2006 Assessment Report

VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

2006 Physical Education GA 3: Written examination

GENERAL COMMENTS

The 2006 Physical Education examination was the first paper to be completed during the accreditation of the current study design (2006–2009). Students handled the new content area well, particularly the Area of Study 'Monitoring and promotion of physical activity'.

Students who read and interpreted the questions carefully and gave specific rather than general responses were more likely to receive full marks, as were students who used correct terminology in their responses. A common error was to restate an answer that was given in the stem of the question when the question had said 'other than' this response. Students need to be reminded to read the question properly and provide a response that relates to the question asked.

SPECIFIC INFORMATION

Section A – Multiple-choice questions

This table indicates the number of students who chose each option. The correct option is indicated by shading.

Question	% A	% B	% C	% D	Comments
1	54	13	2	31	
2	77	16	3	4	
3	12	7	59	22	
4	6	57	26	11	
5	50	11	17	22	
6	10	19	31	40	Students found this question challenging, not recognising that an increase of 3 to 4 sets is a 33% change in one variable.
7	19	58	14	9	
8	19	37	31	13	
9	26	58	10	6	
10	17	3	4	76	
11	31	20	16	33	As well as showing a lack of knowledge about chronic adaptations, this question indicated that many students did not understand the concept of maximum heart rate and that this was not a chronic adaptation to the given training program.
12	31	3	62	4	
13	56	24	11	10	
14	9	2	87	2	
15	72	10	5	12	

Section B – Short-answer questions

For each question, an answer or range of suitable answers is provided, followed by a comment on students' performance. It is not intended that these suggested solutions cover all possible correct answers.

Question 1

Marks	0	1	2	3	Average
%	22	30	33	15	**1.4**

Possible responses included:

- increase awareness of physical activity as a public health issue
- provide information about other non-health benefits of being active
- provide information about the consequences of inactivity
- provide role models for active behaviour
- increase interest in physical activity participation
- raise awareness of community-based programs
- motivate individuals to take action towards participating in physical activity.

Students should have provided information other than the health benefits associated with regular physical activity as this information was included in the question.

Question 2

2a–b.

Marks	0	1	2	Average
%	14	39	47	**1.4**

2a.

Children should not spend more than two hours per day using electronic media for entertainment (for example, computer games, Internet and TV), particularly during daylight hours.

2b.

Aerobic energy system

2c.

Marks	0	1	2	Average
%	46	4	50	**1.1**

- carbohydrates: one third
- fats: two thirds

Question 2 was handled well by most students. In part a. those who did not specify the 'per day' were not awarded the mark.

Question 3

3a.

Marks	0	1	2	3	4	Average
%	34	16	22	18	10	**1.6**

3ai.

Either of:

- short interval training
- intermediate interval training.

3aii.

Short interval

- Work to rest ratio: 1:5 or more
- Intensity: 95–100%
- Frequency: three to five times per week.

Intermediate interval

- Work to rest ratio: 1:3
- Intensity: 85–90%.
- Frequency: three to five times per week

3b.

Marks	0	1	2	Average
%	70	18	12	**0.5**

An increase or decrease in rest intervals would change the work to rest ratio. This would change the energy system being used and the fitness components being trained. It would result in a loss of specificity to the intended aim.

3c.

Marks	0	1	2	Average
%	66	8	25	**0.6**

Possible responses included:

- increased energy substrate levels in muscle (ATP, CP, creatine and glycogen) – more fuel readily available
- increased ATP-CP splitting and resynthesis of enzymes – greater energy release and restoration
- increased glycolytic capacity – increased energy from lactic acid system

- increased contractile proteins (actin and myosin) in muscles – greater force can be generated
- increased myosin ATPase – increased rate of contractions due to increased energy release.

Question 3 was answered poorly by many students. In part a. students often failed to specify the type of interval training (short or intermediate). In part b. students thought that manipulating the rest intervals would be overloading and this would be beneficial to the program; few students understood the concept being examined. In part c. students listed muscle hypertrophy or an increase in fibre size, which was given in the question. Students who did list a correct adaptation were generally able to explain how it increased anaerobic power.

Question 4

4a.

Marks	0	1	2	Average
%	11	17	72	**1.6**

- 10–11 am: The child was most likely engaged in a sedentary classroom-based activity such as reading or writing whilst sitting.
- 12.30–1.30 pm: The child was probably engaged in at least moderate-intensity activity during lunch break or during a physical education or sport class.

4b.

Marks	0	1	2	Average
%	46	38	16	**0.7**

Possible responses included:

- cannot be worn during aquatic-based activities
- underestimates movement during bike riding, rollerblading or activities that are predominantly upper body
- energy expenditure prediction equations are mostly based on laboratory studies, more field-based studies of special populations are required
- does not document behaviour or the context of the activity
- requires someone with a level of knowledge to administer it.

4c.

Marks	0	1	2	3	Average
%	45	17	15	23	**1.2**

The more practical the measure the less accurate it is. For example, recall questionnaires are more practical yet less accurate than direct observation.

Question 4 was not well understood by many students and many gave information that was not asked for. In part a. the question asked students to explain the data; many stated the difference in the data but did not link that to what the boy was doing (for example, in class, at lunch time) to make those changes. In part c. students explained the relationship between practicality and/or accuracy and cost, **not** practicality and accuracy as asked, and often failed to provide an example. Students also confused fitness tests with physical activity measures as their example.

Question 5

5a–b.

Marks	0	1	2	3	Average
%	15	50	25	11	**1.3**

5a.

Either of:

- lactic acid system
- anaerobic glycolysis
- lactacid system.

5b.

Because all three events fully utilise the anaerobic systems, which have a finite capacity.

5c.

Marks	0	1	2	Average
%	53	27	20	**0.7**

Either of:

- the rate of energy release is higher in the 400m event, where there is greater reliance on the anaerobic systems
- the rate of energy release is lower in the 1500m event, where there is greater reliance on the aerobic system.

Question 5 was generally well answered, particularly part a. Students demonstrated a good understanding that all three energy systems contribute to each of the events shown; however, rate of energy production was still an area that was not fully understood by many students.

Question 6

Marks	0	1	2	3	4	Average
%	12	16	27	30	15	**2.2**

6ai.

Rest recovery allows for ATP-PC replenishment so that each jump can be performed at maximal intensity.

6aii.

Active recovery allows for quicker removal of lactic acid (or other waste products), prevention of muscle soreness and prevents venous pooling.

Students demonstrated a good understanding of the benefits of active and passive recovery; those who did not receive full marks did not link the benefit back to the athlete.

Question 7

Marks	0	1	2	3	Average
%	13	21	39	28	**1.8**

7a.

Either of:

- seven days
- everyday.

7b.

60 minutes

7c.

60–90 minutes per day

This question was well answered by most students.

Question 8

8a.

Marks	0	1	2	3	4	Average
%	42	20	29	4	5	**1.1**

- There is a contribution from the anaerobic energy systems and some pyruvic acid is converted to lactic acid, (even with oxygen present).
- Due to sufficient oxygen being available, lactic acid doesn't begin to accumulate.
- Post-exercise lactic acid was not removed and is therefore present in the blood.
- Red blood cells only respire anaerobically, therefore there will be lactic acid in the blood.

8b–c.

Marks	0	1	2	3	Average
%	14	53	14	19	**1.4**

8b.

Line B

8c.
Either of:

- decreased lactic acid production: greater utilisation of FFA, therefore less lactate is produced
- increase in oxygen consumed at the beginning of exercise: smaller oxygen deficit, therefore decreased lactic acid accumulation
- increased oxidation of lactic acid during exercise, therefore decreased lactic acid accumulation.

In part a. students were able to correctly identify that lactic acid is present in the blood due to a contribution from the anaerobic systems, even at rest. Few managed to correctly discuss a second reason, the most common being post exercise lactic acid that had not been removed.

Question 9
9a.

Marks	0	1	2	3	Average
%	15	18	29	38	**1.9**

Possible responses included:

- improved employee morale
- increased quality and quantity of production/work productivity
- reduced absenteeism
- increased capability of employees to handle job stress
- improved community relations
- reduced staff turnover.

9b.

Marks	0	1	2	3	Average
%	7	14	37	42	**2.2**

	Potential intervention strategy
Physical environment	Responses needed to refer to a manipulation of either the man-made or natural environment within a school to promote physical activity. Some examples include: • introduce bicycle racks or walking/bike paths around the school grounds or school routes • provide access to exercise equipment such as skipping ropes, gym equipment or sporting equipment such as balls, bats and racquets • introduce basketball rings, courts, grassed spaces or other surfaces suitable for activity • introduce playground equipment • introduce traffic calming near school routes to encourage walking and cycling to school • introduce shaded playground equipment and drinking facilities.
Social environment	The strategy needed to relate to a **human** resource, such as a teacher, student or parent, as the mechanism to either promote physical activity or be the recipient of the activity promotion. Some examples include: • encourage teachers to be active during lunch time and to interact with students (active role-models) • PE teachers could encourage other teachers to integrate physical activity into their lessons • encourage parents to provide social support to their children by turning skipping ropes before school in the yard for children to jump over • teach students to be active role models to encourage other students to be active at lunchtime.
Policy/curriculum	The strategy needed to relate to a policy, rule or curricular program that encourages students to be physically active. Some examples include: • have designated areas in the school yard for different year levels/age groups • ensure teachers meet the Mandate for PE and Sport in Government schools • allow students to bring sporting equipment from home • provide access to the school yard to play before and after school.

9c–d.

Marks	0	1	2	3	Average
%	16	54	13	17	**1.3**

9c.
Either of:

- assess the number of people in each of the stages before and after the program to determine what proportion/how many moved into a more active stage
- assess the stage an individual is at within the Stages of Change model before the commencement of the program and at the end of the 12 months determine if the individual has moved to a more active stage.

9d.
Self-efficacy improves/is enhanced as you move through the Stages of Change.

Part a. was well answered by students. In part b., responses such as 'more PE classes' or 'more sport' were too general as they did not give specific strategies. Part c. demonstrated that students were familiar with the Stages of Change but were unsure how it could be used to critique a program; students were unable to apply their knowledge of the Stages of Change model to the given situation. Part d. was very well answered by most students.

Question 10

10a.

Marks	0	1	Average
%	20	80	**0.8**

Natalie

10b.

Marks	0	1	2	3	Average
%	11	5	14	71	**2.5**

10bi.
Yes

10bii.
She meets the 'five or more days' criterion and the '150 minutes plus' or at least 30 minutes on most days criterion (she swims four days per week for 90 minutes and rides her bike to work).

Students demonstrated a thorough understanding of the National Physical Activity Guidelines and interpreted the graph correctly.

Question 11

Marks	0	1	2	3	4	5	6	7	8	9	Average
%	15	8	12	15	9	9	10	9	7	6	**3.9**

11a.
Good responses to this question identified the link between the energy systems and the fitness component and provided a suitable example from the data. For example:

- the player sprinted less than 10 metres 275 times. These short duration, high intensity efforts required the player to have a high degree of speed and would rely on the ATP-CP system to supply the ATP
- the player has two to three high intensity rallies with only 7.2 seconds of rest, which is insufficient to replenish the CP stores, so the power and speed needed in the later rallies rely on the lactic acid system to supply the ATP
- aerobic endurance is needed to recover between points and between games. The player walked or jogged a total of 284 times and relied on the aerobic system for the supply of ATP for these activities.

11b.

Marks	0	1	2	3	4	5	Average
%	13	29	17	13	26	2	**2.2**

11bi.
flexibility

11bii.
Possible responses included:

- joint capsule – connective tissue and ligaments of a joint can limit flexibility or can be stretched to increase flexibility
- sex – females are generally more flexible than males
- resting muscle length – shortened resting muscle length leads to a decrease in flexibility
- muscle temperature – increase in muscle temperature leads to increased flexibility
- age – flexibility decreases with age
- joint structure – the more stable the joint the less flexibility
- body build – excessive fat or muscle bulk decreases flexibility
- injury – scar tissue may reduce flexibility
- skin resistance – surrounding skin limits flexibility
- bone – structural limit to flexibility
- disease – some diseases can reduce flexibility, for example, arthritis.

11biii.
Gluteals and hamstrings

In part a. of this question many students provided detailed information about each of the energy systems but failed to read the question carefully and did not link the energy system to the relevant fitness components. Students were able to provide data to support their discussion but tended to focus on the interplay between the energy systems and not the relationship between energy systems and fitness components. Students were awarded full marks for this question for clearly and concisely linking each of the energy systems to one or more relevant fitness component and providing a specific example from the data to support their answer.

Parts bi–iii. were answered well, with the students who were able to identify flexibility correctly then being able to list and explain one of the factors affecting flexibility.

Question 12

Marks	**0**	**1**	**2**	**3**	**4**	**Average**
%	21	10	21	38	12	**2.1**

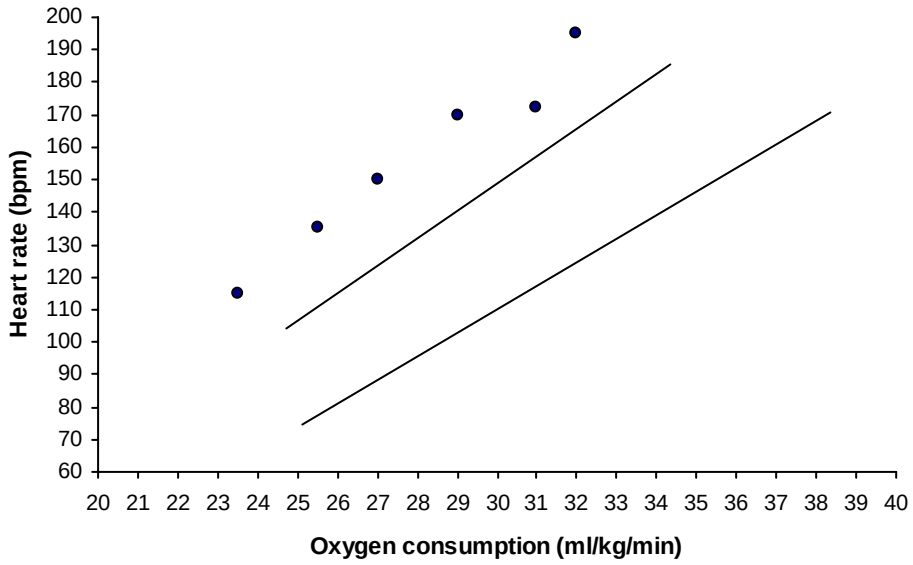
Athlete	**Test**	**Justification for selection of test**
Senior school cross country team	20m shuttle-run test	• many students can complete the test at the same time • doesn't require expertise to administer the test • no expensive equipment required
Elite cross country runner	Laboratory test to determine VO_2 max on a treadmill	• increased accuracy – direct measure • increased reliability of norms • maximal tests are suitable for elite athletes

This question was generally well answered, although few students were able to obtain the second mark for laboratory tests.

Question 13
13a–b.

Marks	**0**	**1**	**2**	**3**	**Average**
%	12	20	25	44	**2.0**

13a.



13b.
65–85% HR max

13c.

Marks	0	1	Average
%	32	68	**0.7**

Possible responses included:

- increase the frequency of the speed bursts
- increase the distance covered
- increase the duration of the speed bursts
- reduce the time but maintain the distance
- include hills/sand.

13d.

Marks	0	1	2	Average
%	23	34	43	**1.2**

Possible responses included:

- increased volume of left ventricle
- increased plasma
- increased haemoglobin and/or myoglobin
- increased a-VO_2 difference
- increased capillary density
- decreased blood pressure (at rest and sub maximal exercise)
- increased stroke volume and cardiac output.

This question was well answered by most students. Common errors included not reading carefully and missing part a. altogether and, in part d., answering heart rate even though the question asked for a chronic adaptation **other than** heart rate, or listing skeletal or respiratory adaptations when the question asked for cardiovascular. Part b. was very well answered but a number of students were unfamiliar with Fartlek training and discussed changes in W:R as a form of overload.

Question 14
14a.

Marks	0	1	Average
%	19	81	**0.8**

Possible responses included:

- games are more aggressive, increased intensity, players go harder
- games have less structured play
- games have competing teams
- playing fields are not always in good condition.

14b.

Marks	0	1	2	3	Average
%	4	12	35	49	**2.3**

14bi. Training

- appropriate warm-up
- appropriate overload
- sport-specific training program (ankle)
- properly instruct technique or skills
- include agility training
- adequate supervision
- simulate game play at training
- consider athlete size, age and ability when selecting team
- outline dangers prior to training
- introduce plyometrics after a sound strength base

14bii. Environmental

- field is flat and free from holes
- sprinklers covered
- playing field kept clear

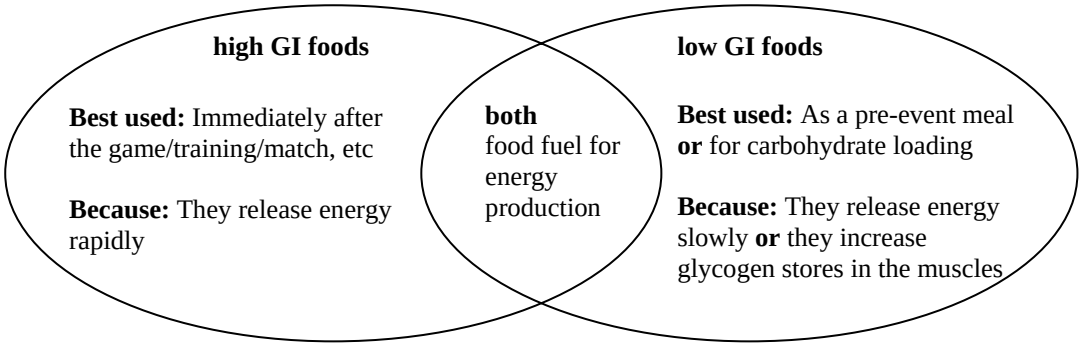
14biii. Equipment

- shin guards (shock absorbent and appropriately fitted)
- appropriate footwear
- ankle support (for example, brace or sports tape)
- appropriate sized ball for the age group and gender of the players
- goals are securely anchored to the ground

Students performed well on this question although some responses were too general. Students who were awarded full marks gave a specific strategy that related to soccer.

Question 15

Marks	0	1	2	3	4	Average
%	14	7	20	20	38	**2.6**



Glycemic index was well understood by most students

Question 16

Marks	0	1	2	3	4	Average
%	20	25	30	18	8	**1.7**

Positive ethical considerations

- it is not in the spirit of the game
- values of fair play and sportsmanship are upheld

Negative ethical considerations

- winning at any cost
- creates an even playing field because other athletes are doing it
- diuretics don't improve performance, they only allow you to make weight grade

Students found this new area of the course difficult. A common error was to provide information that related to the physiological effects of diuretics, which the question specifically excluded. Positive ethical considerations were those where the athlete would decide not to use the performance enhancing drug and negative considerations were those where the athlete would decide to use the performance enhancing drug.

Question 17

17a.

Marks	0	1	2	3	4	Average
%	11	6	18	17	49	**2.9**

17ai.

Aerobic: Run session – continuous activity for more than 20 minutes at a HR greater than 70% of HR max.

17aii.

Anaerobic: Gym session – W:R of 1:6 indicates the use of the ATP-PC system.

17b.

Marks	0	1	2	Average
%	64	29	7	**0.5**

Possible responses included:

- an increased VO_2 max
- an increased tolerance of lactic acid (associated with fatigue)
- an increased anaerobic threshold
- an increased metabolism of lactic acid resulting in a greatly enhanced aerobic performance.

17c.

Marks	0	1	2	3	4	Average
%	6	15	33	28	18	**2.4**

17ci. Massage

- relaxes muscles and reduces tightness which improves joint movement and decreases the impact of DOMS
- increases blood flow to the site (increased oxygen/nutrients to muscles and removal of waste products) which promotes repair of muscles
- breaks down scar tissue, which will aid in recovery by increasing the muscles' range of motion

17cii. Meditation

- relaxing the CNS and reducing 'noise' and external stimuli leads to decreased heart rate, blood pressure, reduced respiration rate and relaxed muscles
- aids sleep to promote a faster recovery for the athlete

17d.

Marks	0	1	2	Average
%	14	40	45	**1.3**

17di. Coach

- careful monitoring of performance
- individual training programs specific to the athlete's individual needs

- encourage variability
- include rest and recovery sessions in training program
- training log
- encourage use of support staff such as physiotherapists, nutritionalists and psychologists

17dii. Athlete

- training log: records both physiological and psychological aspects of training
- balanced diet, meeting the nutritional requirements of the specific athlete
- replenish fluids and electrolytes and replenish fuel and food stores to ensure athletes have enough energy

17e.

Marks	0	1	Average
%	34	66	**0.7**

Possible responses included:

- to assist in the repair and recovery process after exercise
- to cover a small proportion of energy costs
- protein assists glycogen synthesis. Protein eaten with carbohydrates amplifies the insulin response and promotes glucose delivery to the depleted muscle cells.

Part a. was very well done by the majority of students; however, many had difficulty with part b. Part c. was also handled well by most students, although a common error was not explaining how the strategy enhanced recovery. These students were only awarded two of the four marks. Parts d. and e. were thoroughly answered by most students.