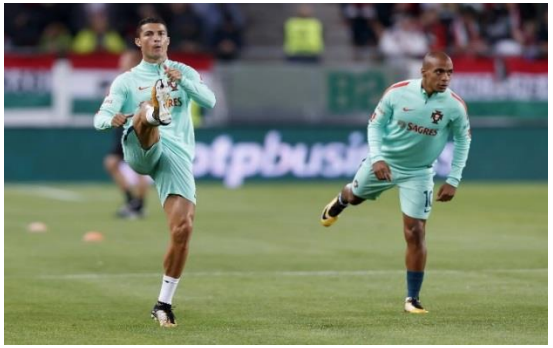
LEARNING OUTCOMES

BY THE END OF THIS TOPIC YOU SHOULD …

- **Understand the Key components of a warm up, including the effects on:**
  - pulse raising mobility
  - stretching
  - dynamic movements
  - skill rehearsal.
- **Know the Physical benefits of a warm up**
  - Warming up muscles
  - Body temperature
  - Heart rate
  - Flexibility of muscles and joints
  - Pliability of ligaments and tendons
  - Blood flow and oxygen to muscles
  - The speed of muscle contraction
- **Understand the key components of a cool down and be able to apply examples**
  - low intensity exercise
  - stretching
- **Know the benefits of a cool down**
  - Helps the body's transition back to a resting state
  - Gradually lowers heart rate
  - Gradually lowers temperature
  - Circulates blood and oxygen
  - Gradually reduces breathing rate
  - Increases removal of waste products such as lactic acid
  - Reduces the risk of muscle soreness and stiffness
  - Aids recovery by stretching muscles.

The key components of a warm up

Warm Up: Preparing the body for activity in order to reduce the risk of injury



Component 1: **Pulse Raising** exercises - to **slowly** raise heart rate and **gradually** increase body temperature
e.g. jogging / cycling

Component 2: **Mobility** exercises that take joints through their full range of movement e.g. high knees / arm swings

Component 3: **Stretching** can include static or dynamic type stretches e.g. lunges, walking hamstring stretch.

Component 4: **Dynamic Movements** that show a change in speed and direction e.g. shuttle runs

Component 5: **Skill Rehearsal** or practising the common movement patterns and skills that will be used in the activity e.g. dribbling drills for football, shooting in basketball.

Task: Design a warm up routine for your own sport that you will perform in every training session

Physical benefits of the warm up

- Warms up the muscles & prepares the body for physical activity
- Increases Heart Rate (release of adrenaline)
- Increases blood flow and oxygen to working muscles
- Decreases the ***likelihood*** of injury and muscle soreness (DOES NOT ***PREVENT*** INJURY
- Increase in Body Temperature (increased energy production)
- Increases Flexibility of muscles and joints
- Increases Pliability of ligaments and tendons
- Increases speed of muscle contraction

Components of the cool down

The Cool Down: Retuning the body to a state of rest after physical activity

Component 1: **Low Intensity Exercises**

aimed to gradually lower Heart Rate and reduce the body's core temperature

Examples - light jogging

Component 2: **Stretching**

includes steady and static stretches which are held for longer than in the Warm Up, example 15 seconds.

Examples - hamstring stretch & triceps stretch

Physical benefits of the cool down

The Cool Down is essential to an effective training session.
Cool downs allow Oxygen to flush through muscle tissue and get rid of Lactic Acid.

The Cool Down is crucial in…

- Helping the body's transition back to resting state
- ***Gradually*** lowering heart rate
- ***Gradually*** lowering temperature
- Circulating blood and oxygen
- ***Gradually*** reducing breathing (respiratory) rate
- Increasing the removal of waste products such as lactic acid
- Reducing the risk of muscle soreness and stiffness
- Reducing the risk of damage to joints
- Aiding recovery by stretching muscles

Exam Tip:
You must always include ***GRADUALLY*** when writing about lowering heart rate/breathing rate/temperature.

Task: Design a cool down routine for your own sport that you will perform in every training session

OCR Resources: *the small print*

OCR's resources are provided to support the delivery of OCR qualifications, but in no way constitute an endorsed teaching method that is required by the Board, and the decision to use them lies with the individual teacher. Whilst every effort is made to ensure the accuracy of the content, OCR cannot be held responsible for any errors or omissions within these resources.

Our documents are updated over time. Whilst every effort is made to check all documents, there may be contradictions between published support and the specification, therefore please use the information on the latest specification at all times. Where changes are made to specifications these will be indicated within the document, there will be a new version number indicated, and a summary of the changes. If you do notice a discrepancy between the specification and a resource please contact us at:
resources.feedback@ocr.org.uk.

- 4 > Elementary school boys and girls running in an open field / Monkey Business Images / Shutterstock.com
- 5 > Athlete jumping / bezikus / Shutterstock.com
- 6 > Bodybuilder training in a gym / Istvan Csak / Shutterstock.com
- 8 > Flooded soccer pitch / Marcel Jancovic / Shutterstock.com
- 8 > Knee of injured football player / Capifrutta / Shutterstock.com
- 13 > Hand with pen mark calendar / Pretty Vectors / Shutterstock.com
- 16 > Triathlon Varga Brownlee brothers / / Shutterstock.com / ED
- 19 > 2000 participants cycle toward Colorado National Monument / Linda Armstrong / Shutterstock.com / ED
- 20 > Young woman jumping participating in a trail race through the forest / David Pereiras / Shutterstock.com
- 21 > Anonymous people reaching lunging in gym as they run fast short sprints in gym / Daxiao Productions / Shutterstock.com
- 22 > Young attractive woman practicing yoga / F8 studio / Shutterstock.com
- 22 > Young woman holding dumbbells while being in squat position in a health club/ By ArtFamily / Shutterstock.com
- 23 > Fitness asian woman doing exercise and lifting barbell weights in sport gym / Peera_stockfoto / Shutterstock.com
- 24 > Box jump exercise / baranq / Shutterstock.com
- 25 > Young woman in sportswear doing exercise during intensive circuit training in gym class/ Jacob Lund / Shutterstock.com
- 27 > Cristiano Ronaldo of Portugal warms up with Joao Mario of Portugal/ Laszlo Szirtesi / Shutterstock.com
- 29 > Sporty girl stretching her hamstring / Romariolen / Shutterstock.com

Please get in touch if you want to discuss the accessibility of resources we offer to support delivery of our qualifications: resources.feedback@ocr.org.uk