How can nutrition and recovery strategies affect performance?

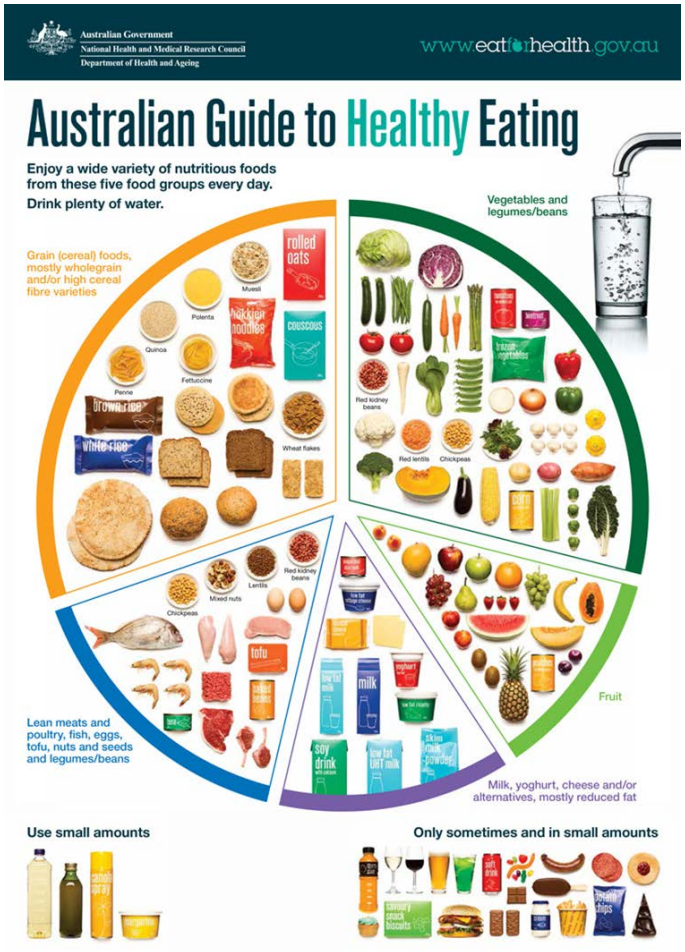
Students learn about:

- nutritional considerations
  - pre-performance, including carbohydrate loading
  - during performance
  - post-performance

Students learn to:

- compare the dietary requirements of athletes in different sports considering pre-, during and post-performance needs

Figure 7.1: Fluid, like food, is an important nutritional consideration in endurance activity. If hydration is inadequate, an athlete's health can suffer.



- The Australian Guide to Healthy Eating indicates the amount of each food group that is recommended for all Australians. An athlete will require, roughly the same percentage of each food group, but will consume greater amounts of them. In addition to this, an athlete may benefit from other nutritional considerations before, during and after a performance.
- These include carbohydrate loading before endurance events, the consumption of glucose and electrolytes during events lasting longer than 60 minutes, and replacing glycogen and fluid lost after performance.

Pass the parcel…

- The glycaemic index (GI) rates carbohydrates according to how quickly they raise the glucose level of the blood.
- Simple Carbs (sugars) vs Complex Carbs (fibre & starches) .

- If you keep – low GI or high GI
- If you give – that person needs to say is it low or high GI

Glycemic Index

Low GI (<55), Medium GI (56-69) and High GI (70>)

Grains / Starchs		Vegetables		Fruits		Dairy		Proteins	
Rice Bran	27	Asparagus	15	Grapefruit	25	Low-Fat Yogurt	14	Peanuts	21
Bran Cereal	42	Broccoli	15	Apple	38	Plain Yogurt	14	Beans, Dried	40
Spaghetti	42	Celery	15	Peach	42	Whole Milk	27	Lentils	41
Corn, sweet	54	Cucumber	15	Orange	44	Soy Milk	30	Kidney Beans	41
Wild Rice	57	Lettuce	15	Grape	46	Fat-Free Milk	32	Split Peas	45
Sweet Potatoes	61	Peppers	15	Banana	54	Skim Milk	32	Lima Beans	46
White Rice	64	Spinach	15	Mango	56	Chocolate Milk	35	Chickpeas	47
Cous Cous	65	Tomatoes	15	Pineapple	66	Fruit Yogurt	36	Pinto Beans	55
Whole Wheat Bread	71	Chickpeas	33	Watermelon	72	Ice Cream	61	Black-Eyed Beans	59
Muesli	80	Cooked Carrots	39						
Baked Potatoes	85								
Oatmeal	87								
Taco Shells	97								
White Bread	100								
Bagel, White	103								

Pre-performance nutritional needs of athletes

- For many sports: low GI/high carb meal three hours before (low fat and protein) and smaller high GI meal 30-minute snack – adequate hydration (extra 1–2 litres over 24 hours before).
- Carbohydrate loading - In the final days of tapering before a major endurance event, increasing carbohydrate intake to ensure glycogen stores are maximised.
- **Carbohydrate loading** is the technique of loading the muscles with glycogen in preparation for an endurance activity of more than 90 minutes.

Table 7.1: Suggested food intake prior to performance

Three to four hours before exercise	One to two hours before exercise	One hour or less before exercise
• crumpets with jam or honey + flavoured milk • baked potato + cottage cheese filling + glass of milk • baked beans on toast • breakfast cereal with milk • bread roll with cheese/ meat filling + banana • fruit salad with fruit-flavoured yoghurt • pasta or rice with a sauce based on low-fat ingredients (e.g. tomato, vegetables, lean meat)	• liquid meal supplement • milkshake or fruit smoothie • sports bars (check labels for carbohydrate and protein content) • breakfast cereal with milk • cereal bars • fruit-flavoured yoghurt • fruit	• sports drink • carbohydrate gel • cordial • sports bars • jelly lollies

Source: Australian Institute of Sport, fact sheet, 'Competition and training', www.ausport.gov.au/ais/nutrition.

During Performance

- Regular hydration (150 mL per 15 minutes) – high GI snack (gel) if event goes longer than 1hour.
- Thirst is not a good indicator of the body's need for fluid; by that time, dehydration has already started to take effect.
- Weather conditions need to be accounted for

Post-performance nutritional needs of athletes

- Protein for muscle repair, 50–100 grams carbs and drink the equivalent of 150% of fluids lost (1.5L for every kg lost).
- All within the first 30–60 minutes after the event.
- If event lasts longer than 1hr sports drinks aid recovery.

Research…

- https://www.sportsdietitians.com.au/section/food-for-your-sport/

Dietary requirements of different sports

Draw an enlarged copy of the following table into your workbook. Choose three sports or activities that are different in their dietary requirements and performance needs. Choices may include activities or sports such as the City to Surf marathon, sprinting, discus throwing and basketball. Use the table to compare the before, during and after the event dietary requirements for athletes competing in these events.

	Sport 1	Sport 2	Sport 3
Pre-performance			
During performance			
Post-performance			

Compare the dietary requirements of a power athlete and an endurance athlete

- **Power athlete:** increased protein and total energy intake to fuel muscular development. Moderate carbohydrate intake.
- **Endurance athlete:** increased carbohydrate (Low GI) and moderate protein intake. Hydration is more important.
- Both require a balance of nutrients and plenty of healthy, fresh foods

Past HSC question - look at your HSC HUB!

- In using 2 very different sports – shot put and marathon running, dietary requirements are clearly explained.

Past HSC Questions

HSC PDHPE Exam 2011:

> "Compare the dietary requirements of athletes in TWO sports that have different nutritional needs. Provide relevant examples." (6 marks)

Sample Response

Highlight 2 sports and address syllabus dot points

Shot putters and marathon runners have very different dietary requirements in terms of pre, during and post-performance, due to the divergent nature of these sports.

Address first sport – pre-performance

In terms of pre-performance, shot putters would not need to alter their diet to fuel their body, as stores of ATP and creatine phosphate exist naturally in the body to fuel them for their explosive event, and the recovery time between throws is long enough to regenerate ATP. They would want to make sure they are hydrated with water though, to ensure co-ordination is not impaired, as technique is an important aspect of the shot put.

Contrast with other sport

In contrast, marathon runners would need to increase their intake of complex carbohydrates, for example pasta, to ensure sustained aerobic energy during their event. They would also need to increase their intake of water 24hrs before their event and drink continually leading up to the event due to the massive fluid losses sustained from the event.

Sample Response

Compare sports for during performance

In terms of during performance, the shot putter will not need to do anything more than sip on water as this event does not last long enough to warrant any further dietary requirements. In contrast, the marathon runner will need to consume quickly digested simple carbs during performance, such as carb gels, to conserve muscle glycogen levels. They will also need to drink 200-300ml sports drink every 15mins, to maintain hydration AND energy supply.

Compare sports for post-performance

Post-performance, the shot putter should drink water and consume a small amount of simple carbs to replace any glycogen that may have been used. On the other hand, the marathon runner will need to consume a larger 50-100g of simple carbs in first 2hrs to rapidly replace glycogen levels. They should also drink 150% of their fluid deficit (1.5L for every kg lost), with sports drinks being the preferred option, to rehydrate.