

Principles of Nutrition Knowledge Organiser

	Function	Sources	Deficiency	Excess Side Effects	RDA
Vitamin A Retinol	<ul style="list-style-type: none"> • Healthy immune system • Good health and development in children • Helps vision in dim light • Keeps mucus membranes moist 	<ul style="list-style-type: none"> • Dairy products • Egg yolk • Oily fish • Fortified low fat spreads • Liver • Yellow, red and leafy green vegetables, spinach, carrots, sweet potato, tomatoes, peppers • Yellow fruits, mango, papaya, apricots 	<ul style="list-style-type: none"> • Can cause night blindness • Reduces ability to fight infections • Limits growth in children 	<ul style="list-style-type: none"> • Can affect bone health, causing increased fractures • Pregnant women should avoid liver and liver-based foods due to possibility of birth defects 	<ul style="list-style-type: none"> • Men: 0.7 mg • Women: 0.6mg

	Function	Sources	Deficiency	Excess Side Effects	RDA
Vitamin D The Sunshine Vitamin	<ul style="list-style-type: none"> • Formation of strong bones • Helps control amount of calcium absorbed from food 	<ul style="list-style-type: none"> • Oily fish • Eggs • Liver • Fortified foods – breakfast cereals, margarines, supplements 	<ul style="list-style-type: none"> • Can lead to rickets due to poor absorption of calcium • Weak bones and teeth • Extreme cases can lead to heart failure 	<ul style="list-style-type: none"> • Kidney damage • Hyperglycemia in infants 	<ul style="list-style-type: none"> • 0.1mg • (naturally available in the summer through sunlight)

Fat Soluble Vitamins (Vitamins A, D, E and K)

The body needs access to these every day to function. Fat soluble vitamins are stored in the liver and fatty tissue to be used when needed.

Water Soluble Vitamins (B Vitamins and Vitamin C)

These vitamins dissolve in water – we need these daily as they are not stored in the body.

Micronutrients

- are vitamins, minerals and trace elements that the body needs in small amounts
- are measured in milligrams or micrograms



Vitamin E Tocopherol	Function	Sources	Deficiency	Excess Side Effects	RDA
	<ul style="list-style-type: none"> Acts as an antioxidant protecting the body from disease Strengthens immune system Helps maintain healthy skin and eyes 	<ul style="list-style-type: none"> Plant oils, soya, corn, olive oil Nuts, seeds, wheatgerm Milk Egg yolk Polyunsaturated spreads and oils 	<ul style="list-style-type: none"> Very rare – but can lead to weak muscles 	<ul style="list-style-type: none"> Headaches Nausea Can affect blood coagulation 	<ul style="list-style-type: none"> Men: 4mg Women: 3mg

Vitamin K	Function	Sources	Deficiency	Excess Side Effects	RDA
	<ul style="list-style-type: none"> Helps blood clotting Supports healing of wounds Good bone health 	<ul style="list-style-type: none"> Leafy green vegetables Cauliflower Liver Bacon Cereals Vegetable oils Small amounts found in meats and dairy 	<ul style="list-style-type: none"> Rare – can cause uncontrolled bleeding in infants 	<ul style="list-style-type: none"> Any vitamin K the body doesn't need immediately is stored for future use 	<ul style="list-style-type: none"> 0.0001 mg for every kg of body weight

Vitamin B1 Thiamin	Function	Sources	Deficiency	Excess Side Effects
	<ul style="list-style-type: none"> Releases energy from high carbohydrate foods Promotes healthy nervous system Supports healthy growth in childhood 	<ul style="list-style-type: none"> Red meat Wholegrain cereals Yeast and yeast extract Dairy products Fresh and dried fruits Eggs Seeds, nuts, beans Fortified breakfast cereals 	<ul style="list-style-type: none"> Muscle wasting disease Tiredness 	<ul style="list-style-type: none"> Headaches Nausea Can affect blood coagulation

Vitamin B2 Riboflavin	Function	Sources	Deficiency	Excess Side Effects
	<ul style="list-style-type: none"> Releases energy from food Helps support growth in childhood Keeps skin, eyes and the nervous system healthy 	<ul style="list-style-type: none"> Red meat Yeast and yeast extract Dairy products Eggs Rice Mushrooms Fortified breakfast cereals Wheat products 	<ul style="list-style-type: none"> Can cause swollen tongue Dry skin and sores around the corners of the mouth 	<ul style="list-style-type: none"> Rare – but increased risk of kidney stones

Vitamin B3 Niacin	Function	Sources	Deficiency	Excess Side Effects
	<ul style="list-style-type: none"> Releases energy from food Keeps skin and nervous system healthy Helps lower the levels of fat in the blood Amino acid 'tryptophan' can be converted into niacin in the body 	<ul style="list-style-type: none"> Red meat Liver Wholegrain cereals Yeast and yeast extract Dairy products Eggs Seeds, nuts, beans Fortified breakfast cereals Wheat products 	Pellagra – can cause diarrhoea, rough scaly and sore skin, confusion, memory loss	<ul style="list-style-type: none"> Over time, can cause liver damage

Vitamin K	Function	Sources	Deficiency	Excess Side Effects	RDA
	<ul style="list-style-type: none"> Helps blood clotting Supports healing of wounds Good bone health 	<ul style="list-style-type: none"> Leafy green vegetables Cauliflower Liver Bacon Cereals Vegetable oils Small amounts found in meats and dairy 	Rare – can cause uncontrolled bleeding in infants	<ul style="list-style-type: none"> Any vitamin K the body doesn't need immediately is stored for future use 	<ul style="list-style-type: none"> 0.0001 mg for every kg of body weight

Vitamin B5 Pantothenic Acid	Function	Sources	Deficiency	Excess Side Effects
	<ul style="list-style-type: none"> Releases energy from fat and carbohydrate 	<ul style="list-style-type: none"> Beef, chicken, liver, kidney Wholegrains, Yeast Potatoes Broccoli Tomatoes eggs 	<ul style="list-style-type: none"> Unlikely due to it being in a lot of food sources 	<ul style="list-style-type: none"> Unlikely, but may lead to diarrhoea, dehydration, heartburn and nausea

Vitamin B6 Pyridoxine	Function	Sources	Deficiency	Excess Side Effects
	<ul style="list-style-type: none"> Nerve function Brain development Helps body use protein Supports the formation of hemoglobin 	<ul style="list-style-type: none"> Red meat, liver, kidney Chicken, pork Eggs Soya beans Yeast and yeast extract Wholegrain cereal Peanuts, walnuts 	<ul style="list-style-type: none"> Unusual, but can lead to anaemia and weakness 	<ul style="list-style-type: none"> Over time, could lead to loss of arms and legs

	Function	Sources	Deficiency	Excess Side Effects
Vitamin B7 Biotin	<ul style="list-style-type: none"> Metabolism of fat Production of energy Metabolism of protein Strengthens hair and nails 	<ul style="list-style-type: none"> Kidney, liver Egg yolk Dried fruit Raspberries Avocado Cauliflower Fish Peanuts Soya beans Milk 	If large quantities of egg white are consumed – it combines with biotin to make it unavailable to the body	<ul style="list-style-type: none"> No toxic side effects

	Function	Sources	Deficiency	Excess Side Effects
Vitamin B9 Folate Folic Acid	<ul style="list-style-type: none"> Release energy from food – especially protein Works with vitamin B12 to form healthy red blood cell Helps reduce the formation of spina bifida 	<ul style="list-style-type: none"> Leafy green vegetables Potatoes Beans, seeds, nuts Oranges, berry fruits Yeast extract 	<p>Anaemia - nausea, loss of appetite, diarrhoea</p> <p>Tiredness and muscle weakness</p> <p>Lack of folate can cause spina bifida</p>	<ul style="list-style-type: none"> High doses can cause stomach upsets, trouble sleeping and skin reactions

	Function	Sources	Deficiency	Excess Side Effects
Vitamin B12 Cobalamin	<ul style="list-style-type: none"> Making red blood cells Keeps the nervous system healthy Releases energy from food Processing folic acid 	<ul style="list-style-type: none"> Liver, meat Fish Eggs Milk and cheese Fortified breakfast cereal Yeast 	<ul style="list-style-type: none"> Anaemia Fatigue, depression Long-term damage to nervous system and brain Vegans need to supplement their diet with fortified foods 	<ul style="list-style-type: none"> No toxic side effects

	Function	Sources	Deficiency	Excess Side Effects
Vitamin C Ascorbic Acid	<ul style="list-style-type: none"> Helps absorb iron from foods Needed for formation of collagen Helps resist infection Helps wounds heal 	<ul style="list-style-type: none"> Fruits, citrus, kiwi, blackberries, tomatoes Dark green leafy vegetables Potatoes 	<ul style="list-style-type: none"> Extreme cases – scurvy Bleeding gums, wounds not healing, general tiredness Anaemia 	<ul style="list-style-type: none"> Excess vitamin C gets flushed out with urine

Minerals

Function	Sources	Deficiency	Excess Side Effects
<p>Calcium Ca</p> <ul style="list-style-type: none"> Forms, strengthens and maintains healthy bones and teeth Supports blood clotting Helps nerves and muscles working properly Help with growth in children 	<ul style="list-style-type: none"> Dairy foods Leafy green vegetables Wholegrain cereals Soya drinks with added calcium Fish with edible bones, sardines, pilchards Bread made with fortified flour 	<ul style="list-style-type: none"> Can cause rickets Osteoporosis Those at higher risk – diet free from lactose or cow's milk, coeliac disease, osteoporosis, breastfeeding, past menopause 	<ul style="list-style-type: none"> Higher doses could lead to stomach pain and diarrhoea Calcium buildup in kidneys could be fatal

Function	Sources	Deficiency	Excess Side Effects
<p>Iron Fe</p> <ul style="list-style-type: none"> Helps make haemoglobin 	<ul style="list-style-type: none"> Red meat Wholegrain cereals Leafy green vegetables Beans, nuts Dried fruits, raisins, apricots 	<ul style="list-style-type: none"> Anaemia – lethargy, pale complexion Must be combined with vitamin C in order to effectively be absorbed 	<ul style="list-style-type: none"> Constipation Vomiting Stomach pain Nausea

Function	Sources	Deficiency	Excess Side Effects
<p>Potassium K</p> <ul style="list-style-type: none"> Helps balance body fluids Helps to lower blood pressure Keeps heart healthy Improves bone health Helps prevent muscle cramps 	<ul style="list-style-type: none"> Fruits and vegetables Pulses, nuts and seeds Fish, shellfish Beef Chicken, turkey Coffee Salt substitutes 	<ul style="list-style-type: none"> Diarrhoea Heart failure 	<ul style="list-style-type: none"> Stomach pains Nausea Diarrhoea Excess is excreted through the kidneys

Function	Sources	Deficiency	Excess Side Effects
<p>Phosphorus P</p> <ul style="list-style-type: none"> Helps build strong bones and teeth Works with calcium Important for energy release 	<ul style="list-style-type: none"> Animal and plant based foods Red meat Diary Fish Poultry Bread Brown rice Oats 	<ul style="list-style-type: none"> Unlikely due to being in so many foods but can cause weak muscles and painful bones 	<ul style="list-style-type: none"> Can trigger involuntary muscles spasms Diarrhoea and stomach pain Over time, can reduce amount of calcium being absorbed resulting in fractured bones

	Function	Sources	Deficiency	Excess Side Effects
Magnesium Mg	<ul style="list-style-type: none"> • Bone development • Helps nervous system • Important for energy release 	<ul style="list-style-type: none"> • Meat • Fish • Dairy foods • Wholegrain cereals • Nuts and seeds • Leafy green vegetables 	<ul style="list-style-type: none"> • Rare, but can lead to loss of appetite, nausea, vomiting, fatigue • Can cause high blood pressure and heart disease 	<ul style="list-style-type: none"> • Diarrhoea



	Function	Sources	Deficiency	Excess Side Effects
Sodium Na	<ul style="list-style-type: none"> • Helps control amount of water in the body • Helps body use energy • Helps control nerves and muscles 	<ul style="list-style-type: none"> • Salt • Processed foods • Crisps, ready meals • Ham, kippers, sausages • Some breakfast cereals • Yeast extracts • Stock cubes 	<ul style="list-style-type: none"> • Muscles cramps 	<ul style="list-style-type: none"> • High blood pressure • Heart and kidney damage • Stroke

Trace Elements

	Function	Sources	Deficiency	Excess Side Effects
Iodine I	<ul style="list-style-type: none"> Helps make thyroid hormone 	<ul style="list-style-type: none"> Sea fish, shellfish, seaweed Dairy products Plant foods Cereals and grains 	<ul style="list-style-type: none"> Body doesn't make enough thyroid hormone In pregnancy can lead to baby's brain not developing Vegetarians and vegans are at risk of deficiency 	<ul style="list-style-type: none"> Can affect the way the thyroid gland works

	Function	Sources	Deficiency	Excess Side Effects
Zinc Zn	<ul style="list-style-type: none"> Helps maintain immune system Helps fight infection and disease Helps wounds heal and blood to clot Keeps skin healthy 	<ul style="list-style-type: none"> Meat Dairy foods Eggs Shellfish Pulses Wholegrain cereals White bread Breakfast cereals Fermented soya 	<ul style="list-style-type: none"> Poor growth in children 	<ul style="list-style-type: none"> Reduces the amount of copper the body can absorb – can lead to anaemia and weakening of bones

	Function	Sources	Deficiency	Excess Side Effects
Fluoride F ⁻	<ul style="list-style-type: none"> Helps harden tooth enamel and prevent decay 	<ul style="list-style-type: none"> Tea Sea fish Vegetables Tap water (in the UK) 	<ul style="list-style-type: none"> Tooth decay 	<ul style="list-style-type: none"> Discoloration of teeth

	Function	Sources	Deficiency	Excess Side Effects
Selenium Se	<ul style="list-style-type: none"> Supports the thyroid hormone Helps the immune system function properly Acts as an antioxidant Helps prevent heart disease 	<ul style="list-style-type: none"> Red meat Fish Cereals Eggs Brazil nuts 	<ul style="list-style-type: none"> Depression 	<ul style="list-style-type: none"> Causes selenosis – loss of hair, skin and nails