



# YEARS 11&12

## SPORT SCIENCE - FOUNDATION TEACHING & LEARNING SUPPLEMENT

# Teaching and Learning Supplement

## SPORT SCIENCE - FOUNDATION (SPT215118)

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### ADVICE TO TEACHERS

This document helps to describe the nature and sequence of teaching and learning necessary for learners to demonstrate achievement of course outcomes.

It suggests some examples of appropriate learning activities to enable learners to develop the knowledge and skills identified in the course outcome statements.

Tasks should provide a variety of opportunities and the mix of tasks should reflect a range of different types of tasks to address different knowledge and skills, and different learning styles. Tasks do not always have to be lengthy to make a decision about student demonstration of achievement of an outcome.

At the core of the Sport group of courses are the concepts of physical activity and physical literacy. It is essential that learners acquire movement skills and concepts to enable participation in a range of physical activities, confidently, competently and creatively, and therefore engage in lifelong physical activity participation. This is crucial as Health and Physical Education and the Sport Group of courses must fill a key role in dealing with Tasmania's alarming statistics in relation to young people and their wellbeing:

- physical activity participation rates, notably amongst young people – particularly girls, is showing concerning decline;<sup>1</sup>
- approximately 30 per cent of Tasmanian children aged between 12 and 15 are overweight, and nearly 10 per cent are obese<sup>2</sup>;
- estimate Type 1 Diabetes rates are higher in Tasmania for children aged between 0 and 14 than nationally<sup>3</sup>;
- deaths of children and young people due to intentional self-harm are higher in Tasmania than nationally<sup>4</sup>.

Alongside improving physical activity levels is the development of physical literacy, and managing the integration of physical, psychological, cognitive and social capabilities that help us live active, healthy and fulfilling lifestyles. By combining physical activity, physical literacy and placing an emphasis on the practical nature of the Sport group of courses we provide the basis for lifelong holistic learning. Teachers should ensure they are familiar with the different roles, pathways and purposes of all courses across the HPE suite and particularly the connections aligned to those within the Sport group

### COURSE SPECIFIC ADVICE

This Teaching and Learning Supplement for *Sport Science – Foundation* Level 2 must be read in conjunction with the *Sport Science – Foundation* Level 2 Course Document. It contains advice to assist teachers delivering the course and can be modified as required. This Teaching and Learning Supplement is designed to support teachers new to or returning to teaching this course.

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<sup>1</sup> 2011, *Australian Social Trends: Sport and Physical Recreation*, Australian Bureau of Statistics,

<http://abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features30Jun+2011> (accessed 22 February 2018)

<sup>2</sup> 2017, Media Release: *Commissioner release updated Data Report on the Health and Wellbeing of Tasmania's children*, Commissioner for Children and Young People, <http://www.childcomm.tas.gov.au/wp-content/uploads/2017/03/Media-Release-CCYP-Health-and-Wellbeing-Report-4-Sept-2017.pdf> (accessed 22 February 2018)

<sup>3</sup> 2

<sup>4</sup> 2

HEALTH AND PHYSICAL EDUCATION SUITE				
Level	Sport Group	Recreation Group	Health Group	Outdoor Group
3	<a href="#">Sport Science</a> 15		<a href="#">Health Studies</a> 15	<a href="#">Outdoor Leadership</a> 15
2	<a href="#">Sport Science- Foundation</a> 15 <a href="#">Athlete Development</a> 15 <a href="#">Community Sport and Recreation</a> 15		<a href="#">Personal Health and Wellbeing</a> 15	<a href="#">Outdoor Education</a> 15
1	<a href="#">Fitness Experiences</a> 5 <a href="#">Sport and Recreation Experiences</a> 10		<a href="#">Personal Care</a> 10	<a href="#">Outdoor Experiences</a> 5
Pre	<a href="#">Sport and Recreation for Life</a> 10			

*Sport Science - Foundation* is a level 2 course in the Sport group of the Health and Physical Education (HPE) suite of courses. The course aims to give a balanced insight into the range of disciplines, philosophical views and ethical considerations behind using science to assist in understanding and improving sports performance.

*Sport Science - Foundation* aims to provide learners with:

- insight into the scientific examination of sport and exercise performance
- core understanding around how the healthy human body works during exercise, how to achieve the best possible performances and how physical activity impacts health
- a broad basic understanding of the specialised professional fields and discipline areas related to HPE
- a range of appropriate skills in preparation for further study or employment
- general knowledge of key concepts, language, conventions, ethos, and context of study specific to this field
- an understanding of the specialised skills, standards, practices, expectations and pathways available for future work or study related to the sport sciences
- a broad platform for a range of destinations and possible future study or employment pathways in Sport Science related areas.

*Sports Science – Foundation* introduces participants to a wide range of concepts and experiences. Learners will gain insight into the broader application of Sport Science to contemporary sport and have numerous opportunities to apply their learning across a range of practical settings and roles.

The course is designed to help learners:

- develop an understanding of human functioning and physical activity
- build skills in communication, discussion and inquiry
- be exposed to scientific investigation processes.

*Sport Science – Foundation* connects and integrates key concepts by reviewing practical situations and opportunities in real time to highlight the theory elements and strategies covered. Learners develop an understanding of anatomy and physiology of the human body, fitness, and how scientists investigate a range of connected functions and factors that influence sporting performance. Participants will also use their increasing awareness to reflect on the importance of physical activity, sport, recreation and fitness in their own lives. This course provides opportunities to apply theory in a practical context through participating in, and organising sporting events, as well as participating in practical laboratory activities. This course is designed to encourage and support learners in their involvement in sport as participants, administrators, coaches, umpires or in associated support roles. Learners will develop knowledge and skills, which will assist them to help others participate in sports and recreational activities. This course also develops learners' research skills as they are required to conduct an individual unit of inquiry that allows for some scope in learning about sport in society and associated current issues.

The content is divided into five (5) units of study. All five (5) units are **compulsory**.

Unit 1: Body Systems

Unit 2: Fitness

Unit 3: Sports Knowledge and Involvement in Sport

Unit 4: Science of Performance

Unit 5: Unit of Inquiry

While *the order of delivery is not prescribed, it is recommended* the Units are delivered in the noted sequence.

Learners will participate in *at least five* (5) class laboratory sessions.

At least one (1) laboratory session *must* be included in each of Units 1, 2, 3 and 4.

## SEQUENCE OF CONTENT

There are some topics with close connections with topics in other Units (e.g. the respiratory system in Unit 1 and the transportation and supply of oxygen in Unit 4, and energy systems in Unit 1 and nutrition and energy in Unit 4). In such cases the topics' contents might be delivered as a combined whole (e.g. Unit 1 respiratory system and Unit 4 'transportation and supply of oxygen'). It must be noted that topics in Unit 1 are studied from a basic anatomical perspective, while in Unit 4 topics are studied from a performance perspective.

## TEACHING AND LEARNING

### UNIT 1

#### **Body Systems**

(approximately 40 hours theory, 10 hours practical)

This Unit examines specific body systems. It explores the major components and functions of the major body systems and their contributions and interactions during physical activity.

**Suggested resources:**

Amezdroz, G., Dickens, S., Hosford, G., Stewart, T. & Davis, D., 2010, *Queensland Senior Physical Education*, Macmillan Education Australia, Melbourne.

Telford, A., Seery, P., Whittle, R., Corrie, M. & Malpeli, R., 2010, *Nelson Physical Education VCE Units 1 & 2*, Nelson Cengage Learning, South Melbourne.

#### **Examples of learning activities**

Learners:

stand in a circle and then turn backwards so they are facing outward and cannot directly see lots of other learners or alternatively they could be wearing blindfolds. Read out different scenarios in which they have to do certain movements using anatomical directions and different types of movement, eg; place your hands on the ventral face of your metatarsals, move them medially, now anteriorly, now superiorly, now laterally, now medially until they contact your sternum, eg; with your finger, trace a line beginning at a spot superficial to the cervical vertebrae on their posterior side. Move along an oblique plane, inferior and lateral to the right, now trace medially and continue laterally to the left

about 6 inches, turn and trace superiorly and medially. Eg. Using your right arm, flex it, extend it, pronate it whilst inverting your right foot and abduct your left leg etc.

work in pairs to measure the vital capacity and the tidal volume of their lungs (they will need a metre ruler and balloons). To measure tidal volume: Stretch a round balloon several times to stretch it out. Inhale normally and then exhale normally into the balloon. Do not force breathing. Pinch the end of the balloon and measure its diameter. Repeat this to record 3 measurements on a data table. Find the average of the measurements. To measure vital capacity: Repeat the procedure, only this time inhale as much air as possible and exhale forcefully into the balloon. Record three measurements in a data table. Create class discussion around the data. Explain any differences noticed. What could be explanations for these differences? Discuss: how might an athlete's vital capacity may compare to a non-athlete?

calculate their maximum heart rate and target heart rate zones using the following equations:

- Maximum Heart Rate (MHR) =  $220 - \text{age}$
- Target Heart Rate Zone (THRZ) = 50 % to 85% of maximum heart rate

Review formulas and pulse taking options. In small groups, learners count their heartbeat and record their heart rate whilst completing a range of physical activities. After each physical activity below provide the learners 1 to 2 minutes to let their heart rate recover before starting the next activity.

- Sitting in a chair - relaxed
- Standing - relaxed
- After walking at a leisurely pace for 3 minutes
- After speed walking for 2 minutes
- After 2 minutes of jogging in place
- After doing 25 jumping jacks
- After running in place as fast as possible for 1 minute

After learners have recorded their heart rate as instructed, learners will do a bar graph of the information. Once the bar graphs are completed have a class discussion using the following questions:

- Did anyone hit their maximum heart rate, if so, what activity were they doing?
- What activities were you doing when you were within your target heart rate zone?
- During the recovery time after an activity, did your heart rate drop below your target heart rate zone?
- What physical activities do you think will get your heart beating at the maximum heart rate?
- Could you tell when your heart rate was within your target heart rate zone?
- Could you tell when your heart rate was at your maximum heart rate?

work with a partner, to design and draw a graphic representation of the circulatory and respiratory systems working together

do a physical warm up, before completing a 40m sprint, a 400m run and a 1km slow jog. Complete a cool down and stretch. As a class, discuss the energy systems and the different fuels being used for the 3 different activities. Discuss intensity and duration and how learners felt whilst completing the 3 different activities.

## UNIT 2

### Fitness

(Approximately 15 hours theory, 15 hours practical)

This Unit covers topics related to fitness, particularly how it can be assessed and developed.

**Suggested resources:**

Amezdroz, G., Dickens, S., Hosford, G., Stewart, T. & Davis, D., 2010, *Queensland Senior Physical Education*, Macmillan Education Australia, Melbourne.

Telford, A., Seery, P., Whittle, R., Corrie, M. & Malpeli, R., 2010, *Nelson Physical Education VCE Units 1 & 2*, Nelson Cengage Learning, South Melbourne.

**Examples of learning activities:**

Learners:

view a teacher provided range of images of athletes or mini clips of athletes and determine what components of fitness are being displayed. Then individually or in pairs determine if each athlete would be required to develop more fitness components than just those displayed

work in groups of 3 to research a given fitness test, find out:

- what it measures
- why it is such a good measurement of particular fitness components?
- how to correctly complete the fitness test step by step (learners then teach the rest of their class the correct procedure/ technique for completing the test)
- (optionally) look at norms for learners of similar age and formulate discussion around this

use an online BMI calculator to determine individual weight. Discuss factors that affect these results and may not always make it an accurate measurement. Play around with the calculator to see what you would need to weigh to be in the healthy weight range (if you are not already there) by keeping your height measurement the same. Create discussion around what might be better ways to keep track of body weight rather than BMI

work in small groups of 3 or 4, to design a training session based on a different chosen training method for each group. They need to design a suitable warm up, skills activity, strength and conditioning aspect and suitable cool down/ stretching. The activities must be suitable for their class members and they must have the necessary equipment. The idea is that then each group will lead their class through their practical training session whilst gaining knowledge on many different training methods

devise an overview of how to periodise training by using an AFL training plan (for example). Discuss aspects such as volume, duration, intensity, tapering, strength training, endurance training, rest etc. Have learners discuss and determine when best to train for particular gains, when to do higher intensity training vs lower intensity, when to be doing more volume vs less volume etc. Then have learners individually develop a training program suitable for a chosen sport, considering the above factors.

### **UNIT 3**

#### **Sports Knowledge and Involvement in Sport (Approximately 10 hours theory, 20 hours practical)**

This Unit provides basic background information on a selection of sports and activities. This will equip learners with the required knowledge and skills to enable them to either effectively take part in sports/activities, to advise and instruct others or to undertake an administrative role.

### **Suggested resources:**

Amezdroz, G., Dickens, S., Hosford, G., Stewart, T. & Davis, D., 2010, *Queensland Senior Physical Education*, Macmillan Education Australia, Melbourne.

Telford, A., Seery, P., Whittle, R., Corrie, M. & Malpeli, R., 2010, *Nelson Physical Education VCE Units 1 & 2*, Nelson Cengage Learning, South Melbourne.

### **Examples of learning activities:**

Learners:

are allocated to one of the following groups: striking game, invasion game, racquet game or net game. With their group members learners must design a unique game whereby they determine the rules, the equipment needed, how to score, how to win, how many players per team etc. Within the group learners must divide up the roles of instructor, umpire and scorer

as a class, decide on a sport to focus on eg: soccer. Learners, in small groups, must plan a small session that develops a particular soccer skill eg. kicking, dribbling, tackling etc. They will be linked with a local primary school in which the class takes a primary school class for a lesson whereby the primary school learners rotate around each group and learn different skills all from the one sport. The learners need to practice their communication, their demonstrations and their encouragement prior to taking the primary school children, and can be assessed on these aspects

work as a class to brainstorm qualities that make a good coach vs qualities that make a bad coach, then discuss: what affect do both of these coaches have on a young athlete?

select a very uncommon sport that they and the rest of the class are unlikely to be familiar with eg: curling. Learners find out the history of the game, how it is played, how many players, what the rules are, what equipment is used, etc. Learners present this information in a PowerPoint format to the class, along with accompanying online visual footage

explore common principles that occur in team games here in Australia - do different team games have similar tactics? Discuss as a class and give examples across lots of different sports.

## **UNIT 4**

### **Science of Performance**

**(Approximately 20 hours theory, 10 hours practical)**

This Unit is designed to develop basic knowledge about exercise physiology, skill acquisition and psychology, through a range of topics.

### **Suggested resources:**

Amezdroz, G., Dickens, S., Hosford, G., Stewart, T. & Davis, D., 2010, *Queensland Senior Physical Education*, Macmillan Education Australia, Melbourne.

Telford, A., Seery, P., Whittle, R., Corrie, M. & Malpeli, R., 2010, *Nelson Physical Education VCE Units 1 & 2*, Nelson Cengage Learning, South Melbourne.

### **Examples of learning activities:**

Learners:

- review a teacher provided range of images or clips (or both) and use a show of hands to share their opinion if the skill displayed is a fine or gross skill
- work in pairs to complete a reaction time test using a metre ruler. One learner has their arm on a bench with their thumb and index finger over the side whilst their partner drops the ruler from a pre-determined height (this height needs to be constant for all class members so that results can be compared). Have three turns each and record all results as to how many centimetres it took to catch the ruler in, compare results across the class, males vs females, left handed vs right handed
- determine simple and choice reaction time by using the following online test or similar: <http://epsych.msstate.edu/deliberate/SimpleRT/index.html> (at the end the test the tool gives results so that data can be compared across the class)
- produce a 3-5 minute clip to show the progression through the stages of learning in a particular skill – learners choose a skill that allows another student (demonstrator) to be filmed in all 3 stages of completing that skill. Include discussion of what the demonstrator is doing and why they are classified as being in a particular stage of learning
- take visual footage (both still images and clips) of an advanced athlete performing a particular skill vs a beginner athlete performing the skill - learners analyse the differences in each subroutine of the skill. Eg: a drop kick in football. Learners analyse the grip on the ball, backswing of leg, downswing of leg, ball drop, contact with ball and then follow through. Learners may also look at the differences in anatomical positions whilst doing this
- use a journal or diary to record a step by step list of everything they do from the night before competition until the beginning of competition. Learners think about food intake, water intake, rest, activity, sleep, how they get to the competition, warm up, equipment they need, getting dressed for the competition etc. Learners share their journals/diaries with the class.

## UNIT 5

### **Unit of Inquiry** (approximately 10 hours theory/ practical)

This Unit is designed to allow learners to cover current issues that relate to sport in society and which are of particular interest to them.

Suggested resources:

Amezdroz, G., Dickens, S., Hosford, G., Stewart, T. & Davis, D., 2010, *Queensland Senior Physical Education*, Macmillan Education Australia, Melbourne.

Telford, A., Seery, P., Whittle, R., Corrie, M. & Malpeli, R., 2010, *Nelson Physical Education VCE Units 1 & 2*, Nelson Cengage Learning, South Melbourne.

#### **Examples of learning activities:**

Learners:

Must address one (1) topic (1200 words). As a minimum (but not limited to), work **MUST** contain and address the following topics:



### aim or hypothesis

what are you specifically trying to find out and/or prove?

### key issues and impacts from a Sport Science perspective

explain and reference your findings – logically and scientifically assess the information  
also include a brief examination of where your topic has some cross discipline links  
between exercise physiology, skill acquisition and sport psychology

### method (equipment list, procedure etc.)

lists the process you used to get your information

### results (includes tables, graphs etc., all clearly labelled)

provide visual representation of your data/findings  
trends and impact variables should be featured

### discussion

observations and connections to recognised Sport Science practice  
patterns, cause/effect relationships, reflection on aim/hypothesis  
explain how this topic impacts sporting performance

### conclusions & recommendations

logical and well-reasoned summary that flows from discussion  
implications of the conclusions/findings on current and future practice  
future research to refine, confirm or next steps in related areas

### reference list/bibliography

Some suggested topics (includes but not limited to):

- technology in sport
- media and sport
- sport as a career
- community recreational services
- extreme sports
- drugs in sport
- injuries in sport
- violence in sport
- climate
- leadership
- program design
- clothing
- sport for the elderly and/or disabled

## **SUPPORTING STUDENT RESPONSES AND ELABORATIONS**

*Sport Science – Foundation* is a course with multiple study and vocational pathways. It is designed for learners aiming to develop a broad understanding of the field of Sport Science and how the discipline areas of exercise physiology, skill acquisition and sport psychology, connect and contribute to contemporary practice. This course is suitable for learners who intend to follow a career in the fitness, sport and recreation industry and for those who intend to be involved as a volunteer in sport.

*Sport Science - Foundation* extends on the Australian Curriculum – Health and Physical Education.

Strand: Personal Social and Community Health

Focus Areas:

- Being healthy, safe and active
- Communicating and interacting for health and wellbeing
- Contributing to healthy active communities

Strand: Movement and physical activity

Focus Areas:

- Moving our body
- Understanding movement
- Learning through movement

Teachers may find the following references helpful in aligning with current approaches to Health and Physical Education:

The Australian Curriculum HPE - [Australian Curriculum – 9/10 Health and Physical Education v8.2](#)

## WORK REQUIREMENTS

The work requirements outlined in the course document should form the minimum assessment tasks for each of the units. Teachers will need to acknowledge these requirements when designing their scope and sequence however, additional assessment (particularly of a formative nature) may be included to support and enhance the learning program. The learning activities, described in the preceding section, may support, facilitate and enrich learners' understandings in preparation for completion of the following work requirements.

Minimum Work Requirements – Unit 1 BODY SYSTEMS		
Task	Example Products	Criteria
Blood pressure lab. report (400 – 800 words)	Lab Report & Compression Garment Discussion	1, 2, 5, 6
Heart rate lab. report (400 – 800 words)	Heart Rate investigation and discussion/report	1, 2, 5, 6
Somatotype and BMI assignment (200 words)	Research and make a somatotype self-assessment. Create a short document describing your somatotype and possible implications for sport.	2, 5, 6
High and low GI foods - practical shopping experience & research (200 words)	Create a pamphlet that could be used as a guide while shopping that listing good GI choices, with justifications.	1, 2, 5, 6
Minimum Work Requirements – Unit 2 FITNESS		
Task	Example Products	Criteria

Fitness testing and profiling research and report: (400 words)	Written review of Victoria Police Applicants test battery	1, 5, 6
Personal fitness test and analysis (200 - 400 words)	Personal profile sheet and reflection	1, 3, 5, 6
Developing fitness – client project (1000 words)	Plan and review of personal trainer role  - client interview  - program plan  - written report	3, 5, 6, 8
Minimum Work Requirements – Unit 3 SPORTS KNOWLEDGE AND INVOLVEMENT IN SPORT		
Task	Example Products	Criteria
Key game concepts summary invasion sports (100 words)	Summary brochure: 10 dot points that summarise invasion sports	1, 4
Coaching session plan (400 words)	Session plan in detail for personal coaching experience	1, 3, 8
Practical coaching or admin (150 words)	Post session reflection - journal style report on personal experiences of the session - teacher designed form	1, 4, 7, 8
Practical sports marketing (3 minute presentation)	The Pitch: 3 minute presentation aimed at gaining buy-in and boosting participation - selling a specific event or activity	1, 3, 7, 8
Minimum Work Requirements – Unit 4 SCIENCE OF PERFORMANCE		
Task	Product	Criteria
Video and skill analysis (300 word report)	Written report discussing – how coaches and athletes can benefit from these sorts of tools and sessions?	1, 2, 5, 6
Practical relaxation – PMR session (150 words)	Post session reflection - journal style report on personal experiences of the session - teacher designed form	1, 2, 5, 8
Minimum Work Requirements – Unit 5 UNIT OF INQUIRY		
Task	Product	Criteria
Inquiry (1200 word)	Inquiry Report	1, 3, 5, 6, 7, 8

## RESOURCES

### Recommended books

- Amezdroz, G., Dickens, S., Hosford, G., Stewart, T. & Davis, D., 2010, *Queensland Senior Physical Education*, Macmillan Education Australia, Melbourne.
- Bowers, R. W. & Fox, E.L., 1992, *Sports Physiology, 3<sup>rd</sup> Edition*, WCB McGraw-Hill, USA, p. 77.
- Buchanan, D., O'Connor, D., McLean, J., & Ingram, K., 2009, *Peak Performance 2: HSC PDHPE Australia*, Macmillan Education Australia, Melbourne.
- Davis, D., Kimmet, T., Ackerly, D. & McAnee, A., 1999, *VCE Physical Education, 3<sup>rd</sup> Ed*, MacMillan Education Australia, Melbourne, p.87.
- McPartland, D., Pree, A., Malpeli, R. & Telford, A., 2010, *Nelson Physical Education Studies For WA*, Cengage Learning Australia, South Melbourne.
- Smyth, D., Judge, W., O'Keefe, M. & Shepherd, F., 2006, *Live It Up 2: VCE Physical Education Units 3 & 4, 2nd Ed. QLD*, John Wiley & Sons Australia, Milton. (<http://www.jaconline.com.au/liveitup/book2.htm> Web Supplements section, p. 75; 118)
- Wilmore J. H. & Costill D. L., 2005, *Physiology of Sport and Exercise: 3rd Edition*. Champaign, IL: Human Kinetics

### Websites

All URLs (website addresses) cited were accessed and checked for accuracy and appropriateness of content on 19 February 2018. However, due to the transient nature of material placed on the web, their continuing accuracy cannot be guaranteed.

- DoE Sport Science - Foundation Canvas Room – follow the instructions for access at this link <https://11and12.education.tas.gov.au/online-years-and-11-and-12-courses-for-2018/>
- Brian Mac Sports Coach <http://www.brianmac.co.uk/>
- Surf Life Saving Australia <http://sls.com.au/sites/sls.com.au/files/The%20Latest%20on%20Recovery.pdf>
- Top End Sports <http://www.topendsports.com/index.htm>
- Victorian Curriculum and Assessment Authority: Physical Education <http://www.vcaa.vic.edu.au/Pages/vce/studies/physicaledu/phyeduindex.aspx>



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State of Tasmania (Department of Education) 2016