MA99 EDUCATION

Health and Movement Science: Practice Examination

NSW HEALTH AND MOVEMENT SCIENCE 11-12 SYLLABUS 2023 FOR HSC 2028 AND LATER

1. Instructions

Instructions

Reading time: 5 minutes. **Working time:** 2 hours. **Total:** 70 marks.

Section I (15 marks): 15 multiple choice questions.

Section II (35 marks): short responses, answered in the spaces provided. Focus Area 1 (16), Focus Area 2 (16), Collaborative skills (3).

Section III (20 marks): two extended responses. Focus Area 1 (10) and Focus Area 2 (10). Answer in the spaces provided.

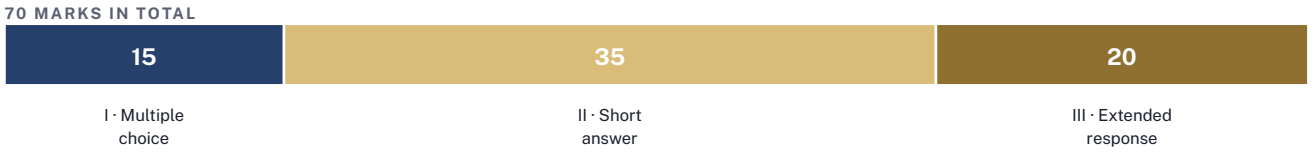


Figure 1 · How the 70 marks are split. Your time should follow the same split.

2. Section I · Multiple choice (15 marks)

FOUNDATION One mark each.

Question 1

1 MARK

The World Health Organization defines health as complete physical, mental and social wellbeing, and

A freedom from all stress
B a long life
C not merely the absence of disease
D physical fitness

Question 2

1 MARK

The health continuum shows that health is

A dynamic
B fixed
C only physical
D the same for all

Question 3

1 MARK

The number of new cases of a condition in a period is the

A prevalence
B mortality
C morbidity
D incidence

Question 4

1 MARK

Which is a socioeconomic determinant of health?

A blood pressure
B income
C smoking
D air quality

Question 5

1 MARK

Which is an action area of the Ottawa Charter?

A develop personal skills
B reduce taxes
C build gyms
D ban fast food

Question 6

1 MARK

The leading single cause of death among 15 to 24 year olds is

A cancer
B heart disease
C asthma
D suicide

Question 7

1 MARK

The muscle that relaxes to allow a movement is the

A agonist
B antagonist
C stabiliser
D fixator

Question 8

1 MARK

A contraction in which the muscle shortens under load is

A eccentric
B isometric
C concentric
D static

Question 9

1 MARK

Which energy system dominates for a maximal effort of up to about 10 seconds?

A aerobic
B lactic acid
C digestive
D ATP-PC

Question 10

1 MARK

Cardiac output is equal to

A stroke volume plus heart rate
B stroke volume times heart rate
C heart rate minus stroke volume
D ventilation times stroke volume

Question 11

1 MARK

The pulmonary circulation carries blood between the heart and the

A lungs
B muscles
C brain
D liver

Question 12

1 MARK

The first stage of skill acquisition is the

A autonomous stage
B associative stage
C cognitive stage
D reflex stage

Question 13

1 MARK

A skill performed in a changing, unpredictable environment is a

A closed skill
B open skill
C self paced skill
D discrete skill

Question 14

1 MARK

Motivation that comes from enjoyment and personal challenge is

A extrinsic
B negative
C external
D intrinsic

Question 15

1 MARK

Slow twitch muscle fibres are best suited to

A endurance activity
B short sprints
C maximal lifts
D explosive jumps

3. Section II · Short answer (35 marks)

3.1 Focus Area 1 · Health for Individuals and Communities (16 marks)

Question 16

3 MARKS

Outline what is meant by the dimensions of health.

Question 17

4 MARKS

Life expectancy in Australia is 81.1 years for males and 85.1 years for females (ABS, 2022 to 2024). Calculate the difference, and suggest one reason for it.

Question 18

4 MARKS

Explain how one determinant of health can create a health inequity for a population group.

Question 19

5 MARKS

Explain how health promotion, using the Ottawa Charter, can improve the health of young people.

3.2 Focus Area 2 · The Body and Mind in Motion (16 marks)

Question 20

3 MARKS

Name the three types of muscle contraction, and describe the role of the agonist and antagonist in a biceps curl.

Question 21

5 MARKS

At rest an athlete has a stroke volume of 65 mL and a heart rate of 68 beats per minute; during exercise these rise to 115 mL and 175 beats per minute. Calculate the cardiac output in each case, and explain why it changes.

Question 22

8 MARKS

Explain the interplay of the three energy systems during a team sport such as soccer.

3.3 Collaborative skills (3 marks)

Question 23

3 MARKS

Describe one collaborative skill you would use in a group investigation, and explain how it helps the group.

4. Section III · Extended response (20 marks)

EXAM STYLE Answer both in the spaces provided.

Question 24

10 MARKS

Analyse how the determinants of health interact to create health inequities for a population group in Australia. Support your answer with evidence.

Question 25

10 MARKS

Analyse how the systems of the body work together to produce efficient movement in a physical activity of your choice.

End of examination.

Attempt record

Date each attempt and record the section marks separately. A single total hides which section is costing you. Note one change for the next attempt.

DATE	SECTION I	SECTION II	SECTION III	TOTAL OUT OF 70	THE ONE CHANGE I AM MAKING

DATE	SECTION I	SECTION II	SECTION III	TOTAL OUT OF 70	THE ONE CHANGE I AM MAKING

5. Marking guidance

Mark your answers after you have finished, not while you write. The sample answers show one way to reach full marks; other accurate, relevant points earn marks too.

5.1 Section I answer key

Q	ANSWER	Q	ANSWER	Q	ANSWER
1	(C)	6	(D)	11	(A)
2	(A)	7	(B)	12	(C)
3	(D)	8	(C)	13	(B)
4	(B)	9	(D)	14	(D)
5	(A)	10	(B)	15	(A)

5.2 Section II

QUESTION 16 · 3 MARKS

MARKS	CRITERIA
3	Names the dimensions and outlines that they are interrelated so a change in one affects the others.
2	Names several dimensions with a general statement.
1	Names a dimension.

Sample answer

The dimensions of health are the physical, social, emotional, spiritual and cognitive parts of health. They are interrelated, so a change in one dimension, such as a drop in emotional health, affects the others.

QUESTION 17 · 4 MARKS

MARKS	CRITERIA
4	Correct difference (4.0 years) and a plausible reason.
2 to 3	Correct difference with working.
1	Some relevant statement.

Sample answer

Difference = 85.1 minus 81.1 = 4.0 years, with females living longer on average.

One reason is that males are more likely to engage in risky health behaviours and to die earlier from injury and cardiovascular disease, differences linked to the determinants of health.

QUESTION 18 · 4 MARKS

MARKS	CRITERIA
4	Names a determinant and clearly explains how it produces poorer health for a group.
2 to 3	Names a determinant with some explanation.
1	Identifies a determinant.

Sample answer

Lower income, a socioeconomic determinant, limits a group's access to healthy food, safe housing and health services. Over time this leads to poorer diet, later diagnosis and higher rates of chronic disease, producing an avoidable and unfair difference in health, that is, a health inequity.

QUESTION 19 · 5 MARKS

MARKS	CRITERIA
4 to 5	Names several action areas and explains, with youth examples, how each improves health.
2 to 3	Names action areas with some example.
1	Identifies an action area.

Sample answer

Developing personal skills builds health literacy and help seeking through school programs; creating supportive environments makes schools and clubs smoke free and inclusive; and strengthening community action involves young people in designing services. Acting together on the determinants, these areas improve young people's health.

QUESTION 20 · 3 MARKS

MARKS	CRITERIA
3	Names the three contractions and correctly describes the agonist and antagonist roles.
2	Names the contractions, or describes the muscle roles.
1	Some relevant information.

Sample answer

The three types are concentric, eccentric and isometric. In a biceps curl the biceps is the agonist, contracting concentrically to lift the weight, while the triceps is the antagonist, relaxing to allow the movement.

QUESTION 21 · 5 MARKS

MARKS	CRITERIA
4 to 5	Correct cardiac output at rest (4.42 L/min) and exercise (20.1 L/min) with working, and a correct explanation.
3	Both values correct with working.
2	One value correct.
1	Some relevant working.

Sample answer

Rest: Q = SV × HR = 70 × 72 = 5040 mL/min = 5.04 L/min.

Exercise: Q = 120 × 180 = 21600 mL/min = 21.6 L/min.

Cardiac output rises because both stroke volume and heart rate increase during exercise, delivering more oxygen to the working muscles and removing carbon dioxide faster.

QUESTION 22 · 8 MARKS

MARKS	CRITERIA
7 to 8	Explains that all three systems contribute and links each to phases of play with correct timing and by-products.
5 to 6	Links the systems to the activity with some correct detail.
3 to 4	Describes one or two systems.
1 to 2	Makes general statements.

Sample answer

During a soccer match all three energy systems contribute at once, and the dominant one shifts with the intensity and duration of each effort. In a hypothetical (MA99) example, a midfielder sprints 15 metres to win the ball in about 3 seconds. This effort is fuelled by the ATP-PC system, which breaks down creatine phosphate to resynthesise ATP without oxygen. It produces no lactic acid, it lasts up to about 10 seconds, and it is about 2 minutes before the stores are restored, so only a pause in play allows another maximal effort of the same quality.

When the same player makes repeated high intensity runs in a sustained attack, lasting from about 10 seconds to 2 minutes, the lactic acid system takes over. It breaks down glucose without oxygen. Its by-product, lactic acid, accumulates in the muscle and contributes to fatigue, which is why the player slows after a long passage of play.

The aerobic system supplies most of the energy across 90 minutes, because most of a match is jogging, walking and positioning. It uses carbohydrate and fat with oxygen, yields far more ATP per glucose molecule than the other two systems, and produces carbon dioxide and water, which are removed by breathing and sweating without causing fatigue. It also powers recovery between sprints, restoring creatine phosphate and clearing lactic acid. The systems therefore overlap rather than switch: a player with a well developed aerobic system recovers faster and can repeat the sprints that decide a match.

QUESTION 23 · 3 MARKS

MARKS	CRITERIA
3	Names a collaborative skill and clearly explains how it helps the group's work.
2	Names a skill with some explanation.
1	Names a skill.

Sample answer

Negotiating plans and tasks means the group agrees on the research question and shares the work fairly according to each member's strengths. This prevents duplication and gaps, keeps everyone involved, and helps the investigation stay on schedule.

5.3 Section III

QUESTION 24 · 10 MARKS

MARKS	CRITERIA
9 to 10	Analyses how several determinants interact to create inequities, supported by dated evidence and syllabus terms, in a sustained response.
6 to 8	Describes determinants and inequities with some analysis and evidence.
3 to 5	Outlines some determinants or inequities.
1 to 2	Makes general statements.

Sample answer

Health inequities are avoidable, unfair differences in health between groups, and Aboriginal and Torres Strait Islander people show how determinants interact to produce them. Life expectancy at birth in 2020 to 2022 was 71.9 years for Indigenous males and 75.6 years for Indigenous females, which is 8.8 and 8.1 years less than for non-Indigenous males (80.6) and females (83.8), with the gaps calculated before rounding (Australian Bureau of Statistics, 2020 to 2022). The gap is not uniform: it was 13.5 years for males and 13.8 years for females in the Northern Territory, but 6.8 and 5.9 years in New South Wales (ABS, 2020 to 2022), which shows that place matters as much as the group.

These outcomes arise from layers that reinforce one another. Broad features of society, including the continuing effects of dispossession and racism, and fewer culturally safe services in remote areas, shape socioeconomic conditions such as income, education, employment and housing. Those conditions affect health behaviours and exposure to risk, such as smoking, diet and delayed help seeking, which in turn raise biomedical risk factors and rates of chronic disease. Each layer then makes the next worse, so an inequity builds across a lifetime and across generations.

This interaction explains why a single intervention rarely closes the gap. Funding one clinic addresses access but not income or housing; a health education program addresses skills but not the cost or distance that stop a person using services. On balance, the evidence from the Northern Territory and New South Wales suggests that inequity is driven by the interaction of determinants and varies with the strength of local services and social conditions, so it is avoidable. Equity, which means directing more resources to those with greater need, must therefore be applied across several determinants together.

QUESTION 25 · 10 MARKS

MARKS	CRITERIA
9 to 10	Analyses how several systems interact to produce efficient movement in the chosen activity, using correct terms in a sustained response.
6 to 8	Describes the role of several systems with some analysis.
3 to 5	Outlines the role of one or two systems.
1 to 2	Makes general statements.

Sample answer

Efficient movement in a 400 metre run, shown by a hypothetical (MA99) athlete who runs it in about 55 seconds, depends on the body systems working together. The nervous system sends signals from the brain through motor neurons to recruit muscle fibres in the right order and force, and it coordinates stride rhythm. The muscular system produces the movement: the hamstrings and gluteals act as agonists to extend the hip while the hip flexors act as antagonists and relax, and the trunk muscles act as stabilisers. The skeletal system provides levers, and the hip, knee and ankle, which are synovial joints, allow the swinging motion of the legs.

The energy systems fuel this. ATP-PC gives about the first 10 seconds, then the lactic acid system dominates, producing lactic acid that causes the heavy legs felt in the last 100 metres, while the aerobic system contributes more as the race continues. The respiratory and circulatory systems support all three: breathing rate rises to take in oxygen and remove carbon dioxide, and cardiac output, which is stroke volume times heart rate, can rise from 5.04 litres a minute at rest (70 mL times 72 beats) to 21.6 litres a minute (120 mL times 180 beats), as in the athlete in Question 21, delivering oxygen and removing wastes. The endocrine system releases adrenaline to raise heart rate and release fuel, and the digestive system supplies the glucose stored as glycogen.

The systems are interdependent, so a limit in one reduces the efficiency of the whole movement. If the athlete starts too fast, the lactic acid system produces acid faster than the circulation can clear it, the muscles fatigue, stride length shortens, and the nervous system cannot maintain the same muscle recruitment. Efficient movement is therefore the result of integration, and the weakest link sets the limit on performance.

About this resource

MA99 EDUCATION

Scope

NSW Health and Movement Science, Year 11. Written to the NSW Health and Movement Science 11-12 Syllabus 2023, both focus areas, for students sitting the HSC in 2028 and later years. Every worked context uses current Australian health data from the AIHW and ABS, each figure dated and sourced, and invented athletes and communities for worked examples, and every number was recomputed from its inputs before printing.

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