

# **Sfrito Assessment Guideline**

## **Unit 5373**

**Level 4: Credit 4: Version 4**

**Sport Science and Technology**

**Explain the management of  
extreme environments and travel  
in a coaching situation**

**Activity Instructions**

1. Written explanation
2. Written or oral/verbal presentation of effects of heat performance and cold performance.
3. Written explanation for travel strategies.

**Purpose**

People credited with this unit standard are able to:

- explain the effect of altitude on performance and recommendations for training, acclimatising, and performing at altitudes;
- explain the effect of heat on performance and make recommendations for training, acclimatising and performing in hot environments;
- explain the effect of cold on performance and recommendations for training, acclimatising, and performing in cold environments;
- explain strategies for minimising the effect of travelling different distances and time zones on physiological function and performance;
- explain the effects of pollutants and ways of minimising their effect on performance.

**Special Notes**

- 1 Recommended: Unit 5368, *Demonstrate knowledge of basic functional anatomy, and physiology as they relate to movement* and Unit 6572, *Apply the principles of nutrition to people involved in physical activity*, or demonstrate equivalent knowledge and skills.
- 2 'Extreme environments' in the context of this unit standard refer to altitude, heat, cold, pollution, and those requiring travel across time zones or to a foreign country to reach.

**Element 1: Explain the effect of altitude on performance and recommendations for training, acclimatising, and performing at altitudes.**

**Task:** Written or verbal explanation

<b>Performance criteria</b>		<b>Evidence</b>
1.1	<p>Explanation establishes the effect of various altitudes on performance in a range of categories of sports.</p> <p>Range: at least one of - endurance, sprint, power, technical, artistic, combat, duel, precision events.</p>	<ul style="list-style-type: none"> <li>• The effect of altitude on performance is explained for at least one of the range statement categories. For example:               <ul style="list-style-type: none"> <li>- Sprint – training in thinner air will improve sprint performance resulting in the Athlete sprinting faster when back under normal conditions.</li> </ul> </li> </ul>
1.2	<p>Explanation establishes the physiological effect of acute changes in altitude.</p> <p>Range: pulmonary ventilation, number of red blood cells, blood volume, elimination of bicarbonate, blood pH, performance of fitness components, quantity and quality of training that can be accomplished, physical performance.</p>	<p>Four physiological effects, from range statement, resulting from acute changes in altitude are explained. For example:</p> <ul style="list-style-type: none"> <li>• Number of red blood cells – will not change unless chronic exposure which will lead to an increase in red blood cells.</li> <li>• Performance of fitness component               <ul style="list-style-type: none"> <li>- at altitude sprint/power will improve</li> <li>- Endurance will decrease if no acclimatisation</li> <li>- Ventilation will increase</li> </ul> </li> </ul>
1.3	<p>Explanation describes the process and duration of acclimatisation to various altitudes.</p> <p>Range: time in which to adjust to ensure optimum performance; other measures to enhance adjustment - fluid, diet, sleeping patterns, training level versus living level.</p>	<ul style="list-style-type: none"> <li>• The process and duration (time) of acclimatisation to various altitudes is described.</li> <li>• Four methods of enhancing adjustments to altitude from the range statement are described. For example:               <ul style="list-style-type: none"> <li>- Fluids – increasing of fluid intake because of respiratory loss.</li> </ul> </li> </ul>
1.4	<p>Explanation establishes the effect of altitude training on performance at sea level for a range of categories of sports.</p> <p>Range: at least one of - endurance, sprint, power, technical, artistic, combat, duel, precision events.</p>	<ul style="list-style-type: none"> <li>• The effect of altitude training on performance at sea level is explained for at least one of the range categories. For example:               <ul style="list-style-type: none"> <li>- Endurance – if you train at altitude you will increase your performance at sea level.</li> </ul> </li> </ul>
1.5	<p>Explanation establishes the effect of sea level training on training and performance at altitude for a range of categories of sports.</p> <p>Range: at least one of - endurance, sprint, power, technical, artistic, combat, duel, precision events.</p>	<ul style="list-style-type: none"> <li>• The effect of sea level training on training and performance at altitude is explained for at least one of the range statement categories. For example:               <ul style="list-style-type: none"> <li>- Endurance – will decrease if not acclimatised.</li> </ul> </li> </ul>

1.6	Explanation establishes recommendations for training, acclimatising, and performing at altitudes.	<ul style="list-style-type: none"> <li>• Candidate establishes recommendations for training, acclimatising and performing at altitudes. For example: <ul style="list-style-type: none"> <li>- Training for 3-4 weeks at altitude will help athlete acclimatise and perform better.</li> </ul> </li> </ul>
<b>Element 2: Explain the effect of heat on performance and make recommendations for training, acclimatising and performing in hot environments.</b>		
<b>Task:</b> Written and or Oral presentation.		
<b>Performance criteria</b>		<b>Evidence</b>
2.1	Explanation establishes the effect of a hot environment on performance in categories of sports.  Range: endurance, sprint and/or power.	<ul style="list-style-type: none"> <li>• Candidate explains the effect of a hot environment on performance in endurance, sprint and/or power categories of sports.</li> </ul>
2.2	Body's normal temperature is identified and contrasted with the range of temperatures the body can tolerate during exercise.	<ul style="list-style-type: none"> <li>• The body's normal temperature is identified.</li> <li>• Normal temperature is contrasted with the range of temperatures the body can tolerate during exercise.</li> </ul>
2.3	Explanation establishes the mechanisms by which heat exchange can occur between the body and the environment.  Range: conduction, radiation, convection, evaporation.	<ul style="list-style-type: none"> <li>• The four mechanisms by which heat exchanges can occur between the body and the environment are established and briefly defined. For example: <ul style="list-style-type: none"> <li>- Evaporation – the most common method of heat dissipation.</li> <li>- Sweating - removes heat from body; sweat and blood flow.</li> </ul> </li> </ul>
2.4	Explanation describes the main regulatory mechanisms that contribute to heat dissipation.  Range: sweat, blood flow.	<ul style="list-style-type: none"> <li>• The main regulatory mechanisms that contribute to heat dissipation are explained, e.g. <ul style="list-style-type: none"> <li>- Sweat – heat dissipation. Fluid produced by secretory glands, as it evaporates it takes heat from the body.</li> <li>- Blood flow – vasodilation – leads to heat dissipation.</li> </ul> </li> </ul>
2.5	Explanation establishes the effect of humidity on the ability to dissipate heat.	<ul style="list-style-type: none"> <li>• The effect of humidity on the ability to dissipate heat is established.</li> </ul>
2.6	Explanation describes the physiological adaptations that follow acclimatisation and/or training.  Range: circulatory adjustments, sweating mechanisms, subjective symptoms and discomfort, effect of training on the ability to perform.	<ul style="list-style-type: none"> <li>• The four physiological adaptations that follow acclimatisation and/or training are described, for example:</li> <li>• Effect of training on the ability to perform – after you have been at altitude and have acclimatised you would have increased the number of red blood cells.</li> </ul>

2.7	<p>Explanation establishes the dangers and management of heat stroke.</p> <p>Range: conditions leading to heat stroke, symptoms, emergency treatment.</p>	<ul style="list-style-type: none"> <li>• 3 dangers and management of heat stroke are established. Explanation to include 2 points for each of range statement. For example:  <u>Conditions leading to heat stroke</u> <ul style="list-style-type: none"> <li>- exposure to extreme heat for prolonged period.</li> <li>- No fluid intake.</li> </ul> <u>Symptoms of heat stroke:</u> <ul style="list-style-type: none"> <li>- Rising internal temperatures.</li> <li>- Cessation of sweating.</li> </ul> <u>Emergency treatment</u> <ul style="list-style-type: none"> <li>- Remove from heat source.</li> <li>- Cool down, e.g., with damp towels.</li> </ul> </li> </ul>
2.8	<p>Explanation establishes recommendations for training, acclimatising, and performing in the heat.</p> <p>Range: clothing, period of acclimatisation, adaptation of competitive strategy to environmental conditions; hydration - type and content of fluid, rate of fluid absorption, pre and post-competition hydration, monitoring of fluid losses using body weight.</p>	<p>Candidate makes recommendations for training, acclimatising and performing in the heat. To include</p> <ul style="list-style-type: none"> <li>• What type of Clothing</li> <li>• Period of acclimatisation – how long?</li> <li>• Adaptation of competitive strategy – how will it be adapted?.</li> <li>• Hydration <ul style="list-style-type: none"> <li>- type and rate</li> <li>- pre and post competition hydration</li> <li>- Monitoring fluid loss – how much, how often, when.</li> </ul> </li> </ul>

**Element 3: Explain the effect of cold on performance and recommendations for training, acclimatising, and performing in cold environments.**

**Task:** Written explanation or oral/verbal presentation.

	<b>Performance criteria</b>	<b>Evidence</b>
3.1	<p>Explanation describes factors that effect tolerance to cold.</p> <p>Range: body surface area, percentage of body fat, age, fitness levels, clothing, gender differences.</p>	<ul style="list-style-type: none"> <li>• Each factor that affects tolerance to cold is described in a sentence for all of range statement. For example, %age of body fat – fat acts as an insulator.</li> </ul>
3.2	<p>Explanation describes the physiological adaptations that follow acclimatisation and/or training.</p> <p>Range: circulatory adjustments, sweating mechanisms, subjective symptoms and discomfort, effect of training on the ability to tolerate and perform in the cold.</p>	<ul style="list-style-type: none"> <li>• The physiological adaptations that follow acclimatisation and/or training are described.</li> <li>• Three adaptations from the range are explained. For example: <ul style="list-style-type: none"> <li>- <u>Circulatory adjustments</u> – vaso constriction when cold – blood vessals shrink to conserve heat.</li> </ul> </li> </ul>

3.3	<p>Explanation describes the management of hyperthermia (should read hypothermia) and frostbite.</p> <p>Range: symptoms, treatment.</p>	<ul style="list-style-type: none"> <li>The management of hypothermia and frostbite is described by explaining symptoms and treatments. E.g. Hypothermia:</li> </ul> <p><u>Symptoms</u></p> <ul style="list-style-type: none"> <li>- Shivering, disorientation.</li> </ul> <p><u>Treatment</u></p> <ul style="list-style-type: none"> <li>- Warm blankets, warm drink, no alcohol.</li> </ul>
3.4	<p>Explanation establishes recommendations for training, acclimatising, and performing in the cold.</p> <p>Range: clothing, period of acclimatisation, training recommendations to reduce risk of injury, hydration: type and content of fluid, rate of fluid absorption, pre and post-competition hydration.</p>	<ul style="list-style-type: none"> <li>Candidate establishes recommendations for training, acclimatising and performing in the cold for all of range statement. For example:</li> </ul> <p><u>Clothing</u></p> <ul style="list-style-type: none"> <li>- Layered.</li> <li>- Loose, breathable.</li> <li>- Thermal wear.</li> </ul>

**Element 4: Explain strategies for minimising the effect of travelling different distances and time zones on physiological function and performance.**

**Task:** Written

	<b>Performance criteria</b>	<b>Evidence</b>
4.1	Explanation defines circadian rhythm.	<ul style="list-style-type: none"> <li>Circadian rhythm is defined and explained.</li> </ul>
4.2	<p>Explanation establishes general physical and psychological effects observed when changing time zones and individual variations.</p> <p>Range: diet, fluid intake, sleeping patterns, daily routines, speed of adjustment, bodily functions.</p>	<ul style="list-style-type: none"> <li>General physical and psychological effects observed when changing time zones are explained, to include all of range.</li> <li>Individual variations are established. For example, need to increase fluid intake to avoid dehydration for a specific athlete in a specific sport.</li> </ul>
4.3	<p>Explanation establishes strategies for offsetting detrimental effects of travel particularly over different time zones or in foreign countries.</p> <p>Range: sleep, eating, drinking, training.</p>	<ul style="list-style-type: none"> <li>Candidate establishes strategies for offsetting detrimental effects of travel. <ul style="list-style-type: none"> <li>- Particular emphasis on travel over different time zones or in foreign countries.</li> <li>- Includes strategies for sleep, eating, drinking and training.</li> </ul> </li> </ul>

**Element 5: Explain the effects of pollutants and ways of minimising their effect on performance.**

**Task:** Written

<b>Performance criteria</b>		<b>Evidence</b>
5.1	<p>Explanation establishes general and specific effects on training and performance of pollutants.</p> <p>Range: carbon monoxide, ozone, sulphur dioxide, unclean environments, uneven surface to perform on.</p>	<ul style="list-style-type: none"> <li>• General and specific effects that pollutants listed in range have on training and performance are established. For example; <u>Carbon monoxide</u> – decreases respiratory performance, may lead to lung damage.</li> </ul>
5.2	<p>Explanation establishes strategies to offset the negative effects of training and competing in polluted environments.</p> <p>Range: gathering information on environment prior to arrival, modifying training to minimise effects of pollutants, use of equipment.</p>	<ul style="list-style-type: none"> <li>• Candidate establishes strategies to offset the negative effects of training and competing in polluted environments. For example: <ul style="list-style-type: none"> <li>- Gathering information prior to find a training area away from traffic, factories etc. If this is not possible then minimise effect by training indoors or away at another venue.</li> </ul> </li> </ul>

## Unit 5373 Checklist

### Explain the management of extreme environments and travel in a coaching situation

Assessor name: \_\_\_\_\_

Organisation name: \_\_\_\_\_

#### Element 1: Explain the effect of altitude on performance and recommendations for training, acclimatising, and performing at altitudes.

1.1	Explanation establishes the effect of various altitudes on performance in a range of categories of sports.  Range: at least one of - endurance, sprint, power, technical, artistic, combat, duel, precision events.	
1.2	Explanation establishes the physiological effect of acute changes in altitude.  Range: pulmonary ventilation, number of red blood cells, blood volume, elimination of bicarbonate, blood pH, performance of fitness components, quantity and quality of training that can be accomplished, physical performance.	
1.3	Explanation describes the process and duration of acclimatisation to various altitudes.  Range: time in which to adjust to ensure optimum performance; other measures to enhance adjustment - fluid, diet, sleeping patterns, training level versus living level.	
1.4	Explanation establishes the effect of altitude training on performance at sea level for a range of categories of sports.  Range: at least one of – endurance, sprint, power, technical, artistic, combat, duel, precision events.	
1.5	Explanation establishes the effect of sea level training on training and performance at altitude for a range of categories of sports.  Range: at least one of – endurance, sprint, power, technical, artistic, combat, duel, precision events.	
1.6	Explanation establishes recommendations for training, acclimatising, and performing at altitudes.	

#### Element 2: Explain the effect of heat on performance and make recommendations for training, acclimatising and performing in hot environments.

2.1	Explanation establishes the effect of a hot environment on performance in categories of sports.  Range: endurance, sprint and/or power.	
2.2	Body's normal temperature is identified and contrasted with the range of temperatures the body can tolerate during exercise.	
2.3	Explanation establishes the mechanisms by which heat exchange can occur between the body and the environment.  Range: conduction, radiation, convection, evaporation.	
2.4	Explanation describes the main regulatory mechanisms that contribute to heat dissipation.  Range: sweat, blood flow.	

2.5	Explanation establishes the effect of humidity on the ability to dissipate heat.	
2.6	Explanation describes the physiological adaptations that follow acclimatisation and/or training. Range: circulatory adjustments, sweating mechanisms, subjective symptoms and discomfort, effect of training on the ability to perform.	
2.7	Explanation establishes the dangers and management of heat stroke. Range: conditions leading to heat stroke, symptoms, emergency treatment.	
2.8	Explanation establishes recommendations for training, acclimatising, and performing in the heat. Range: clothing, period of acclimatisation, adaptation of competitive strategy to environmental conditions; hydration - type and content of fluid, rate of fluid absorption, pre and post-competition hydration, monitoring of fluid losses using body weight.	
<b>Element 3: Explain the effect of cold on performance and recommendations for training, acclimatising, and performing in cold environments.</b>		
3.1	Explanation describes factors that effect tolerance to cold. Range: body surface area, percentage of body fat, age, fitness levels, clothing, gender differences.	
3.2	Explanation describes the physiological adaptations that follow acclimatisation and/or training. Range: circulatory adjustments, sweating mechanisms, subjective symptoms and discomfort, effect of training on the ability to tolerate and perform in the cold.	
3.3	Explanation describes the management of hypothermia and frostbite. Range: symptoms, treatment.	
3.4	Explanation establishes recommendations for training, acclimatising, and performing in the cold. Range: clothing, period of acclimatisation, training recommendations to reduce risk of injury, hydration: type and content of fluid, rate of fluid absorption, pre and post-competition hydration.	
<b>Element 4: Explain strategies for minimising the effect of travelling different distances and time zones on physiological function and performance.</b>		
4.1	Explanation defines circadian rhythm.	
4.2	Explanation establishes general physical and psychological effects observed when changing time zones and individual variations. Range: diet, fluid intake, sleeping patterns, daily routines, speed of adjustment, bodily functions.	
4.3	Explanation establishes strategies for offsetting detrimental effects of travel particularly over different time zones or in foreign countries. Range: sleep, eating, drinking, training.	

<b>Element 5: Explain the effects of pollutants and ways of minimising their effect on performance.</b>			
5.1	Explanation establishes general and specific effects on training and performance of pollutants.  Range: carbon monoxide, ozone, sulphur dioxide, unclean environments, uneven surface to perform on.		
5.2	Explanation establishes strategies to offset the negative effects of training and competing in polluted environments.  Range: gathering information on environment prior to arrival, modifying training to minimise effects of pollutants, use of equipment.		
DATE	CANDIDATES SIGNATURE	ASSESSORS SIGNATURE	C/NYC
<b>Comments:</b>			

Note: the assessor needs to ensure **sufficiency** of performance and knowledge. Therefore the assessor needs to know that the Candidate has performed the tasks competently many times before and will be competent in the future. Ticking/ dating the boxes more than once, having 2 checklists for different assessment occasions or observing workplace performance over a period of time can show this.