


Key Words: fat soluble: vitamins in fatty foods. Water soluble: found in foods with high water content
Antioxidant: Vitamins that help protect the body from developing heart disease and other types of cancer

Vitamin	Function	Sources	Deficiency (not enough)
Vitamin A (Retinol) fat Soluble 	<ul style="list-style-type: none"> Keeps the skin healthy Helps us see in dim light Helps children to grow Keeps mucous membranes moist and healthy An antioxidant 	Animal (retinol); milk, cheese, butter, eggs, liver, kidney, oily fish, added to veg. fat spreads Plant (beta carotene): cabbage, spinach, kale, lettuce, peas, orange/red/yellow veg. + fruit	Dry + infected skin + mucus membranes •Children don't grow properly •Night blindness leading to total blindness •Poisonous in excess e.g. in supplements, especially to unborn babies. Excess: Excess—Over time can weaken bones
Vitamin D (Cholecalciferol) fat soluble	Helps calcium to be absorbed in the body • Helps calcium to strengthen the bones and teeth	Sunlight on skin; oily fish, meat, eggs, butter, added to veg. fat spreads, fortified breakfast cereals	•Bones weaken + bend = Rickets in children + Osteomalacia in adults Excess can make you absorb too much calcium—this can lead to kidney damage
Vitamin E (Tocopherol) fat soluble	• an antioxidant (helps prevent heart disease + cancer	Soya, corn oil, olive oil, nuts, seeds, whole wheat, veg. fat spreads	•A deficiency is rare
Vitamin K (Phylloquinone) fat soluble	• Helps the blood to clot when the body is injured	Green leafy veg. liver, cheese, green tea	•Babies sometimes lose some blood at birth
Vitamin B1 (Thiamine) water soluble	• Helps energy to be released from carbohydrate in the body	Meat, especially pork, milk, cheese, eggs, veg. fresh + dried fruit, whole-meal bread, fortified breakfast cereals, flour	•Tiredness and weak muscles. (In severe cases) Beri-beri which affects heart, blood vessels and nervous system
Vitamin B2 (Riboflavin) water soluble	• Helps energy to be released from carbohydrate, fat and protein in the body. •Repairs body tissues.	Milk + milk products, eggs, fortified breakfast cereals, mushrooms, cheese, leafy greens	•Mouth gets sore at the corners . •Dry skin and a sore throat.
Vitamin B3 (Niacin) water soluble	• Helps energy to be released from food in the body. Maintains a healthy nervous system and skin.	Beef, pork, wheat flour, maize flour, eggs, milk, nuts, fish	•Pellagra (a disease causing fatigue, depression and loss of memory) diarrhoea, dementia, dermatitis.
Vitamin B9 (Folate or folic acid) water soluble	• Works with vitamin B12 to make healthy red blood cells • Helps to reduce the risk of unborn babies developing spina bifida	Green leafy veg. , yeast extract (marmite), peas, liver, chickpeas, asparagus, wholegrain rice, fruits, added to some breads = breakfast cereals 	•Anaemia, tiredness and nerve damage in extreme cases. Vegans are most likely to have too little. May lead to spina bifida in babies if there are low levels at conception. •Megaloblastic anaemia (large red blood cells)
Vitamin 12 (Cobalamin) water soluble	• Works with vitamin B9 to make healthy red blood cells • Keeps nerve cells healthy	Liver, meat, fish, cheese, fortified breakfast cereals, yeast	•Pernicious anaemia
Vitamin C (Ascorbic acid) water soluble	•Protects the body from infections and allergies. Helps the body absorb iron • Keeps connective tissue, which binds the body cells together, healthy • Heals wounds•An antioxidant	Fruits + veg. especially citrus fruits (e.g. oranges, lemons, limes, grapefruit), blackcurrants, kiwi, Brussel sprouts, cabbage, broccoli, new potatoes, milk + liver	•Scurvy (tiredness and bleeding gums) •Anaemia (not enough iron absorbed) •Bleeding under skin •Loose teeth •Wounds do not heal •Increased risk of cancer 

Vitamins that work with other vitamins or minerals:

- Vitamin C is needed to help the body absorb iron, so it can be used to collect oxygen and carry it round to all the cells in the body for energy production.
- Vitamin D is needed to help the body absorb calcium, so that it can be used to strengthen the bones and teeth and enable the nerves and muscles to work together.
- Vitamin B9 (folate) works with B12 (cobalamin) to help make healthy red blood cells.
- Vitamins B1, B2 and B3 help the body release energy from carbohydrate, fats and proteins

Groups that may need vitamin supplements:

Pregnant women – •If not eating properly due to morning sickness. •Growing baby needs iron, iodine, calcium, protein, B vitamins, which might deplete the amount needed to maintain mother's body. The baby needs to build up a store of iron and needs calcium and other minerals to develop its skeleton.

Young children—•Might not be absorbing all they need because digestive system is not fully developed. •They may have been premature and need extra nutrients to catch up. •They may have poor or small appetites or be fussy eaters, so won't eat enough of a variety of foods to get all their nutrients.

Elderly people – •They might not be absorbing all they need because their digestive system is not working as well as it used to. •They may have poor or small appetites. •They may be taking medicines that affect how much of each nutrient they absorb.

How to prevent damage and loss of vitamins to vegetables and fruit:

Storage:

- Store away from heat and light
- Store in air-tight containers in a cool place
- Store for minimum amount of time

During preparation:

- Buy undamaged and unbruised produce
- Tear rather than rip leafy vegetables
- Do not prepare too far in advance; vitamin C will be exposed to oxygen and lost when the vegetables are cut or peeled.
- Add lemon juice to prevent enzymic browning and stabilise vitamin C (ascorbic acid) in fruit.

During cooking:

- Put the into a small amount of boiling water so they cook quickly; vitamin C and B vitamins will be lost in the water.
- Cook all the vegetables for the minimum amount of time to minimise the damage by heat to vitamin C and B vitamins.
- Steaming reduces the loss of vitamin C and B vitamins to cooking water.
- Serve cooking water in the gravy to conserve some of the vitamins that have gone into it.



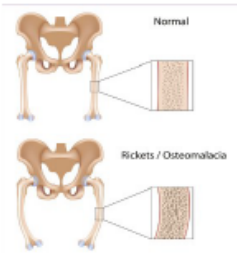
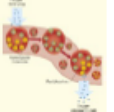



Amounts needed for different life stages:

Measured in milligrams—mg = 1/1000 of a gram OR micrograms μ = 1/1,000,000 of a gram. Daily amounts for healthy people:

Age/gender	Vitamin										
	A	D	E	K	B1	B2	B3	B9	B12	C	
Children	1–3 years	400mcg	#	–	–	0.7mg	0.6mg	–	70mcg	0.5mcg	30mg
	4–6 years	500mcg	#	–	–	0.9mg	0.8mg	–	100mcg	0.8mcg	30mg
	7–10 years	500mcg	#	–	–	1.0mg	1.0mg	–	150mcg	1.0mcg	30mg
Teenagers (male)	11–14 years	600mcg	#	–	–	1.2mg	1.2mg	–	200mcg	1.2mcg	35mg
Teenagers (female)	11–14 years	600mcg	#	–	–	1.0mg	1.1mg	–	200mcg	1.2mcg	35mg
Teenagers (male)	15–18 years	700mcg	#	–	–	1.5mg	1.3mg	–	200mcg	1.5mcg	40mg
Teenagers (female)	15–18 years	600mcg	#	–	–	1.2mg	1.1mg	–	200mcg	1.5mcg	40mg
Adults (male)	19–50 years	700mcg	#	4mg	0.001 mg for each kg body weight (all adults)	1.4mg	1.3mg	17mg	200mcg	1.5mcg	40mg
(female)	19–50 years	600mcg	#	3mg		1.2mg	1.1mg	13mg	200mcg	1.5mcg	40mg
(male)	50+ years	700mcg	^	4mg		0.9mg	1.3mg	17mg	200mcg	1.5mcg	40mg
(female)	50+ years	600mcg	^	3mg		0.8mg	1.1mg	13mg	200mcg	1.5mcg	40mg
Pregnant women		700mcg	*	–		0.9mg	1.4mg	13mg	300mcg	1.5mcg	50mg
Women lactating (breastfeeding) for up to 4 months		950mcg	*	–		1.0mg	1.4mg	13mg	260mcg	1.5mcg	70mg
Women lactating (breastfeeding) for over 4 months		950mcg	*	–		1.0mg	1.4mg	13mg	260mcg	1.5mcg	70mg

Micronutrients needed in small amounts by the body

Minerals 1.1.5

Mineral	Functions	Sources	Deficiency and excess
Calcium	<p>Strong bones and teeth; makes nerves and muscles work; helps blood clot after injury.</p> 	<p>Milk, cheese, yogurt, green leafy veg., canned fish with soft bones that are eaten e.g. salmon.</p> <p>Enriched soya drinks, wheat flour (added by law to plain white flour)</p>	<p>Rickets: caused by insufficient vitamin D in children meaning calcium cannot be absorbed and put into the bones.</p> <p>Osteomalacia: adult form of rickets</p> <p>Peak bone mass: may not be reached.</p> <p>Osteoporosis: after peak bone mass is reached, bones naturally lose minerals and weaken. Minerals are not replaced and may become fragile and easily break.</p> <p>Excess: Too much salt leads to high blood pressure and cardiovascular disease.</p>
Iron	<p>Makes haemoglobin in red blood cells to carry oxygen to produce energy in body cells.</p> 	<p>Red meat, kidneys, liver, wholemeal bread added by law to wheat flour (except wholemeal), green leafy veg. e.g. watercress, spinach, cabbage), egg yolk, dried apricots, lentils, cocoa, plain chocolate, curry powder, fortified breakfast cereals.</p>	<p>Iron deficiency anaemia; tiredness, lack of energy, weakness, pale skin complexion, weak and spilt nails.</p> <p>Excess: Poisonous if too much taken e.g. in supplements.</p>
Sodium	<p>Controls water in body, nerves and muscles.</p>	<p>Salt (sodium chloride), salted foods, cheese, yeast extract, stock cubes, gravy, and seasonings, snack foods e.g. crisps, canned fish, bacon ham, dried fish, soy sauce, salted butter, fast foods, many ready meals and take away. Baking powder used in baked goods.</p>	<p>Muscle cramps.</p> <p>Excess: high blood pressure which can put a strain on the heart + kidneys which affects how efficiently they work</p> 
Fluoride	<p>Strengthens tooth enamel and bones.</p>	<p>Seafood, fish, tea and some water supplies.</p>	<p>Weak enamel – more chance of tooth decay.</p> <p>Excess: May lead to discoloured teeth.</p>
Iodine	<p>Produces thyroxin in thyroid gland to control metabolic rate of body.</p>	<p>Seafood, vegetables and dairy foods.</p>	<p>Swelling in neck (goitre).</p>
Phosphorus	<p>With calcium for strong bones and teeth; energy release; makes cell membranes especially in the brain.</p>	<p>Wide range of foods.</p> 	<p>This is rare.</p> 

Key words:

Peak bone mass: the age at which the bones should contain the maximum amount of minerals and are at their strongest and most dense (30—35 years old)

Amounts needed for different life stages:

Teenage girls and women: need iron and vitamin C to replace iron lost in menstruation.

Boys and girls still growing: need calcium and vitamin D to enable bone growth and bone density to occur

Salt intake:

People should eat no more than 6g of salt each day. There is a concern about the amount consumed because:

- Too much sodium causes a rise in blood pressure which can lead to hypertension.
- Hypertension can lead to a risk of CVD, blood clots and strokes.
- Salt is added to many foods, e.g. cheese and salt fish, to preserve.

Added as a flavouring in foods such as fried snacks, crisps, chips, ready meals.

- Sodium also found in baking powder (sodium bicarbonate) and monosodium glutamate, which is used as a flavour enhancer in many processed and fast foods.
- Because it is in so many different foods, it is easy to eat more salt (sodium) than people realise.

Key Words

Hydrated: the body has enough water

Dehydrated: the body does not have enough water

Functions in the body:

- All cells, bodily fluids (e.g. saliva, blood, urine, digestive juices) and body tissues contain water
- Controls body temperature.
- Needed for chemical reactions in body.
- Keeps skin moist and healthy
- Removes waste products from body.

Sources:

- Drinking water (tap water).
- Naturally found in many foods (e.g. milk, milk products, fruit, vegetables, meat, fish, eggs).
- Added to many foods during preparation, cooking and processing (e.g. soup, sauces, pastries, breads, boiled rice, pasta, beans, pulses etc.).

Effects of excess:

- Substances in the blood become over-diluted.
- Vital organs in the body start to fail, e.g. heart, kidneys.
- May cause death.

Effects of deficiency:

- Thirst—the brain detects when the body is thirsty + sends a message to the mouth
- Headache—blood pressure is concentrated so as it passes through the brain results in a headache
- Dehydration – urine becomes very dark. Should be very pale yellow in colour
- Feeling weak and sick as the body's normal chemical reactions are affected
- Body overheats as it cannot cool itself down
- Confusion as dehydration affects how the brain works
- Blood pressure and heart rate change as volume of blood is reduced

Water 1.1.6

Amount needed for different life stages

In the U.K it is recommended people drink 1—2 litres of water or other fluids a day (6—8 medium glasses) but needs to be increased in hot weather or if a lot of physical exercise takes place.

Other people with increased need for water are:

- Anyone suffering from vomiting or diarrhoea (to avoid dehydration)
- Lactating (breast feeding women) for milk production.
- Elderly people, to prevent kidney problems and infection

Bottled or tap water. Which source is better for environmental sustainability?

- Bottled water is sold in plastic bottles. These use a lot of energy and non-renewable resource (oil to make plastics) and they are bad for the environment because they have to be disposed of, often in landfill sites. Some, but not all, of the plastics used are recyclable.
- Tap water has to be cleaned to make it safe to drink, which uses energy, but it does not have the same effects on environmental sustainability as the plastic bottles used for bottled water.



Ways to encourage young children to drink more water:

Provide more watery foods such as fruits, vegetables, salads.

- Add slices of fresh orange, lemon or lime, or fresh mint to tap water.
- Add fun-shaped ice cubes to tap water.
- Serve water with every meal as a regular habit.
- Adults should set an example and drink water with the child so it becomes normal behaviour.

The Eatwell Guide limits fruit juice and/or smoothies to a total of 150ml per day. This is because they are both high in sugar and acids. The sugar is 'free' sugar because it has been released from the fruit during processing and can be concentrated. This is not good for the teeth meaning the enamel can be damaged by bacteria in the mouth producing acids from the sugar and acids in the fruit. If you drink more

Urine colour chart

1		Good
2		Good
3		Fair
4		Dehydrated
5		Dehydrated
6		Very dehydrated
7		Severe dehydration

