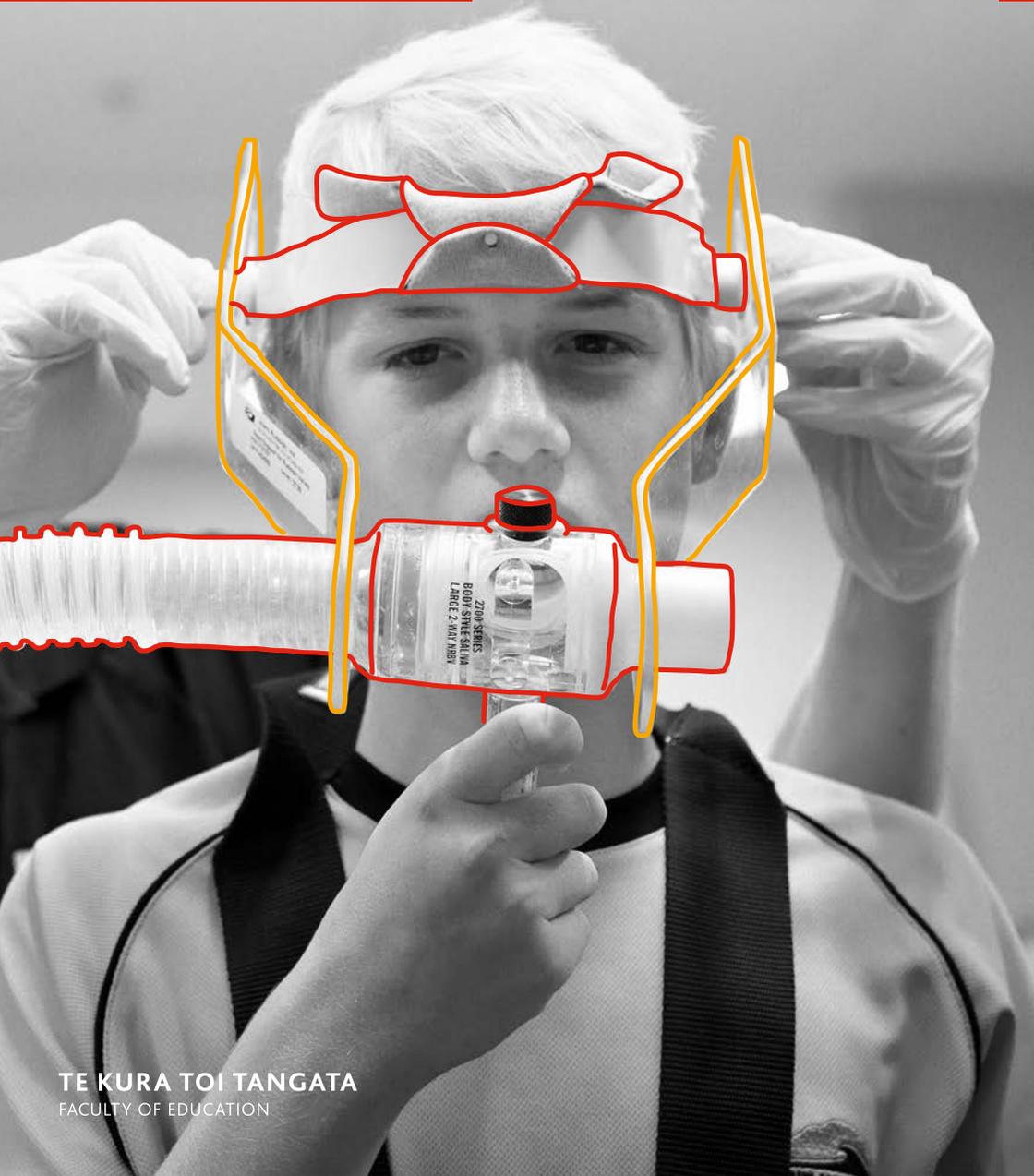




THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

Applied Sport Science Education Programme For Secondary Schools



TE KURA TOI TANGATA
FACULTY OF EDUCATION

Introduction

The Applied Sport Science Education Programme offers a unique opportunity for secondary school students to experience ‘theory in action’ in a high performance sport environment.

The University of Waikato is the tertiary education partner of the Home of Cycling with a dedicated sport science laboratory, He Puna Oranga Tinana, located at the Avantidrome in Cambridge.

We undertake research, athlete servicing, sport science consulting, teaching, and postgraduate studies, in partnership with communities that are representative of the diverse interests associated with sport, exercise and movement.

The atmosphere created by elite athletes from the national team who regularly train at the Avantidrome, provides a unique environment in which students can put theory into practice. The Applied Sport Science Education Programme has been designed to share expertise and expose students to some situations that involve their active participation, bringing the sport science theory they have learned in the classroom to life in a meaningful way.

There are three programme streams to choose from:

- Stream One: Applied Sport Science Modules (for Years 11, 12 and 13)
- Stream Two: Performance Testing for Sport Academies and Teams
- Stream Three: Experience a ‘Day in the Life’ of an Elite Athlete.

Stream delivery

Our material is delivered by staff and post-graduate students of the Faculty of Health, Sport and Human Performance, all of whom have a passion for sport science, and experience in teaching at undergraduate level. The materials are linked to existing achievement standards in Senior Health & Physical Education. The current programme has been developed by the Health, Sport and Human Performance Faculty’s Katie

Schofield and Joe McQuillan, along with former University of Waikato Senior Lecturer Lorna Gillespie.

About the staff

Katie Schofield

Katie is the School Sport Liaison Coordinator for the Applied Sport Science Education Programme. She is a graduate of the University of Otago with specialist knowledge in exercise physiology, sport science, and nutrition. Katie has many years of experience in the application of science theory to track cycling practice, a former member of the NZ track cycling team.

Joe McQuillan

Joe is the Sport Science Laboratory Manager and a lecturer with the Faculty of Health, Sport and Human Performance. He has an established track record for applied sport science provision and innovative research across exercise physiology, nutrition, and strength and conditioning. Joe works with a number of high performance sports including Triathlon New Zealand, Cycling New Zealand and Canoe Racing New Zealand and has previously coached a number of age-group and semi-professional road cyclists.

Lorna Gillespie

Lorna previously taught at Te Kura Toi Tangata Faculty of Education, and focused on physical education curriculum and pedagogy; physical education in secondary schools, sport in education and physical education NCEA assessment.



Stream One

Applied Sport Science Modules

To support your year 11, 12 and 13 Physical Education programme, we offer six modules that align with the New Zealand Curriculum and specific NCEA achievement standards. Each module introduces students to specialist sport science equipment used in assessing elite athletes, whilst at the same time providing a hands-on opportunity for students to make links between theory and practice.

Typically the teaching and learning programme mirrors the testing assessment, meaning that the students learn about body systems and how these work during movement. Much of this learning can be in a movement context so that students 'discover' what happens during activity/exercise. In brief, the learning includes basic anatomy, exercise physiology, and biomechanical principles.

These modules are designed in a way that bridges learning across levels 1, 2 and 3. So while the module theme remains the same across levels, the focus of learning shifts to align with level specific achievement standards. Each module can be tailored to the level/year group of your

students to link to the Curriculum AOs and relevant NCEA standards (see learning modules on p4-6).

The Sport Science Laboratory staff will deliver the sport science content. The teacher(s) are responsible for the assessment activities. Modules are flexible and can incorporate the learning and activities already taking place within your classroom.

Schedule

An example of a full day programme at the Avantidrome is outlined below and includes: completing four modules and the 'Have a Go' session on the velodrome.

Group sizes typically consist of 10-15 students. We can adjust the times to suit the modules that have been selected and any additional requirements.

If students have never ridden on the Avantidrome track and want to give it a try, book into a 'Have a Go' session. In this session a qualified coach will fit students with a bike and helmet, and give them some help and guidance to get started on the track.

Time					
9.30-10am	Arrive, change into exercise gear, split class into 4 groups				
	Module A	Module B	Module C	Module D	Have a Go
10-11am	Group 1	Group 2	Group 3	Group 3	Group 4
11-12pm	Group 4	Group 1	Group 2	Group 2	Group 3
12-12.30pm	Break				
12.30-1.30pm	Group 3	Group 4	Group 1	Group 1	Group 2
1.30-2.30	Group 2	Group 3	Group 4	Group 4	Group 1
2.30-2.45pm	Pack-up and depart				

Modules

Module 1 – VO ₂ max assessment on treadmill			
	Level 1	Level 2	Level 3
Possible learning focus: Overview	Body (physiological) systems responses (acute) to exercise; Understanding VO ₂ max, THR (Threshold Heart Rate), MHR (Maximal Heart Rate)	Understanding what VO ₂ and VO ₂ max tells us. Cardiovascular, respiratory, muscular system responses (acute) to exercise; energy systems; how and why systems work together/impact on one another	As for L2, plus: Comparing results of this assessment with other maximal aerobic assessments e.g. Beep test. Influences on variance. Relevance of VO ₂ max as a measure in developing a training programme
Links to curriculum AOs	6B3, 6B2, 6A3	7B3, 7A2, 7B2	8B3, 8A1, 8B1
Relevant NCEA standards	AS1.2	AS 2.2, AS 2.3	AS 3.3, AS 3.9

Module 2 – Anaerobic assessment using Wattbike, testing a 10 and 30 second sprint			
	Level 1	Level 2	Level 3
Possible learning focus: Overview	Body (physiological) systems responses (acute) to exercise; Understanding aerobic v anaerobic exercise; Energy systems	Cardiovascular, respiratory, muscular system responses (acute) to exercise; energy systems; how and why systems work together/impact on one another; understanding what the comparison between their 10 and 30 second result means	As for Level 2, plus: Relevance of the test to measuring 'fitness'. Understanding what the results tell them in relation to their sport, or to the development of a training programme and/or performance improvement programme
Links to curriculum AOs	6B3, 6B2, 6A3	7B3, 7A2, 7B2	8B3, 8A1, 8B1, 8B2
Relevant NCEA standards	AS1.2	AS 2.2, AS 2.3	AS 3.3, AS 3.9, AS 3.1

Module 3 – Explosive vertical-jump assessment

	Level 1	Level 2	Level 3
Possible learning focus: Overview	Understanding power. Biomechanical principles; Movement at knee joint – muscular system; Compare results and use biomechanics to explain differences	Muscular system – Eccentric/ concentric/ elasticity; Compare results and use biomechanics to explain differences	As for Level 2, plus: Appraise technique of different jumps; Apply biomechanics to improve jump results. Understanding what the results tell them in relation to their sport, or to the development of a training programme or performance improvement programme
Links to curriculum AOs	6B3, 6B2, 6A3	7B3, 7A2, 7B2	8B3, 8A1, 8B1, 8B2
Relevant NCEA standards	AS1.2	AS 2.2, AS 2.3	AS 3.3, AS 3.9

Module 4 – Horizontal explosive assessment / Agility assessment

	Level 1	Level 2	Level 3
Possible learning focus: Overview	Body systems – how they work, and differences for the distances tested; acceleration v top-end speed; Biomechanical principles involved in generating speed, agility	How/why do the body systems involved work together; Muscular system, fast and slow twitch; agility for particular sports; applications to methods of training	As for Level 2 plus: Relevance of speed and agility testing to training and performance improvement; Compare results – speed and sport specific agility and use biomechanical principles to explain results
Links to curriculum AOs	6B3, 6B2, 6A3	7B3, 7A2, 7B2	8B3, 8A1, 8B1, 8B2
Relevant NCEA standards	AS1.2	AS 2.2, AS 2.3	AS 3.3, AS 3.9, AS 3.1

Modules

Module 5 – Female Athlete Health (FAH) and the Female Athlete Triad (Triad)

	Level 1	Level 2	Level 3
Possible learning focus: Overview	Understanding key components of FAH and consequences for later life; symptoms of the Triad ; predisposing factors; prevalence in sports / what sports are at risk; strategies for well-being	As for L1, plus: Further in depth look at each component; interlinking factors; sport performance effects	As for L2, plus: Energy Availability and how it can be measured Calculate estimated Energy expenditure and Energy intake
Links to curriculum AOs	6A1, 6B3	7A1, 7B3, 7C2	8A1, 8B1, 8B4, 8D1
Relevant NCEA standards	Health: AS 1.1, AS 1.2 PE: AS 1.2, AS 1.4	Health: AS 2.1, AS 2.4 PE: AS 2.3	Health: AS 3.2 PE: AS 3.5, AS 3.6, AS 3.9

Module 6 – Biomechanics Assessment

	Level 1	Level 2	Level 3
Possible learning focus: Overview	Understanding biomechanics; what and why, basic principles, interactive learning activities	As for L1, plus: More examples of principles and interactive learning activities	As for L2, plus: Use of video for movement
Links to curriculum AOs	6A3, 6B2, 6B3	7B1, 7B2, 7B3	8A1, 8B1, 8B2, 8B3
Relevant NCEA standards	AS 1.2, AS 1.6	AS 2.2, AS 2.3, AS 2.4	AS 3.2, AS 3.3, AS 3.9

Costing

Cost is per student + GST. Each module is approximately 50min.

- 2 modules: \$25
- 3 modules: \$30
- 4 modules: \$35



Stream Two

Performance Testing for Sports Academies and Teams

Have your student athletes assessed using the same techniques and state-of-the-art equipment used by sport science practitioners working with elite athletes. The Sport Science Laboratory provides specialist fitness testing services for recreational to high performance athletes, sports teams, and schools.

Athletes visit the Sport Science Laboratory to gain an insight into their current physiological status

using measures of anaerobic/aerobic capacity and efficiency; speed, agility, strength and power. This information can be used to set training zones, monitor performance and guide training programmes to ensure athletes are training efficiently and effectively. Some of the most commonly used tests that may be of interest to your athletes are the VO_2 max assessment, lactate profile assessment, and field tests (see Table on p8).

Tests and Performance measurements					
Test	What it tests	Why relevant	What is involved	Testing and equipment used	Summary report will contain
VO_2 max	Aerobic fitness -individual maximal oxygen uptake (VO_2 max);	Gold standard measure of 'fitness'	15min on cycle, treadmill, kayak or rowing ergometer	Metabolic cart	Current aerobic fitness level, guidance for endurance training
Blood Lactate	Predicts endurance performance, or used to show effect of a training block	Establish individualised training zones; effectiveness current training programme	40min on cycle, treadmill, kayak or rowing ergometer	Blood lactate analysis equipment and heart rate monitor	Training zones for correct intensity
Field tests*	Speed and/or Agility	Benchmark indicators	Tests measured by timing gates	Wireless timing gates	Time
Field tests*	Jump height	Benchmark indicators	Explosive power measured by Vertec	Vertec; Forceplate	Height jumped
Field tests*	Aerobic fitness	Benchmark indicators	Fitness with use of beep or yo-yo tests	Heart rate	Fitness level and approximate VO_2 max

*Field testing enables large groups of athletes/students to be tested in a time-efficient manner. This combination of measures (speed, agility, jump and aerobic) provides a snapshot of your students' current fitness levels.

Stream Three

Experience a 'Day in the Life' of an Elite Athlete

Students will be able to experience a typical training day similar to a NZ Track Cyclist at the Avantidrome.

Students will arrive to:

- tour the high performance facility at the Avantidrome
- learn about and experience gym based training
- learn about nutrition for recovery
- interact with a former NZ track cyclist
- observe a NZ track cycling team's training session

Cost: \$300 + GST for up to 30 students



Schedule

Time	Activity
9-9.30am	Arrive and orientation
9.30-10am	Introduction + Tour of facilities
10-11am	Gym based training: infield
11-12pm	Make a shake – Nutrition session
12-12.30pm	Break
12.30-1.30pm	Track Cycling guest speaker + Q&A
1.30-2.15	Observation of a NZ Track session
2.15-2.30pm	Wrap up and pack up



For the vertical jump, we are learning about how to use our legs in order to get an explosive jump so we can beat our personal results.

BRIANA, STUDENT AT PAKURANGA COLLEGE, AUCKLAND.

Avantidrome

In addition to the senior programme and sports academies and teams, we are able to offer 'Have a Go' on the Avantidrome track.

'Have a Go' session

If students have never ridden on the Avantidrome track and want to give it a try, book into a 'Have a Go' session! In this session a qualified coach will fit students with a bike and helmet, and give them some help and guidance to get started on the track.

Cost: 'Have a Go' session: \$10



“ A great opportunity to come down to Cambridge and for the kids to actually take part in activities that relate to what we are talking about in the classroom. ”

DARREN JARDINE, HEAD OF DEPARTMENT HEALTH & PE AT PAKURANGA AUCKLAND.

Get in touch

The University of Waikato Sport Science Laboratory



Katie Schofield

School Sport Liaison Coordinator
027 699 0331
kschofie@waikato.ac.nz



@sportssciencenz



facebook.com/sportandleisure



waikato.ac.nz/go/sport-science





THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

WHERE THE WORLD IS GOING
TE AHUNGA O TE AO

The University of Waikato
Private Bag 3105
Hamilton 3240
Toll Free: 0800 WAIKATO

Sport Science Laboratory
Avantidrome, Hanlin Road,
Cambridge
PO Box 919, Cambridge, 3450