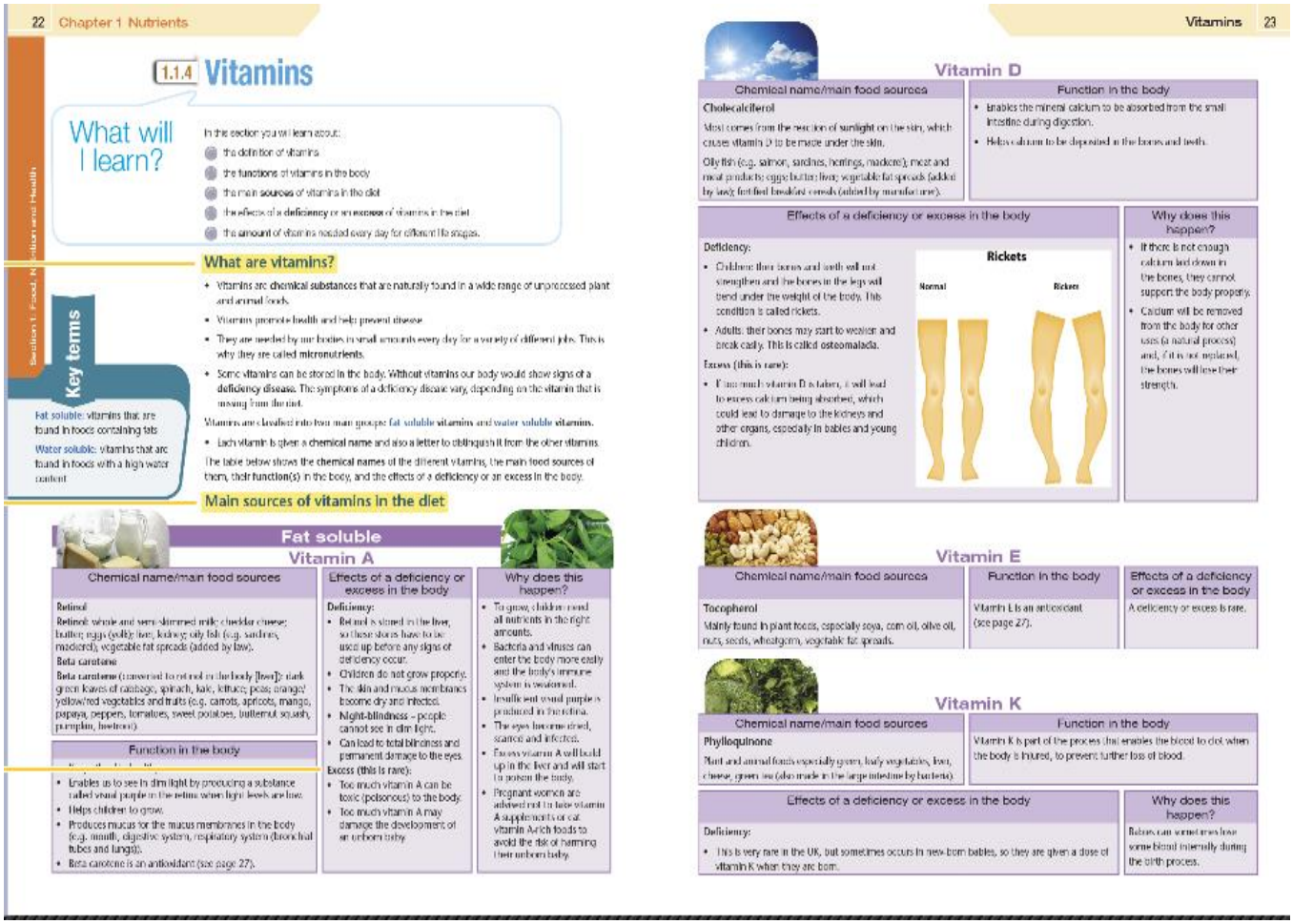

22 Chapter 1 Nutrients

Section 1: Food, Nutrition and Health

1.1.4 Vitamins

What will I learn?

In this section you will learn about:

- the definition of vitamins
- the functions of vitamins in the body
- the main sources of vitamins in the diet
- the effects of a deficiency or an excess of vitamins in the diet
- the amount of vitamins needed every day for different life stages.

Key terms

Fat soluble: vitamins that are found in foods containing fats

Water soluble: vitamins that are found in foods with a high water content

What are vitamins?

- Vitamins are chemical substances that are naturally found in a wide range of unprocessed plant and animal foods.
- Vitamins promote health and help prevent disease.
- They are needed by our bodies in small amounts every day for a variety of different jobs. This is why they are called micronutrients.
- Some vitamins can be stored in the body. Without vitamins our body would show signs of a deficiency disease. The symptoms of a deficiency disease vary, depending on the vitamin that is missing from the diet.

Vitamins are classified into two main groups: fat soluble vitamins and water soluble vitamins.

- Each vitamin is given a chemical name and also a letter to distinguish it from the other vitamins.

The table below shows the chemical names of the different vitamins, the main food sources of them, their function(s) in the body, and the effects of a deficiency or an excess in the body.

Main sources of vitamins in the diet

Fat soluble

Vitamin A

Chemical name/main food sources	Effects of a deficiency or excess in the body	Why does this happen?
Retinol Retinol: whole and semi-skimmed milk; cheddar cheese; butter; eggs (yolk); liver; kidney; oily fish (e.g. sardines, mackerel); vegetable fat spreads (added by law). **Beta carotene** Beta carotene (converted to retinol in the body [liver]): dark green leaves of cabbage, spinach, kale, lettuce; peas; orange/yellow/red vegetables and fruits (e.g. carrots, apricots, mango, papaya, peppers, tomatoes, sweet potatoes, butternut squash, pumpkin, beetroot).	**Deficiency:** • Retinol is stored in the liver, so these stores have to be used up before any signs of deficiency occur. • Children do not grow properly. • The skin and mucous membranes become dry and infected. • Night-blindness – people cannot see in dim light. • Can lead to total blindness and permanent damage to the eyes. **Excess (this is rare):** • Too much vitamin A can be toxic (poisonous) to the body. • Too much vitamin A may damage the development of an unborn baby.	• To grow, children need all nutrients in the right amounts. • Bacteria and viruses can enter the body more easily and the body's immune system is weakened. • Insufficient visual purple is produced in the retina. • The eyes become dried, scarred and infected. • Excess vitamin A will build up in the liver and will start to poison the body. • Pregnant women are advised not to take vitamin A supplements or eat vitamin A-rich foods to avoid the risk of harming their unborn baby.

Function in the body

- Enables us to see in dim light by producing a substance called visual purple in the retina when light levels are low.
- Helps children to grow.
- Produces mucus for the mucus membranes in the body (e.g. mouth, digestive system, respiratory system [bronchial tubes and lungs]).
- Beta carotene is an antioxidant (see page 27).

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Vitamin D

Chemical name/main food sources	Function in the body
Cholecalciferol Most comes from the reaction of sunlight on the skin, which causes vitamin D to be made under the skin. Oily fish (e.g. salmon, sardines, herrings, mackerel); meat and meat products; eggs; butter; liver; vegetable fat spreads (added by law); fortified breakfast cereals (added by manufacturer).	• Enables the mineral calcium to be absorbed from the small intestine during digestion. • Helps calcium to be deposited in the bones and teeth.

Effects of a deficiency or excess in the body	Why does this happen?
Deficiency: • Children: their bones and teeth will not strengthen and the bones in the legs will bend under the weight of the body. This condition is called rickets. • Adults: their bones may start to weaken and break easily. This is called osteomalacia. **Excess (this is rare):** • If too much vitamin D is taken, it will lead to excess calcium being absorbed, which could lead to damage to the kidneys and other organs, especially in babies and young children.	• If there is not enough calcium laid down in the bones, they cannot support the body properly. • Calcium will be removed from the body for other uses (a natural process) and, if it is not replaced, the bones will lose their strength.

Vitamin E

Chemical name/main food sources	Function in the body	Effects of a deficiency or excess in the body
Tocopherol Mainly found in plant foods, especially soya, corn oil, olive oil, nuts, seeds, wheatgerm, vegetable fat spreads.	Vitamin E is an antioxidant (see page 27).	A deficiency or excess is rare.

Vitamin K

Chemical name/main food sources	Function in the body
Phylloquinone Plant and animal foods especially green, leafy vegetables, liver, cheese, green tea (also made in the large intestine by bacteria).	Vitamin K is part of the process that enables the blood to clot when the body is injured, to prevent further loss of blood.

Effects of a deficiency or excess in the body	Why does this happen?
Deficiency: • This is very rare in the UK, but sometimes occurs in new-born babies, so they are given a dose of vitamin K when they are born.	Babies can sometimes lose some blood internally during the birth process.

ERIC 1b Article taken from digital text book (www.illuminate.digital/aqafood)