## Scheme of work

Guided learning hours (GLH): 30  
Number of lessons: 30  
Duration of lessons: 1-2 hours  
Learners should spend lesson time and non-supervised time working on assignments.

This scheme of work is provided to help you make the most of your planning time. Customise this by adding your own activities/lesson ideas to the 'Activities' column.

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<tr>
<td>1</td>
<td>Unit introduction</td>
<td>● Tutor presentation (approx. 10 minutes): outline the nature of the learning aims and the number of assignments that learners will be expected to complete.</td>
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**Learning aim A: Know about the short-term responses and long-term adaptations of the body systems to exercise**

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</table>
| 1-2 cont. | Topic A.1 Short-term effects of exercise on the musculoskeletal system:  
● increased production of synovial fluid  
● increased joint range of movement | ● Tutor presentation: short-term effects of exercise on joints.  
● **Group activity:** learners to produce informational posters on how exercise benefits joints. | **Topic A.1** has links with:  
● Unit 5: Training for personal fitness (Topic A.4)  
● Unit 7: Anatomy and physiology for sports performance (Topic A.10) |
| 3      | Topic A.1 cont.:  
● **Group activity:** learners to research how new bone is formed. Learners to then present their findings to the class. | **Topic A.1** has links with:  
● Unit 5: Training for personal fitness (Topic A.3)  
● Unit 7: Anatomy and physiology for sports performance (Topic A.5) |

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### Unit 4: The Sports Performer in Action

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| 4      | Topic A.1 cont.:  
  - micro tears in muscle fibres  
  - increased metabolic activity |  
  - Tutor-led recap session: Q&A on new bone formations.  
  - Group activity: learners to produce an information poster for a gym on the short-term effects of exercise on muscles.  
  - Group discussion regarding assessment requirements. | Topic A.1 has links with:  
  - Unit 5: Training for personal fitness (Topic A.3)  
  - Unit 7: Anatomy and physiology for sports performance (Topic A.5) |
| 5-6    | Topic A.2 Short-term effects of exercise on the cardiorespiratory system:  
  - increased heart rate  
  - increased breathing rate  
  - increased blood flow |  
  - Tutor presentation: short-term responses of the cardiorespiratory system.  
  - Practical activity: learners to investigate the effects of exercise on heart rate. | Topic A.2 has links with:  
  - Unit 5: Training for personal fitness (Topic A.4)  
  - Unit 7: Anatomy and physiology for sports performance (Topic B.5) |
| 7      | Topic A.2 cont.  
  - sweat production and skin reddening |  
  - Tutor presentation: short-term responses of the cardiorespiratory system.  
  - Practical activity: learners investigate how much they sweat. | Topic A.2 has links with:  
  - Unit 5: Training for personal fitness (Topic A.4)  
  - Unit 7: Anatomy and physiology for sports performance (Topic B.5) |
| 8      | Topic A.2 cont.:  
  - re-distribution of blood flow |  
  - Tutor presentation: blood flow.  
  - Individual activity: learners to investigate changes in blood flow during exercise. | Topic A.2 has links with:  
  - Unit 5: Training for personal fitness (Topic A.4)  
  - Unit 7: Anatomy and physiology for sports performance (Topic B.5) |

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| 9      | Topic A.2 cont.:  
- increased cardiac output  
- increased blood pressure  |  
- **Tutor presentation:** cardiac output and blood pressure.  |  
**Topic A.2** has links with:  
- Unit 5: Training for personal fitness (Topic A.4)  
- Unit 7: Anatomy and physiology for sports performance (Topic B.5) |
| 10     | Topic A.2 cont.:  
- increased build-up of lactic acid  
- increase in Tidal Volume (TV)  |  
- **Tutor presentation:** lactic acid and tidal volume.  
- **Group discussion:** is lactic acid only a waste product?  |  
**Topic A.2** has links with:  
- Unit 5: Training for personal fitness (Topic A.4)  
- Unit 7: Anatomy and physiology for sports performance (Topic B.5) |
| 11     | Topic A.1 and A.2 cont.:  
- End of topic recap  |  
- **Tutor presentation:** end of topic recap.  
- **Head to head quiz:** split learners into two groups and ask each member to write down 3 questions and the answers. These are then given to the tutor. Students then take it in turns to go head to head. Tutor calls questions.  |  
**Topic A.2** has links with:  
- Unit 5: Training for personal fitness (Topic A.4)  
- Unit 7: Anatomy and physiology for sports performance (Topic B.5) |
| 12     | Topic A.3 Long-term adaptations of the musculoskeletal system:  
- hypertrophy (increased muscle size)  
- increased number of mitochondria  |  
- **Tutor presentation:** hypertrophy and increased number of mitochondria as long-term adaptations of the musculoskeletal system.  
- **Individual activity:** learners to produce leaflet that uses illustrations and accompanying explanations of hypertrophy and increased mitochondria. Learners should include relevant examples of how this can benefit different sports.  |  
**Topic A.3** has links with:  
- Unit 5: Training for personal fitness (Topic A.4)  
- Unit 7: Anatomy and physiology for sports performance (Topic A.5) |
| 13     | Topic A.3 cont.:  
- increase in bone density (bone strength)  |  
- **Tutor presentation:** increased bone density as long-term adaptations of the musculoskeletal system.  
- **Individual activity:** learners to investigate bone density.  |  
**Topic A.3** has links with:  
- Unit 5: Training for personal fitness (Topic A.4)  
- Unit 7: Anatomy and physiology for sports performance (Topic A.5) |

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| 14     | **Topic A.3 cont.:**  
- increased stability of joints  
- stronger connective tissues (ligaments and tendons), so more resistant to injury  
- increased thickness of hyaline cartilage  

* Tutor presentation: increased joint stability as a long-term adaptation of the musculoskeletal system.  
* Group activity: learners to come up with six different exercises to be used by office workers to improve their posture.  

**Topic A.3 has links with:**  
- Unit 5: Training for personal fitness (Topic A4)  
- Unit 7: Anatomy and physiology for sports performance (Topic A.5) |
| 15     | **Topic A.3 cont.:**  
- improved posture  

* Tutor presentation: improved posture as a long-term adaptation of the musculoskeletal system.  
* Paired activity: learners to produce an advice leaflet, aimed at office workers, which shows how exercise can benefit posture.  

**Topic A.3 has links with:**  
- Unit 5: Training for personal fitness (Topic A4)  
- Unit 7: Anatomy and physiology for sports performance (Topic A.5) |
| 16     | **Topic A.3 cont.:**  
- decreased risk of osteoporosis  

* Tutor presentation: decreased risk of osteoporosis as a long-term adaptation of the musculoskeletal system.  
* Individual activity: learners to produce an advice leaflet, aimed at female gym users, which explains how exercise can decrease the risk of osteoporosis.  

**Topic A.3 has links with:**  
- Unit 5: Training for personal fitness (Topic A4)  
- Unit 7: Anatomy and physiology for sports performance (Topic A.5) |
| 17     | **Topic A.3 cont.:**  
- end of topic re-cap  

* Group activity: learners take part in ‘Who wants to be a millionaire’ style Q&A session. Tutor could use monopoly money or similar as the ‘prize’.  
* Tutor presentation: end of topic recap followed by a Q&A session.  
* Individual activity: learners to investigate the long-term effects of exercise.  

**Topic A.3 has links with:**  
- Unit 5: Training for personal fitness (Topic A4)  
- Unit 7: Anatomy and physiology for sports performance (Topic A.5) |

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| 18     | Topic A.4 Long-term adaptations of the cardiorespiratory system:  
• decrease in resting heart rate  
• increase in heart size and strength  
• increase in stroke volume  
• decreased risk of hypertension (high blood pressure) | **Tutor presentation**: long-term adaptations of the heart.  
**Individual activity**: learners to investigate strong and healthy hearts. | Topic A.3 has links with:  
• Unit 5: Training for personal fitness (Topic A.4)  
• Unit 7: Anatomy and physiology for sports performance (Topic B.5) |
| 19     | Topic A.4 cont.:  
• increased Vital Capacity (VC)  
• increased efficiency to deliver oxygen and remove waste products  
• increased lung efficiency and gaseous exchange  
• increased maximum oxygen uptake (VO₂ max). | **Tutor presentation**: long-term adaptations of the cardiorespiratory system.  
**Group activity**: learners to produce A3 posters aimed at asthmatic patients on how the cardiorespiratory system adapts to exercise. | Topic A.3 has links with:  
• Unit 5: Training for personal fitness (Topic A.4)  
• Unit 7: Anatomy and physiology for sports performance (Topic B.5) |
| 20-21 | Assignment 1  
Tasks for Learning aim A  
Use centre-devised assignment. Alternatively, use the authorised assignment from Pearson [www.btec.co.uk/sport2012](http://www.btec.co.uk/sport2012) | **Assessment**: evidence could be in the form of a presentation.  
• Learners could use the links at the end of this scheme of work during their research for this assignment.  
• Learners should spend session time and non-supervised time working on this assignment. | |

**Learning aim B: Know about the different energy systems used during sports performance**

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| 22     | Topic B.1 The anaerobic energy system:  
• Sports that use this system | **Tutor presentation**: energy systems in sport.  
**Individual activity**: learners to investigate energy systems in sport. | Unit 5: Training for personal fitness (Topic A4)  
Unit 7: Anatomy and physiology for sports performance (Topic A.5) |

*See the specification for full details of unit content.*
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| 23-24 (2 hour) | **Topic B.2 ATP-CP/alactic acid anaerobic system:**  
- reliance on stored adenosine triphosphate (ATP)  
- another stored molecule, creatine phosphate (CP) helps restore ATP  
- CP is restored aerobically (with oxygen  
- energy is supplied by ATP and CP (four to 20 seconds)  
- when this system runs out of ATP-PC stores, glycolysis takes place | **Tutor presentation:** anaerobic energy systems.  
**Group activity:** learners to produce poster (part A) that explains how the anaerobic energy systems work. |  
- Unit 5: Training for personal fitness (Topic A4)  
- Unit 7: Anatomy and physiology for sports performance (Topic A.5) |
| **Topic B.3 Glycolysis/lactic acid anaerobic system:**  
- ATP is made from glucose stored in the liver and muscles  
- energy is supplied by ATP, CP and muscle glycogen (20 to 45 seconds)  
- energy is supplied by muscle glycogen (45 to 240 seconds)  
- waste product is lactic acid  
- when this system is unable to maintain energy requirements, the aerobic system starts to produce energy  
- sports that use this system | |

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<tr>
<td>25</td>
<td><strong>Topic B.4 The aerobic energy system - using oxygen:</strong></td>
<td>&lt;ul&gt;&lt;li&gt;Tutor presentation: aerobic energy systems.&lt;/li&gt;&lt;li&gt;Activity: learners to timeline in pairs (part B) that explains how the aerobic energy system works (use as many illustrations as possible to support explanation).&lt;/li&gt;&lt;/ul&gt;</td>
<td>&lt;ul&gt;&lt;li&gt;Unit 5: Training for personal fitness (Topic A4)&lt;/li&gt;&lt;li&gt;Unit 7: Anatomy and physiology for sports performance (Topic A.5)&lt;/li&gt;&lt;/ul&gt;</td>
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<tr>
<td>26</td>
<td><strong>Topic B.1,B.2,B.3,B.4 cont.:</strong></td>
<td>&lt;ul&gt;&lt;li&gt;Class activity: tutor to show video clips of different sports and learners to identify which energy systems are being used.&lt;/li&gt;&lt;li&gt;Tutor presentation on how energy systems work.&lt;/li&gt;&lt;li&gt;Individual activity on how energy systems work.&lt;/li&gt;&lt;/ul&gt;</td>
<td>&lt;ul&gt;&lt;li&gt;Unit 5: Training for personal fitness (Topic A4)&lt;/li&gt;&lt;li&gt;Unit 7: Anatomy and physiology for sports performance (Topic A.5)&lt;/li&gt;&lt;/ul&gt;</td>
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<tr>
<td>27</td>
<td><strong>Topic B.1,B.2,B.3,B.4 cont.:</strong></td>
<td>&lt;ul&gt;&lt;li&gt;Individual activity: learners to investigate the energy system continuum.&lt;/li&gt;&lt;/ul&gt;</td>
<td>&lt;ul&gt;&lt;li&gt;Unit 5: Training for personal fitness (Topic A.4)&lt;/li&gt;&lt;li&gt;Unit 7: Anatomy and physiology for sports performance (Topic A.5)&lt;/li&gt;&lt;/ul&gt;</td>
</tr>
<tr>
<td>28</td>
<td><strong>Topic B.1,B.2,B.3,B.4 cont.:</strong></td>
<td>&lt;ul&gt;&lt;li&gt;Tutor presentation: end of learning aim recap followed by a Q&amp;A session.&lt;/li&gt;&lt;li&gt;Small group activity: learners to produce a list of questions (5 per energy system and 5 related to the application to sport). The quizzes are then swapped between groups for completion.&lt;/li&gt;&lt;/ul&gt;</td>
<td>&lt;ul&gt;&lt;li&gt;Unit 5: Training for personal fitness (Topic A4)&lt;/li&gt;&lt;li&gt;Unit 7: Anatomy and physiology for sports performance (Topic A.5)&lt;/li&gt;&lt;/ul&gt;</td>
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| 29-30  | Assignment 2  | ● **Assessment:** evidence could be in the form of a newspaper article.  
| (2     | Tasks for Learning aim B  
| hours) |               | ● Learners could use the following during their research for this assignment (see below).  
|        |               | ● Learners should spend session time and non-supervised time working on this assignment. | |
|        | Use centre-devised assignment. Alternatively, use the authorised assignment from Pearson [www.btec.co.uk/sport2012](http://www.btec.co.uk/sport2012) | | |

**TOTAL: 30 hours**

**Useful links**

http://www.britannica.com/EBchecked/topic/434208/bone-formation  
http://www.brianmac.co.uk/energy.html  
http://www.sport-fitness-advisor.com/energysystems.html

*See the specification for full details of unit content.*