

Nutrients

found in vegetables and fruit

Macronutrients

Carbohydrate

Carbohydrate provides energy for body and brain. There are two main types – sugars and starches. Fibre is also a carbohydrate. Most fruits provide carbohydrate. Legumes and some vegetables, such as potato, sweet potato and corn, are also good sources of carbohydrate.

Dietary fibre

Dietary fibre is the structural part of plants, which is why fibre is only found naturally in plant foods. Dietary fibre cannot be digested in our small intestine, although some types can be partially digested by bacteria in the large intestine. Fibre helps keep the bowels 'regular' and can aid in lowering cholesterol. Most vegetables and fruit are also important sources of fibre.

Protein

Protein is needed for growth and maintenance of muscles, blood, skin and many other body structures. Among many other roles, proteins can also act as enzymes, transporters in the blood (e.g. haemoglobin) and as antibodies. Legumes (e.g. baked beans, lentils and chickpeas) are a good source of protein.

Fat

Saturated fats (animal fats, palm oil and coconut oil) may contribute to raising cholesterol levels in the body. Unsaturated fats (most plant-based fats) are better choices. Fat is very high in energy and can cause excess energy intake if too much is eaten. Fat is used in the body as insulation, padding for vital organs and to carry fat-soluble vitamins. Most vegetables and fruit are low in fat. Olives and avocados are sources of unsaturated fats.

Water

Water is the most important nutrient – without it we could only survive a few days. Adults are made up of around 60% water; children have a slightly higher percentage. It is essential for many body processes including the elimination of waste products and in body temperature regulation. All vegetables and fruit contain water, although some contain more than others.



Vitamins

Vitamin A (retinol)

Vitamin A is needed for vision, healthy mucous membranes and skin, and for reproduction and growth. Vegetables and fruits do not contain vitamin A but may contain beta-carotene, a pre-cursor to vitamin A. The best vegetable and fruit sources of beta-carotene are spinach (and other dark leafy greens), carrots, kumera, pumpkin, rockmelon and apricots.

Thiamin (vitamin B1)

Thiamin helps our bodies release and use the energy from the carbohydrates we eat. It is also important for the normal function of the heart, digestive and nervous systems. The best vegetable and fruit sources of vitamin thiamin are sweet corn, peas, asparagus and rhubarb.

Riboflavin (vitamin B2)

Riboflavin also helps our bodies release and use energy from the carbohydrates we eat. It is important for growth and repair of tissues, especially the skin and eyes. The best vegetable and fruit sources of riboflavin are mushrooms, broccoli, asparagus, spinach, avocado and peas.

Niacin (vitamin B3)

Niacin also helps our bodies release and use the energy from the carbohydrates we eat. It is also needed for growth. The best vegetable and fruit sources of niacin are mushrooms, potato and tomatoes.

Pantothenic acid (formerly known as vitamin B5)

Pantothenic acid helps our bodies release energy from food and plays an important role in the formation of red blood cells. The best vegetable and fruit sources of pantothenic acid are potato, tomatoes and broccoli.

Vitamin B6

Vitamin B6 assists with protein metabolism and helps to make red blood cells. The best vegetable and fruit sources of vitamin B6 are potato, broccoli, banana and watermelon.

Folate

Folate is important in the metabolism of DNA, making it vital in pregnancy. Folate also helps the formation of red blood cells and the prevention of anaemia. The best vegetable and fruit sources of folate are beans and lentils, broccoli and other leafy green vegetables.

Vitamin C

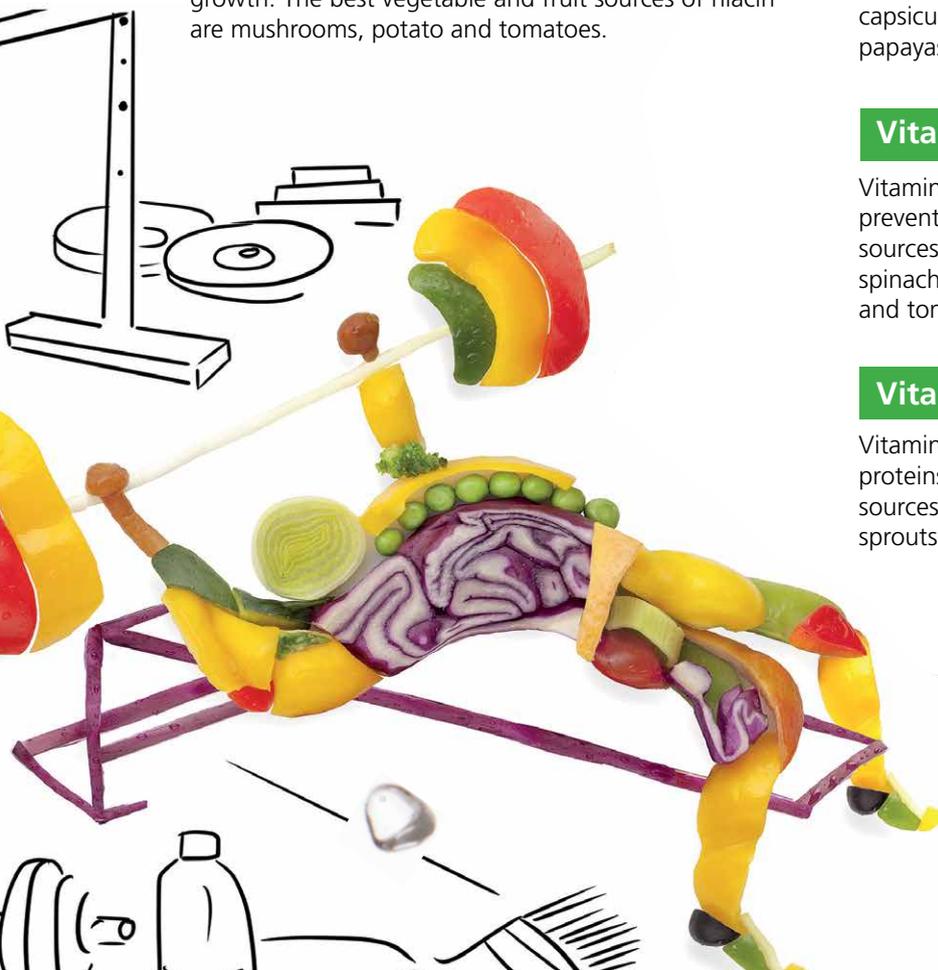
Vitamin C is needed for healthy connective tissue, bones and teeth. Vitamin C also aids the body in absorbing iron from vegetables and grains, and assists the immune system by helping to prevent infection. The best vegetable and fruit sources of vitamin C are citrus fruits, brussels sprouts, broccoli, cauliflower, rockmelon, capsicum, strawberries, lettuce, tomatoes, potato, papayas and mangoes.

Vitamin E

Vitamin E's main role in the body is as an antioxidant preventing cell damage. The best vegetable and fruit sources of vitamin E are leafy green vegetables such as spinach, as well as broccoli, sweet potato, asparagus and tomatoes.

Vitamin K

Vitamin K assists in blood clotting, and in making proteins needed in bones. The best fruit and vegetable sources of vitamin K are silverbeet, spinach, brussels sprouts and broccoli.



Minerals

Calcium

Calcium is very important in building strong bones and teeth. It is also contained in body fluids and helps the nervous system and muscles to function normally. The best vegetable and fruit sources of calcium are bok choy, kale, parsley, broccoli and watercress.

Iron

Iron is needed for proteins in blood and muscles and is also involved in the production of energy by the body. The best vegetable and fruit sources of iron are legumes (e.g. baked beans, lentils and chickpeas), dark green vegetables (e.g. broccoli) and dried fruits.

Magnesium

Magnesium is essential for the release of energy and is important in muscle contraction and nerve function. Sources of magnesium in vegetables and fruit include artichoke, spinach, cabbage, broccoli, watermelon and banana.

Potassium

Potassium is involved in regulating the balance of water in the body, the acidity of the blood and in preserving bone calcium. It is also important in the nerve impulses that make muscles contract. Food processing can reduce the amount of potassium in foods. The best vegetable and fruit sources of potassium are potato, spinach, Jerusalem artichoke, apricot, watermelon and banana.

Zinc

Zinc is a part of many enzymes in the body. It is also important in healing, growth and reproduction. Vegetables and fruit are not good sources of zinc, although legumes do contain some.



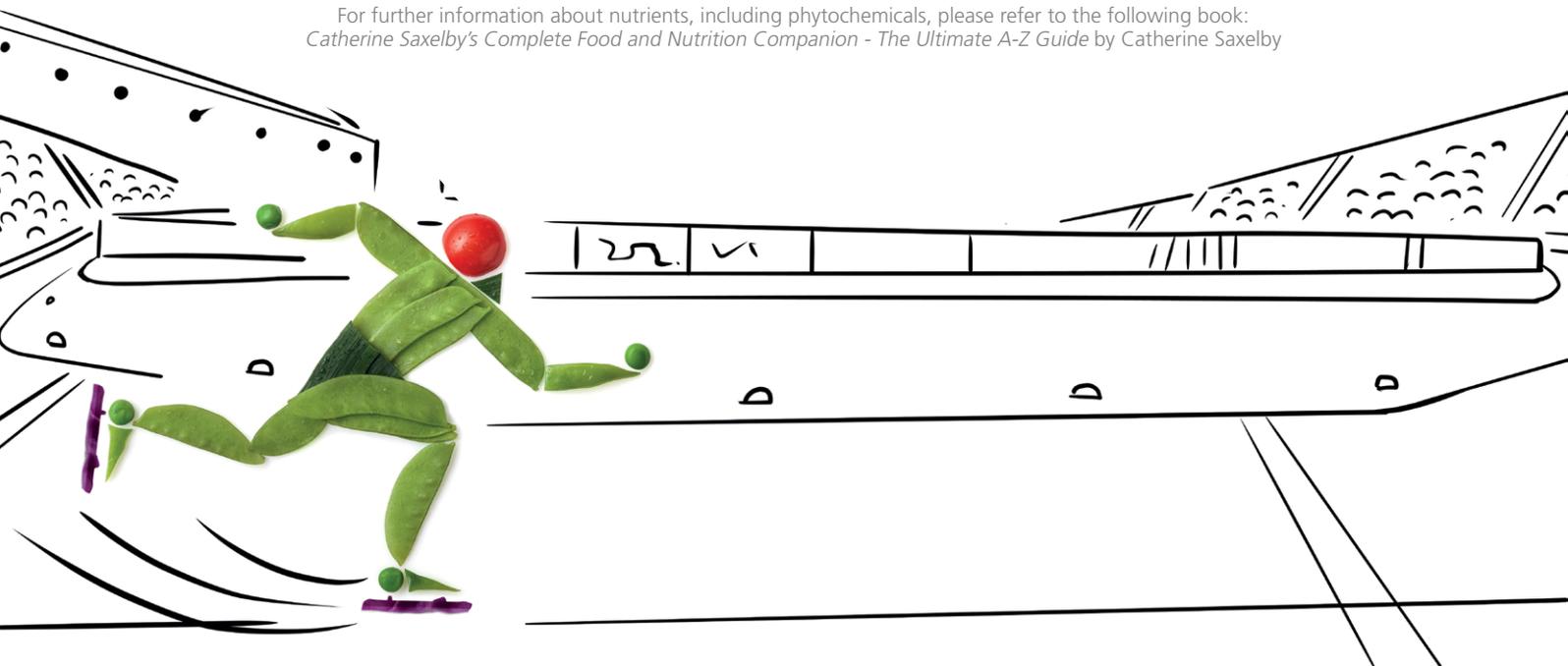
Phytochemicals

Phytochemicals are chemicals in plant foods (such as vegetables, fruit, legumes, nuts, seeds and grains) that can have beneficial effects in the body.

The different colours of vegetables and fruit are often due to the phytochemicals they contain. The following is a summary of some phytochemicals, their function and the vegetables and fruits they are found in.

Phytochemical Group	Names of the phytochemicals in the group	What they do	Vegetable and fruit sources
Carotenoids	Alpha-carotene, beta-carotene, lycopene, lutein, zeaxanthin and beta-cryptoxanthin.	Carotenoids act as antioxidants, and may reduce the risk of cancer and other diseases. Lutein and zeaxanthin help protect against macular degeneration.	Yellow/orange vegetables and fruits (pumpkin, carrot, sweet potato, orange, rockmelon and apricots). Green vegetables (spinach, silverbeet and Asian greens). Red fruits and vegetables (tomatoes, watermelon and red grapefruit).
Flavanoids	Includes kaempferol, catechins, quercetin.	Flavanoids act as antioxidant. Can reduce the risk of heart disease.	Grapes, apple, onions and berries.
Isoflavones	Phytoestrogen.	May reduce the risk of breast cancer and osteoporosis.	Lentils and legumes.
Anthocyanins		Anthocyanins are powerful antioxidants, and have a mild anti-bacterial effect.	Purple/blue vegetables and fruits (eggplant, blueberries, black grapes and blackberries).
Allicin		Allicin has anti-bacterial and anti-viral effects and helps to neutralise carcinogens. May protect against heart disease.	Onions, chives, leeks and garlic.
Ellagic Acid		Ellagic acid is an antioxidant that reduces the effects of carcinogens.	Grapes, strawberries, raspberries and apples.
Indoles and isothiocyanates	Sulphorophane.	Involved in helping to block damage from carcinogens.	Cruciferous vegetables such as broccoli, cabbage, cauliflower, brussels sprouts and turnips.

For further information about nutrients, including phytochemicals, please refer to the following book:
Catherine Saxelby's Complete Food and Nutrition Companion - The Ultimate A-Z Guide by Catherine Saxelby



How to teach children about Nutrition



Use concrete ideas instead of abstract concepts

Primary school aged children aren't capable of understanding abstract concepts, so stick to concrete ideas.

Concrete

- *Everyday vs sometimes* foods
- Eats lots of different foods each day
- Classifying foods by source (i.e. meat, milk, plant foods)
- Whole food items

Abstract

- Vitamins and minerals
- Nutrients that can't be seen or touched (e.g. protein, calcium)
- Classifying foods by nutrients
- Chronic disease risk

Refer to foods as *Everyday* or *Sometimes* foods to express their nutritional value

Refrain from talking about foods based on specific nutrients (i.e. high in saturated fat, a good source of vitamin C). While students can recite this information they struggle to identify foods that fall into these groups and often cannot use this information to make healthy food choices.

Context

Messages will be best remembered if presented in a context that's important to children. Give specific, concrete examples of foods. Use colour photographs or actual foods or packages where possible.

Children live in the present

Children do not think about future implications on health of consuming unhealthy foods. Being strong, growing well and having energy are important to children now. Children care about being overweight because it affects their daily life, not because of future health issues.

Be a role model!

Remember that your actions are more important than your words. Let the children see you munching on some carrots or an apple when you're on playground duty.

Teaching by Ages

Year	Nutrition Education
K to Year 2	Do not understand 'variety', 'diet' or 'low fat foods'
	Trouble identifying foods from various food groups
	All edible items are considered 'food' – no distinction between food and snacks
Years 3-4	Can recite effects of foods but with little understanding
	Do not understand serving sizes
Years 5-6	Can start talking about vitamins and minerals
	Understand it's acceptable to eat less nutritious food sometimes
	Understand risks of eating poorly