



Unit title	Unit 24: Applied Sports Anatomy and Physiology
Guided learning hours	90
Number of lessons	45
Duration of lessons	2 hours
Links to other units	
<ul style="list-style-type: none"> • Unit 1: Health, Wellbeing and Sport • Unit 2: Careers in the Sport and Active Leisure Industry • Unit 3: Research Project in Sport • Unit 6: Exercise and Fitness Skills Development • Unit 9: Nutrition for Physical Activity and Exercise • Unit 15: Developing Coaching Skills • Unit 16: Applied Coaching Skills • Unit 25: Sports Injuries Management • Unit 28: Fitness Testing • Unit 29: Technical and Tactical Skills in Sport • Unit 31: Influence of Technology in Sport and Physical Activity • Unit 35: Practical Sports Performance • Unit 36: Functional Sports Massage. 	

Key to learning opportunities			
AW	Assignment writing	RS	Revision session
GS	Guest speaker	V	Visit
IS	Independent study	GW	Group work



Lesson	Topic	Lesson type	Suggested activities	Resources
Learning aim A: Examine the function of the musculoskeletal system and how it responds to exercise				
1	Unit introduction	IS	<ul style="list-style-type: none"> • Introduce the unit: outline the nature of the topics and the examination that learners are expected to complete for this unit. • Whole-class activity: learners to work individually, in pairs or in small groups to demonstrate prior knowledge of the subject. Suggestions include getting learners to independently recall prior knowledge before developing knowledge in pairs and finally small groups (using A3 paper as means to record findings). Learners to feed back with directed Q&A. 	
2	A1 Structure of skeletal system A2 Function of the skeletal system	IS	<ul style="list-style-type: none"> • Individual or paired activity: ask learners to complete an activity locating different bones on a partner's body (using sticky notes), followed by on a pre-drawn skeletal worksheet. Tutor presentation: the location of major bones, types of bone, and the axial and appendicular skeleton. • Individual task: learners to create an information sheet illustrating the different types of bone, and how they are used within different sporting techniques and/or actions. • Whole-class activity: a practical exercise identifying the major bones. Call out the bone name and ask learners to point to the location of the bone on their own body, and state a sporting technique and/or action where it is used. • Individual activity – learners to label areas of skeleton. • Whole-group activity: individual recap sheet to complete on different types of bone and sporting actions. Follow with learners labelling the skeletal system as a group. 	Sticky notes Model of human Skeleton Tutor-prepared recap sheet Pictures to label for recap activity



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			<ul style="list-style-type: none"> • Tutor presentation: curvature of the spine and the process of bone growth. • Individual activity: ask learners to independently research and then create an information sheet about the curvature of the spine and the process of bone growth. • Whole-group activity: get learners to act as tutors by feeding back information to the rest of the group. • Individual task: recap curvature of the spine (by labelling pictures) and the process of bone growth (by completing worksheets in the style of a mini quiz). • Tutor presentation: the functions of the skeletal system. • Individual and group activity: individuals are given a different function of the skeletal system to research independently. This can be developed via the snowball technique. This involves learners moving into pairs, taking it in turns to explain their research and make notes, then joining another pair to do the same. Ask learners then to feed back all functions to the rest of the class in their groups. 	
3	A3 Structure and function of joints	IS	<ul style="list-style-type: none"> • Small-group activity: instigate learner discussion on 'What are joints?' • Tutor presentation: joints, their classification, and their structure and function. Use video sharing websites to give a visual on the theory content, e.g. www.youtube.com/watch?v=0cYal_hitz4. • Individual task: ask learners to label the structure of a synovial joint. 	Internet access for videos on video sharing websites Synovial joints worksheet



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			<ul style="list-style-type: none"> • Small-group task: allocate to groups one or more synovial joints. They can then create a list of sporting actions that incorporate movement at these joints and demonstrate this practically (in front of the class). 	
4	A4 Structure of the muscular system	IS	<p>Tutor presentation/group discussion: what is the muscular system? Describe the key characteristics and functions of the different types of muscle in the human body.</p> <ul style="list-style-type: none"> • Individual or paired activity: ask learners to identify and describe muscle types by creating an information leaflet to use as notes for the assessment. • Whole-class activity: carry out a quick-fire quiz to check learning. • Individual or paired activity: ask learners to label a diagram of the muscular system with the muscles listed in the specification. They should then complete a peer review using a diagram with the correct location of the muscles. • Extension activity: set learners extended open answer questions, in line with the distinction criteria. There is an opportunity to develop extended writing skills here. 	
5-6	A4 Structure of the muscular system A5 Function of the muscular system	IS	<ul style="list-style-type: none"> • Individual activity: recap on types of muscle. You could complete a mix-and-match task, followed by several tutor-created questions. • Individual or paired activity: ask learners to complete an activity locating different types of muscle. Examples include a 'pin the muscle on the body' game (using reusable adhesive instead of pins) as an adaptation of 'pin the tail on the donkey'. The muscles 	Quiz Reusable adhesive Outline of human body Tutor created worksheets



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			<p>should be stuck on the appropriate places of an A3 outline of a human body.</p> <ul style="list-style-type: none"> • Individual activity: learners to complete a tutor-created worksheet labelling the muscles of the muscular system. • Individual or paired activity: ask learners to come up with methods to remember the names of difficult muscles (e.g. erector spinae = erect = to stand tall = back muscle). • Tutor presentation: to embed key points from previous activity. • Whole-class activity: carry out a practical exercise identifying major muscles and their sporting actions. Using a random name selector, call out a bone name and joint. Learners must point to and identify the location of the bone and joint on their own body, the muscles attached, and the movements enabled at the joint. • Tutor presentation: recap on the major muscles. Ask learners to complete a worksheet. • Tutor presentation: antagonistic muscle pairs. • Small group activity: allocate each group a different sporting action. Their task is to identify the muscle(s) of the agonist, antagonist, synergist and fixator. On completion, ask the groups to feed back to the rest of the class. As an extension activity, ask groups to come up with a different sporting action for further stretch and challenge. • Tutor presentation: explain the link between antagonistic pairs – use a video to aid explanation and use tutor-directed Q&A. Suggestions include www.youtube.com/watch?v=I80Xx7pA9hQ, with numerous other appropriate videos online for support. 	<p>Practical space for exercises and sporting actions</p> <p>Internet access for video-sharing websites</p> <p>Practical space for exercises</p>



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			<ul style="list-style-type: none"> • Tutor presentation: recap antagonist pairs. Give learners a worksheet with questions to answer, and ask them to write down two further questions to test the rest of the group. Q&A and discussion to follow. • Tutor presentation: the different types of muscle contraction. • Individual/paired activity: give learners different types of exercise and ask them to identify the different types of muscle contraction taking place at each phase of movement. Do this activity in the classroom if possible, or the sports hall if needed. • Tutor presentation: explain the link between antagonist pairs. For example, when a bicep brachii contracts concentrically, the tricep brachii has to contract eccentrically. • Individual plenary activity: ask learners to create a rhyme, poem or dance to help them remember the differences between the types of muscular contraction. 	
7-8	A6 Muscle fibre types	IS	<ul style="list-style-type: none"> • Group activity: as a recap, get learners to create a short presentation on one of the muscle types to feed back to the group. • Tutor presentation: the three types of muscle fibre: type I, type IIa and type IIb. • Individual or paired activity: ask learners to describe the characteristics of muscle fibres, with reference to athletes and sporting application. • Tutor presentation: nervous control of muscular contraction and the 'all or none law'. 	Practical space for exercise Range of weights



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			<ul style="list-style-type: none"> • Whole-class activity: get learners to take part in a practical to demonstrate recruitment of muscle fibres depending on effort, e.g. light, medium and heavy weights. • Individual task: quiz/Question of Sport-style game to check learning. 	
9-10	<p>A7 Musculoskeletal responses to acute exercise</p> <p>A8 Musculoskeletal responses to long-term exercise</p>	IS	<ul style="list-style-type: none"> • Individual activity/group discussion: ask learners to identify as many responses of the musculoskeletal system to a sport or exercise session as possible. Discussion can then follow. • Tutor presentation: responses to exercise. • Small-group activity: in groups, ask learners to produce a presentation with supplemented demonstrations to show the responses of the musculoskeletal system. • Individual task: give a mini test to check learning. Use extended questioning as an extension. • Whole-class discussion: what adaptations occur to the musculoskeletal system from exercise? • Tutor presentation: introduce adaptations of the musculoskeletal system. • Pair activity: ask learners to create a poster presentation on musculoskeletal adaptation(s). The pairs should then present to the group with time allocated for Q&A from their peers. • Individual/small-group/whole-class activity: create four information packs, each representing a key adaptation of the muscular system. Give learners a pack each and allow them time to read and annotate the packs, and gain a sound understanding of the adaptations. On completion, learners become the tutor to 	<p>Tutor presentation</p> <p>Tutor created 'pack' relating to muscular adaptations</p>



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			create a 'knowledge cafe', where learners teach among themselves. <ul style="list-style-type: none"> • Tutor presentation: adaptations of the muscular system to exercise. • Small-group activity: Question of Sport-style recap quiz. 	
11-13	Assessment of learning aim A.	AW	<ul style="list-style-type: none"> • Individual activity – learners work independently on the tasks on the assignment brief. Learners may also choose to work independently on the tasks outside of the classroom. Tutors should facilitate the learners completing the assessment before the submission deadline. 	Assignment brief Internet access
Learning aim B: Examine the function of the cardiovascular system and how it responds to exercise				
14-15	B1 Structure of the cardiovascular system	IS	<ul style="list-style-type: none"> • Tutor presentation: the structure of the heart. • Individual activity: get learners to label the structure of the heart or complete a jigsaw puzzle. • Paired activity: ask learners to test each other on the structure of the heart. • Group activity: the tutor will lay out marker disks in the shape of the heart with the oxygenated side of the heart in red cones and de-oxygenated in blue cones. Each learner is given a role in the heart to play, e.g. bicuspid valve. Some learners will be the blood vessels and they start off holding blue bibs and follow the pathway of blood through the heart to pick up red bibs in the 'lungs'. Learners must remember the function of their structure and when they return to the classroom learners must work together to discuss the flow of blood through the heart. 	Jigsaw puzzle of the heart/diagram of the heart without labels Practical space Marker discs and bibs in blue and red



Lesson	Topic	Lesson type	Suggested activities	Resources
			<ul style="list-style-type: none"> • Tutor presentation: go through the functions of each component. • Pair or small-group activity: illustrate the different blood vessels and describe their structure. You can use e-learning to aid learner research. • Tutor presentation: Q&A on the structure of blood vessels. 	
16-17	B1 Structure of the cardiovascular system	IS	<ul style="list-style-type: none"> • Tutor presentation: recap the structure of the cardiovascular system. • Individual activity: as a further recap activity, get learners to race to see who can label the system the quickest. • Independent research task: ask learners to research the composition of blood. Learners should create a poster to show the percentages of the different components. • Tutor presentation: the composition of blood. • Quiz: learners make a quiz/game to test learning and understanding. 	Tutor presentation
18-19	B2 Function of the cardiovascular system	IS	<ul style="list-style-type: none"> • Tutor presentation: recap on composition and function of blood. Recap worksheet followed by Q&A. • Practical activity: learners bring in layers of warm clothing, hats and gloves. They take their temperature before, during and after playing a short game. • Group discussion: learners discuss how they felt during the activity and the differences in their temperatures. • Tutor presentation: thermoregulation. 	Practical space Tutor-created worksheet Poster paper/A3/flip chart for stall signs and info



Lesson	Topic	Lesson type	Suggested activities	Resources
			<ul style="list-style-type: none"> • Individual/pair/group activity: marketplace learning – research using worksheets to increase knowledge in the field. Set up stalls to represent a different topic area. Learners will walk among the different ‘stalls’ to share learning and content. • Tutor presentation: the functions of the cardiovascular system. Hold directed Q&A to check learning. 	
20-21	B3 Cardiovascular responses to acute exercise	IS	<ul style="list-style-type: none"> • Pair activity: as a race in pairs, learners must identify the correct definition for each element making up the cardiac cycle. • Practical activity: learners participate in a 10-minute cardiovascular activity. They should work in pairs to record heart rate before, during and after. • Group discussion: learners discuss the changes in their heart rate during acute activity and compare their figures to normal heart rate boundaries for their age. • Tutor presentation: responses of the cardiovascular system. • Small-group activity: present case studies demonstrating a number of responses following a single sport or exercise session. Ask learners to depict the responses and explain why they are occurring. They should then feed back to the class. • Individual activity: extended style question to test for learning and understanding at higher grades. 	<p>Practical space for cardiovascular activities</p> <p>Case studies – heart.org and livestrong.com may be useful to create these. There are also several journals available on Google Scholar</p>
22-23	B4 Cardiovascular responses to long-term exercise	IS	<ul style="list-style-type: none"> • Tutor presentation: recap responses of cardiovascular system. • Whole-group activity: speed teaching – give small groups/pairs a content area and time to increase knowledge in the field. Groups rotate round to teach each other the content in the format of 	<p>Resources on cardiovascular adaptations</p> <p>Mini quiz</p>



Lesson	Topic	Lesson type	Suggested activities	Resources
			<p>speed dating. Ask individuals to collate a workbook of content and score each other's teaching.</p> <ul style="list-style-type: none"> • Tutor presentation: adaptations of the cardiovascular system. • Individual activity: mini quiz to check learning. • Educational trip: use a museum or educational trip to combine and reinforce all prior knowledge within the unit. Give learners a tutor-devised worksheet to complete during the trip. 	
Learning aim C: Examine the function of the respiratory system and how it responds to exercise				
24-25	C1 Structure of the respiratory system	IS	<ul style="list-style-type: none"> • Tutor presentation: the structure of the respiratory system. • Individual activity: ask learners to label the structures of the respiratory system. Create a jigsaw puzzle from the structure of the entire respiratory system and ask them to solve it, while identifying each structure. • Tutor presentation: the different structures and their function within the respiratory system. • Pair activity: get learners to create a quiz for their partner to complete on the structures and their function within the respiratory system. • Individual activity: examination-style questions as a recap on the structure of the respiratory system. 	Jigsaw
26-27	C2 Function of the respiratory system	IS	<ul style="list-style-type: none"> • Pair activity: using peak flow and a spirometer, get learners to measure lung volumes and capacity, noting their partner's results. • Tutor presentation: lung volumes applied to the sporting context. 	<p>Practical space for exercise</p> <p>Tutor-created worksheet</p>



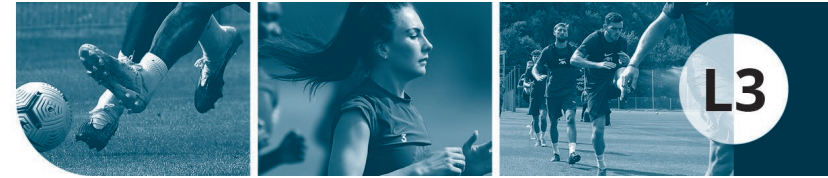
Lesson	Topic	Lesson type	Suggested activities	Resources
			<ul style="list-style-type: none"> • Tutor presentation/practical session: get learners to take part in a range of movements/ activities. Hand out a worksheet for them to complete individually, before working in small groups to check for understanding. • Practical application: learners to measure vital capacity using the balloon method. Go online and watch the YouTube video before performing the task: <i>'How to Measure Vital Capacity Using a Balloon.'</i> • Tutor presentation: devise a game with key terms or phrases in the format of bingo to check learning to date. Call out definitions of the key terms and/or give examples alluding to the key terms or phrases. • Independent study: give learners articles (from journals or other credible sources) and ask them to answer questions on neural and chemical control of breathing. When complete, use the snowball method to work in pairs, then in small groups, and finally as a class to discuss. • Tutor presentation: the control of breathing. • Individual task: carry out extended questioning in line with distinction criteria. 	Paper and pens YouTube video - 'How to Measure Vital Capacity Using a Balloon' by XoletteScience Journal articles Internet access
28-29	C3 Respiratory response to acute exercise	IS	<ul style="list-style-type: none"> • Whole-class activity: 'learner as tutor' game. Ask learners to use their class notes to devise questions to ask the rest of the class, recapping lung volumes and control of breathing. • Small-group activity: allocate groups one response and get them to create a presentation to deliver to the rest of the class. 	



Lesson	Topic	Lesson type	Suggested activities	Resources
			<ul style="list-style-type: none"> • Tutor presentation: recap responses of the respiratory system, followed by a directed Q&A. 	
30-31	C4 Respiratory response to long-term exercise	IS	<ul style="list-style-type: none"> • Tutor presentation: recap responses of the respiratory system. • Group activity: give learners a workbook and one key adaptation to individually work through. On completion, individuals should get together with others to form small groups and teach each other so they all have notes on all key adaptations. • Tutor presentation: adaptations of the respiratory system. • Whole-class activity: Q&A on adaptations. 	Tutor-created workbook
32-36	Assessment of learning aims B and C	AW	<ul style="list-style-type: none"> • Individual activity – learners work independently on the tasks on the assignment brief. Learners may also choose to work independently on the tasks outside of the classroom. Tutors should facilitate learners completing the assessment before the submission deadline. 	Assignment brief
Learning aim D: Explore the different types of energy systems and how they are used in exercise				
37-38	D1 Energy systems	IS	<ul style="list-style-type: none"> • Tutor-led discussion: what is adenosine triphosphate (ATP)? • Tutor presentation: the role of ATP in exercise. • Pair activity: using five balloons, demonstrate how energy is created and recreated. One balloon represents the adenosine molecule, with a further four balloons available to represent the role of phosphate molecules in the creation and recreation of energy. Encourage discovery learning here. • Individual activity: extended writing task on the role of ATP in sport. 	Balloons Video clips of sports activities Space for practical activity



Lesson	Topic	Lesson type	Suggested activities	Resources
			<ul style="list-style-type: none"> • Independent study: get learners to research the ATP-PC system in exercise and sports performance. • Pair, small-group and whole-class activity: following the independent study, pair up individuals to share knowledge. This will then develop into small groups before feeding back to the rest of the class. Discussions and directed Q&A should follow. • Tutor presentation: play video clips of several sports and activities. Ask learners to make notes, applying the system to the actions they can see. Any relevant sporting clip showing anaerobic activity will be appropriate. • Individual activity: mini quiz to check learning. • Tutor presentation: the lactate system in exercise and sports performance. Follow your presentation with practical elements to demonstrate lactate build up (suggestions include one-minute press up and squat challenges). • Tutor presentation: the aerobic system. • Individual task: open questioning relating to the aerobic system's contribution to energy for exercise and sports performance. • Pair activity: get learners to create an information leaflet that explains the aerobic system in sport and exercise. These can be used as guides for the assignment. 	
39-40	D2 Energy system response to acute exercise	IS	<ul style="list-style-type: none"> • Whole-group activity: recap on the aerobic system. Ask learners to produce two questions each (with answers) to ask each other. • Tutor presentation: on energy system response to acute exercise. 	Tutor presentations. Tutor-prepared resources



Lesson	Topic	Lesson type	Suggested activities	Resources
	D3 Energy system response to long-term exercise		<ul style="list-style-type: none"> ● Group activity: learners work in small groups. They are given an acute response and have to research the benefit of the response. The group then present the information back to rest of the group. ● Tutor presentation: on adaptations of the energy systems to exercise. ● Group activity: get learners in groups to produce a presentation on the adaptations of the energy systems. ● Whole-class activity: guided debate to encompass all aspects of ATP and the energy systems during sport and exercise performance. ● Individual task: ask learners to identify key facts surrounding the topic area to aid high grade achievement. 	
41-45	Assessment of learning aim D	AW	<ul style="list-style-type: none"> ● Individual activity: learners work independently on the tasks on the assignment brief. Learners may also choose to work independently on the tasks outside of the classroom. Tutors should facilitate learners completing the assessment before the submission deadline. 	Assignment brief

Pearson is not responsible for the content of any external internet sites. It is essential for tutors to preview each website before using it in class so as to ensure that the URL is still accurate, relevant and appropriate. We suggest that tutors bookmark useful websites and consider enabling learners to access them through the school/college intranet.