

*Classroom*  
**V I D E O**

**TEACHERS NOTES**

**FACTORS AFFECTING  
PERFORMANCE**

**NUTRITION AND SPORT**

**Grades: 10-12**

**Duration - 31 mins**

## NUTRITION AND SPORT

### 1. The Balanced Diet and the Athlete

To enable an athlete to perform at their best it is essential that adequate fuel be supplied. A balanced diet and sufficient fluid intake, together with specific training, provide the basis for maximising cell function.

Partaking in strenuous physical activity has two main effects on the body, (I) the body uses up more energy and (ii) heats up more quickly. These effects need to be the major considerations when planning a diet for an athlete.

Explain why good nutrition is essential in maximising sports performance.

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Complete the table below

<b>Nutrient</b>	<b>Major Functions</b>	<b>Food Group Examples</b>
<b>Carbohydrates</b>		<b>Breads and cereals Fruits and Vegetables</b>
	<b>Growth and repair of cells. Used as a fuel source in conjunction with fats when carbohydrates have run low.</b>	
<b>Fats</b>		<b>All food groups</b>
	<b>Essential in the maintenance of body processes including energy production</b>	
<b>Water</b>		

List the three nutrients that are our fuel for exercise.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

Discuss how an athlete's diet would differ from a non-athlete's diet.

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## 2. Fluid and Hydration

Water plays a very important role in athletic performance. Outline the two main reasons why the regular consumption of water, before, during and after the activity is crucial, especially in endurance sports.

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Dehydration during athletic performance can not only have a detrimental effect on performance but it also has the potential to have an adverse effect on the individual's health. Research and describe two health problems that could result from being dehydrated.

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Three hydration tips are

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

Two ways an individual can monitor their hydration levels are

1. \_\_\_\_\_
2. \_\_\_\_\_

Discuss when the use of sports drinks would have a positive impact on sports performance.

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## 3. Energy Intake

Athletes need to modify their energy intake in two ways. (I) They need to increase the total amount of energy they are consuming to meet the extra demands of their sport. (II) It is also critical to change the proportions of the fuels they eat.

Using a coloured pencil shade in the approximate percentages required by an elite triathlete (A) and the recommendations for a non-athlete (B).

### Carbohydrate

0% 50% 100%

A									
B									

### Fat

0% 50% 100%

A									
B									

### Protein

0% 50% 100%

A									
B									

Justify reasons for the changes to the athlete's diet compared to the non-athlete's diet.

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Whilst the body is engaged in physical activity it normally uses a combination of carbohydrates and fats as fuel sources for energy production. Fats play a dominant role in exercise of lower intensity. This is because fats need more oxygen, when metabolising, to release energy for ATP resynthesis. They also become the major fuel when carbohydrate stores are depleted. When glycogen depletion occurs, and fat becomes the dominant fuel source, performance usually drops due to the body's inability to respond to the demand for more oxygen and higher respiration rates.

As the intensity of the activity increases more carbohydrates are used and less fats. Carbohydrates are the dominant fuel source for higher intensity activities.

Protein starts to be used as a fuel once glycogen depletion has occurred in combination with fat. It rarely becomes the dominant fuel source except in individuals that are extremely mal nourished.

An aerobically fit athlete will be able to use more fat during an endurance event compared with a unfit person. This allows the athlete's limited carbohydrate stores to last longer. The effect is known as glycogen sparing.

Explain the adaptations that have occurred as a result of training that have allowed the athlete to glycogen spare.

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The Glycaemic Index (GI) is a system of measuring how fast a food raises the blood sugar level. Thus a food such as Cornflakes, which has a high GI, will trigger a sharp rise in an individual's blood sugar levels over a short period of time. Low to moderate GI foods such as pasta will cause a smaller rise in blood sugar levels over a longer period of time.

The Glycaemic Load is also important to consider. This indicates the amount of carbohydrate in food. The lower the glycaemic load the more you have to eat of that food to replenish your glycogen stores.

Explain why low GI foods are most appropriate for pre-event intake.

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**GLOSSARY**

<b>AMINO ACID</b>	Protein is broken down into amino acids via digestion.	<b>HEAT EXHAUSTION</b>	A medical condition due to excessive dehydration.
<b>CARBOHYDRATE</b>	An energy rich nutrient. The major fuel source for intense activities.	<b>HEAT STROKE</b>	A potentially fatal medical condition due to extreme dehydration.
<b>CARBOHYDRATE LOADING</b>	A process of increasing carbohydrate intake prior to competition.	<b>HIGH GI FOODS</b>	Carbohydrate foods that raise the blood glucose level quickly.
<b>CAFFIENE</b>	A stimulant found in coffee, tea, energy drinks and cola products.	<b>HYDRATION</b>	Restoring fluid levels in the body using water and in some instances sports drinks.
<b>CONDUCTION</b>	Transfer of heat to an object by contact.	<b>KILOJOULE</b>	A measurement of energy.
<b>CONVECTION</b>	Transfer of heat by a moving fluid.	<b>LOW GI FOODS</b>	Carbohydrate foods that raise the blood sugar levels slowly.
<b>CREATINE MONOHYDRATE</b>	A nutritional supplement used to increase the amount of creatine phosphate in the body.	<b>METABOLISM</b>	The total amount of chemical reactions that take place in the body.
<b>CREATINE PHOSPHATE</b>	A compound derived from amino acids used for short duration high intensity efforts.	<b>MINERALS</b>	A group of micronutrients that are essential for the body to function effectively.
<b>DEHYDRATION</b>	Excessive loss of water from the body.	<b>NUTRIENTS</b>	Carbohydrates, fat, protein, vitamins and minerals.
<b>ENERGY</b>	The ability to do work.	<b>PROTEIN</b>	A nutrient used for growth and repair and in extreme instances for energy.
<b>ENERGY INTAKE</b>	The total kilojoules consumed.	<b>RADIATION</b>	Loss of heat in the form of infra-red rays.
<b>EVAPORATION</b>	Loss of heat through evaporation of sweat.	<b>RECOVERY</b>	The time between bouts of physical activity.
<b>FAT</b>	An energy rich nutrient used for low intensity activity and when glycogen depletion occurs.	<b>SPORTS BAR</b>	A high energy food mainly composed of sugars and in some products may also contain protein.
<b>FATTY ACIDS</b>	One of the by products of fat metabolism.	<b>SPORTS DRINK</b>	Carbohydrate and electrolyte fluid.
<b>GLUCOSE</b>	The simplest form of carbohydrate.	<b>SPORT GEL</b>	High GI carbohydrate.
<b>GLYCAEMIC INDEX</b>	A system of measuring how fast a food raises the blood glucose levels.	<b>SUPPLEMENT</b>	Additional nutrients that exceed/assist normal intake.
<b>GLYCAEMIC LOAD</b>	The amount of carbohydrate contained in foods.	<b>THERMO-REGULATION</b>	The process by which the body attempts to regulate its temperature to 37°C.
<b>GLYCEROL</b>	A by product of fat	<b>TRIGLYCERIDES</b>	A by product of fat

	metabolism.		metabolism.
<b>GLYCOGEN</b>	Stored carbohydrate found in the muscles and liver.	<b>VITAMINS</b>	A group of micronutrients that assists body functions.
<b>GLYCOGEN SPARING</b>	One effect of aerobic training that allows the athlete to use more fat early in an event.	<b>WATER</b>	An essential component of the diet that enables the body to function efficiently and assists thermoregulation.

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