

Food Technology—Yr. 11: Macronutrients 1 — Carbohydrates

Macronutrients

Macro means big they are needed in **greater** amounts (g = gram)

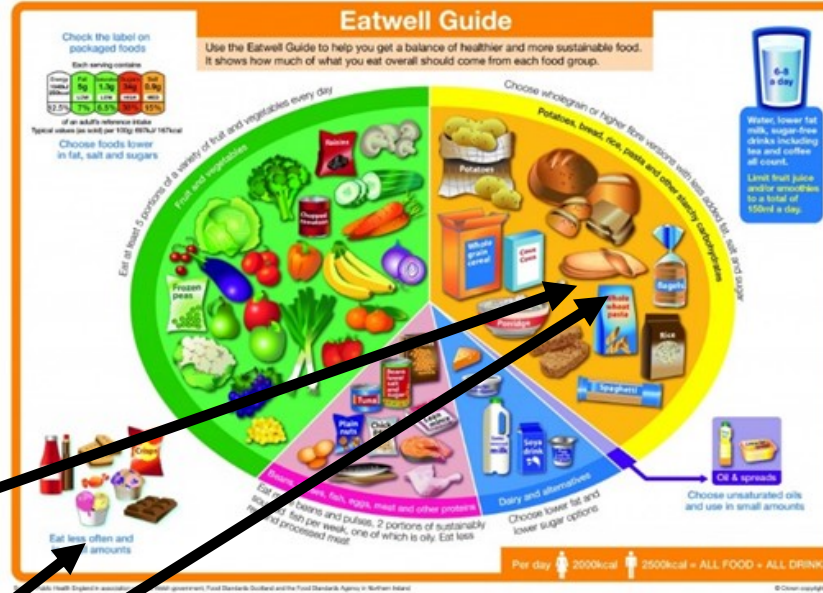
Carbohydrate—the **primary** source of energy.

There are **3 types** of carbohydrate:

Starches are complex carbohydrates (polysaccharides), they take longer to be broken down and converted into energy.

Sugars are **simple carbohydrates** (monosaccharides or disaccharides), they are **easily broken down** and **quickly absorbed** into the bloodstream, providing an **instant burst of energy**.

Dietary fibre is a **complex carbohydrate** (polysaccharide) which **cannot be broken down** by the digestive system.



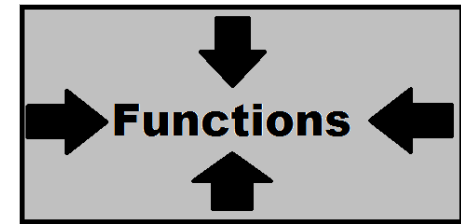
Of your diet should be from complex **carbohydrates**. Most meals should be based on starchy carbohydrates

- Dietary fibre**
- Maintains a healthy digestive system
 - Aids weights control (feel fuller for longer)
 - Can prevent some bowel diseases
 - Can reduce cholesterol through soluble fibre

Key words to look up

- Saccharides
- Simple/Complex
- Simple/Fruit /Double sugars
- Free/Hidden sugars
- Soluble/Insoluble fibre
- Protein sparing

- Sugar**
- Source of quick release energy bursts



- Starch**
- Source of slow release, longer lasting energy
 - Stops the body using protein as a main energy source (protein sparing)

If it ends in **-ose** it's **sugar**

Fact

The reason free/double sugars are not included in the Eatwell guide is that you should get all the sugar you need from simple/Double sugars.

Glucose; Fructose; Lactose; Maltose



DEFICIENCY

- Lack of energy (starch)
- Constipation and increased risk of **bowel cancer** (Dietary fibre)

F.Y.I.

Mono = 1, **Di** = 2, **Poly** = Many (2+)

EXCESS

- Tooth decay and **weight gain** (sugar)
- Weight gain** if inactive (Starches)
- Prevent absorption of iron and calcium (Dietary fibre)

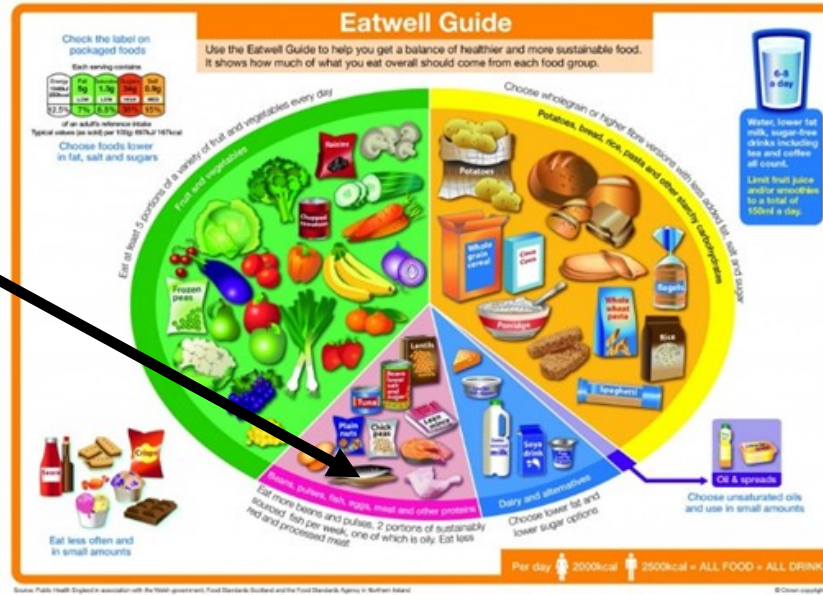
Food Technology—Yr. 11: Macronutrients 2 — Protein

Macronutrients

Macro means big they are needed in **greater** amounts (g = gram)

Protein—is needed for many functions in the body including:

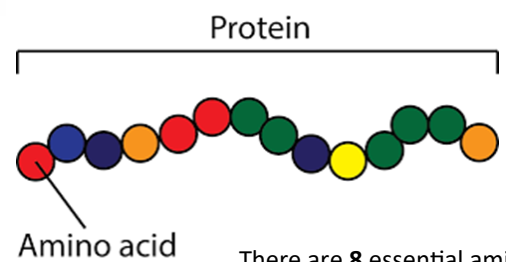
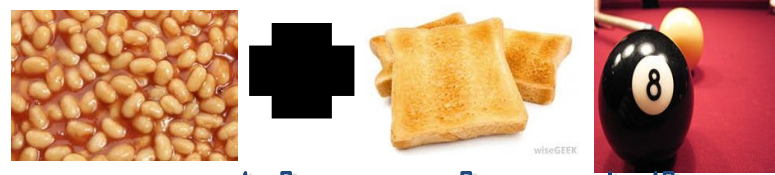
- **growth of all cells and tissue**
- **Repair and maintenance of body tissue**
- **third source of energy**
- **makes hormones, enzymes and antibodies**



High Biological Value (HBV)	Low Biological Value (LBV)
Meat	Plants
Poultry	Legumes
Fish	Grains
Eggs	Nuts
Milk (cow, goat, soya)	Seeds
Cheese	Beans
Yogurt	Vegetables

12%

12% of your diet should be from protein with an emphasis on more sustainable protein foods beans and pulses rather than animal based sources



protein complementation

Amino acids

There are **8** essential amino acids which you have to get through your diet

DEFICIENCY

EXCESS

Proteins are large molecules that form chains. Each link in the chain is an amino acid.

There are 20 amino acids, some non-essential and some essential.

20

Non-essential amino acids
Are made by the body and always available



Essential amino acids

Cannot be made by the body and must come from the food you eat

Kwashiorkor disease:
Poor growth, hair loss, water retention in body



Harmful to kidneys and liver
Can lead to obesity

Key words to look up

- Protein complementation
- Amino acids
- Essential/Non-essential
- HBV
- LBV

HBV foods have all

Food Technology—Yr. 11: Macronutrients 3 — Fats

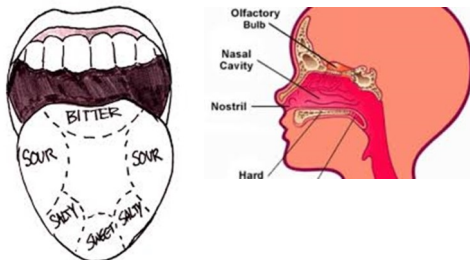
Macronutrients

Macro means big they are needed in

Fat is the **secondary source of energy**. It also

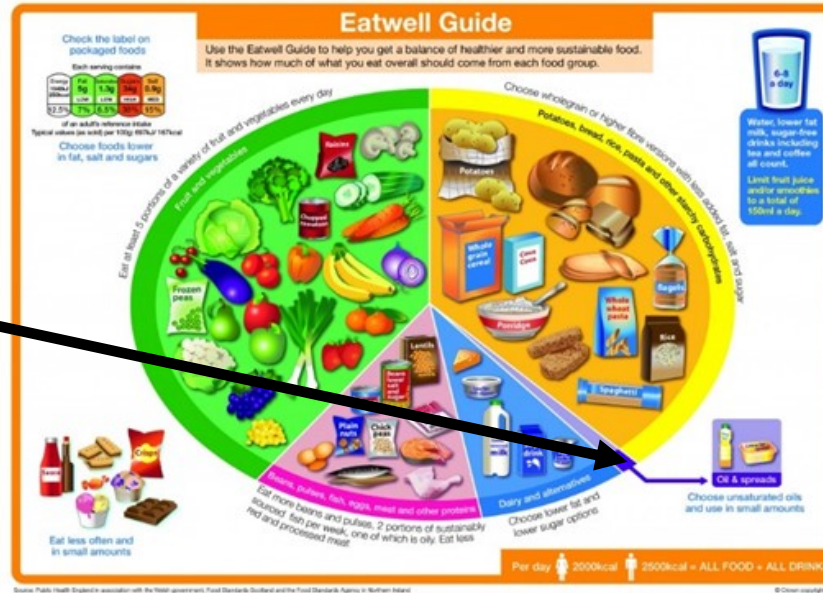
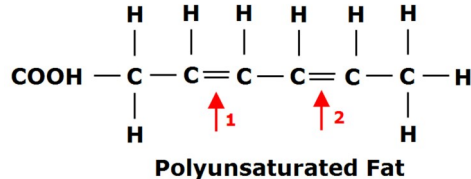
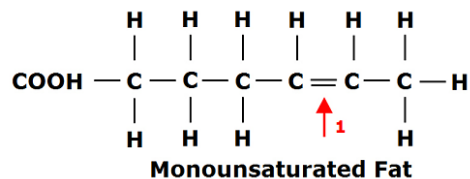
- keeps us warm,
- protects internal organs
- makes body cells
- provides fat soluble vitamins and essential fatty acids

Fats also play an important role in improving the **sensory characteristics** of food. They can improve the flavour, texture, colour and aroma of foods.

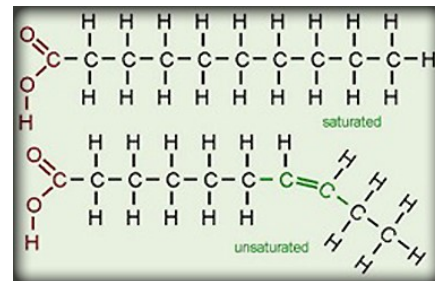


Fats can make food **crispy, crumbly and moist**.

Essential fatty acids must be obtained through diet as the body cannot make them. These include omega 3 and omega 6.



The chemical name for a fat is a triglyceride, this is made of three fatty acids and one glycerol. The fatty acids can be either saturated (full up) or unsaturated (not full up) with hydrogen atoms.



The reason oils are liquid is because they are not full up (rigid) with hydrogen atoms.

No more than 35% of your energy should come from Fat...

There are 2 types of unsaturated fats: **Monounsaturated** and **Polyunsaturated**. Mono have **one double bond** and poly have **two or more double**

DEFICIENCY

- Weight loss
- Deficiency in Fat soluble vitamins

EXCESS

- Weight gain (obesity)
- Diabetes
- High blood pressure/Heart disease



Fats are **solid** at room temperature.

They are more likely to come from an **animal source** and to be **saturated**



Oils are **liquid** at room temperature.

They are more likely to come from a **vegetable source** and to be **unsaturated**

Key words to look up

- Saturated/unsaturated
- Monounsaturated
- Polyunsaturated
- Hydrogenation
- Visible/Invisible
- Trans fats



Fats can be **visible** or **invisible**



Food Technology—Yr. 11: Micronutrients 1 — Fat soluble vitamins

Micronutrients

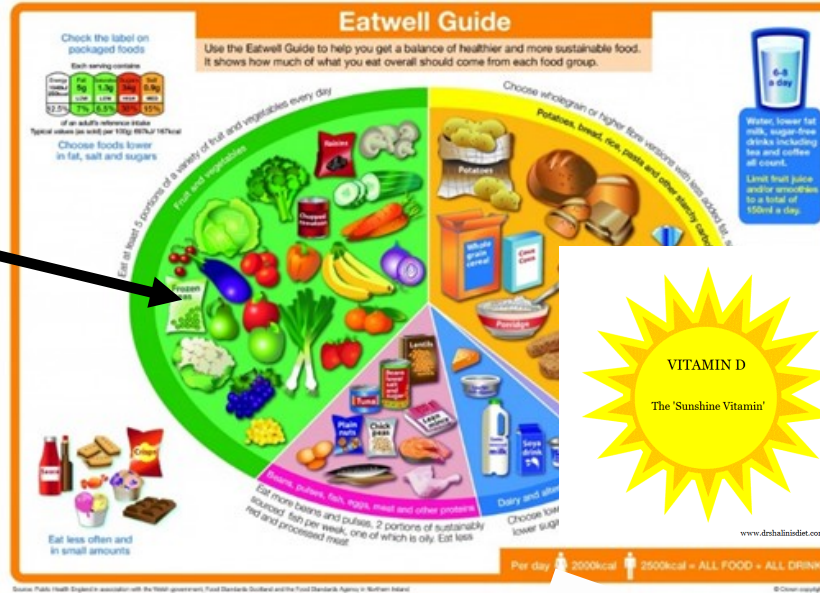
Micro means **tiny** they are needed in **smaller amounts** (mg = milligram and mcg = microgram)

Vitamins can be divided into **two types**:

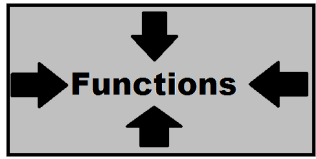
Fat soluble—Can be stored in the body so are generally needed in smaller amounts (mcg)

Water soluble—Cannot be stored in the body so must be **obtained regularly through the food** you eat (mg)

The key difference between a vitamin and a mineral is that vitamins are **organic**, meaning they come from **living things: plants and animals...**



vitamin
A



DEFICIENCY

EXCESS

A

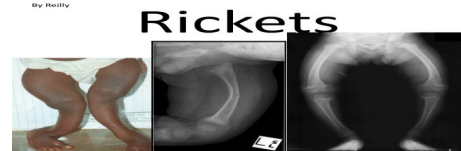
Vision, Skin, Antioxidant



Can be poisonous...

D

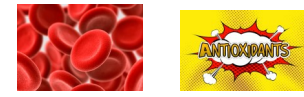
Absorption of calcium, Bone health



Doesn't really happen...

E

Blood cells, Antioxidant

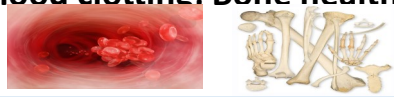


Very rare

Loss of appetite

K

Blood clotting. Bone health



Results not known



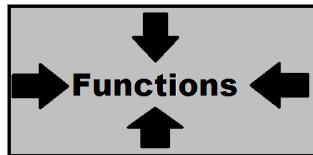
Food Technology—Yr. 11: Micronutrients 1 — Water soluble vitamins

Water soluble vitamins **cannot be stored** in the body so need to be eaten regularly.

Water soluble means they can **dissolve in water**, this means that:

Foods containing these vitamins need to be prepared and cooked with care as **soaking, boiling or simmering in water** will cause the vitamins to leach out (wash away).

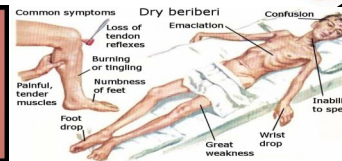
This is why you should **cook** vegetables in as **little water** as possible and for as **little time** as possible. Hence the reason steaming vegetables is considered a healthier way of cooking.



DEFICIENCY

B₁

Release energy, nervous system



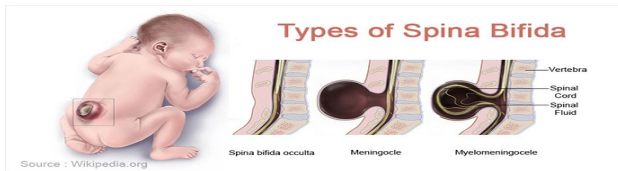
B₂

Release energy, skin, eyes

Skin problems,
Dry cracked lips
Poor growth (children)

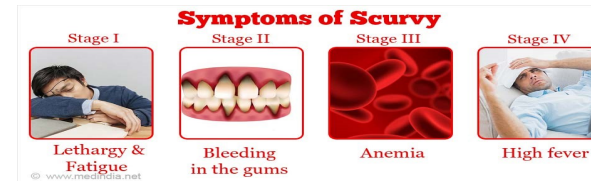
Folic acid

Prevents nervous system defects in babies, blood



C

Absorption of iron, helps wounds heal, antioxidant



N/A

Because they are water soluble, so can't be stored and are easily diluted



Food Technology—Yr. 11: Micronutrients 3 — Antioxidants



vitamin
A

Micronutrients

Antioxidants help to protect healthy cells from the damage done by free radicals

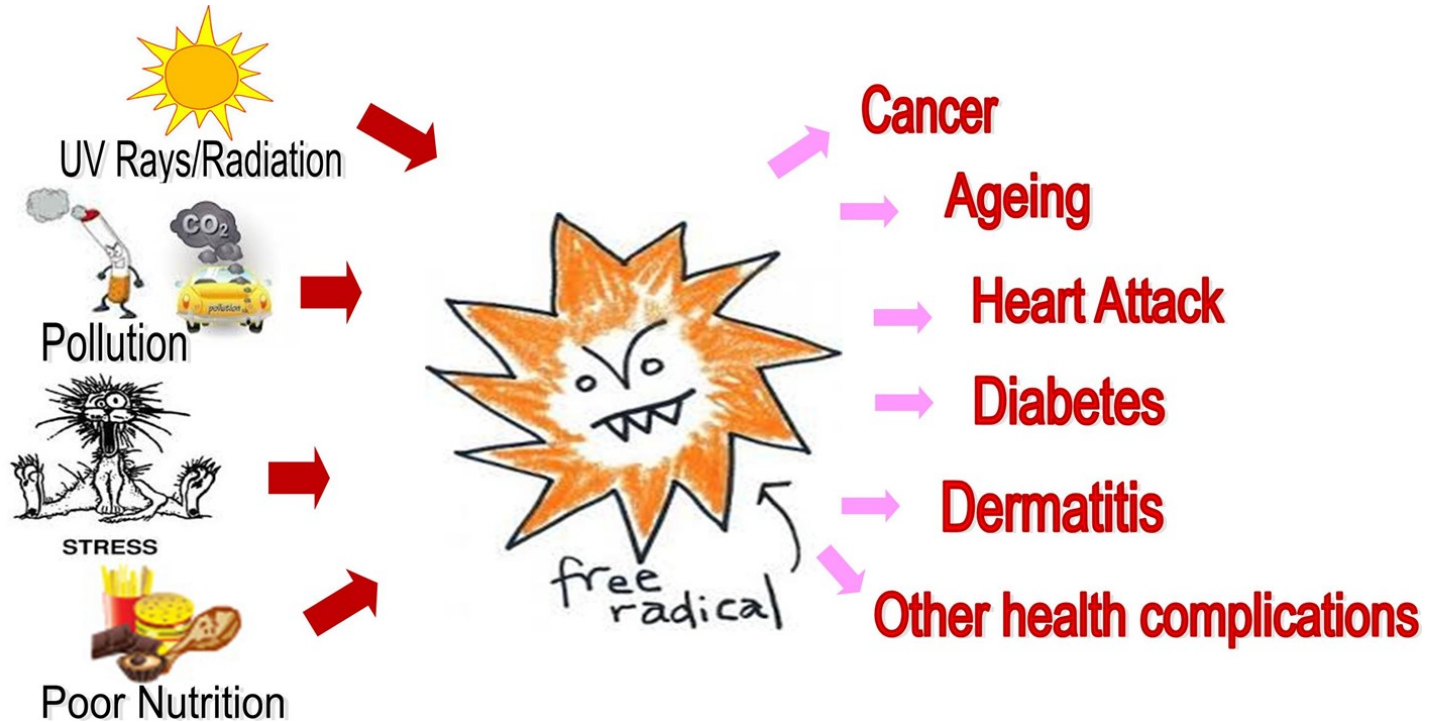
Vitamins **A, C and E** are all antioxidants.

All **bodily functions** and can produce substances called **free radicals** that can **attack healthy cells**. **Fruits, nuts, vegetables and wholegrains** contain **large amounts of antioxidants**



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**ANTIOXIDANTS:
SUPERHEROS
FIGHTING
FREE RADICALS**



Food Technology—Yr. 11: Micronutrients 4 — Minerals

Micronutrients

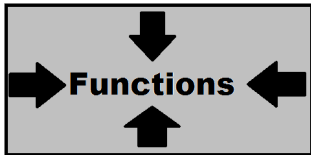
Micro means **tiny** they are needed in **smaller amounts** (mg = milligram and mcg = microgram)

Minerals come from **inorganic** sources, usually from **elements or compounds of elements** (chemistry), rather than from living plants/animals.

Some minerals are needed in greater quantity, for example calcium

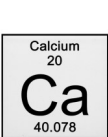
They are measured in:

Mg: Calcium and Iron, g: Sodium, Mcg: Iodine. You should obtain all the sodium you need naturally from foods.



DEFICIENCY

EXCESS



Bones, teeth, blood clotting



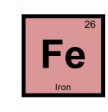
Rickets (children)

Osteoporosis



Stomach pain

Diarrhoea

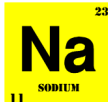


Makes red blood cells to carry oxygen



Iron deficient anaemia: tiredness, pale, dizzy, short of breath...

Constipation, feeling sick and stomach pain



Keeps level of water in body balanced



Increased blood pressure, stroke, heart attack

Muscle cramps



Minerals can be obtained from multiple sections of the Eatwell guide, e.g. calcium is associated with dairy products, but is also present in bread, green leafy vegetables, nuts, tofu and soya. Everyone thinks of red meat and eggs as a good source of iron but it is also present in nuts, beans, dried fruits and green leafy vegetables. This is good news for vegans.

Food Technology—Yr. 11: Micronutrients 5 — More minerals...

Micronutrients

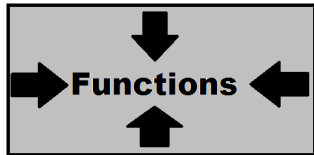
Micro means **tiny** they are needed in **smaller amounts** (mg = milligram and mcg = microgram)

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Phosphorus and fluoride are measured in mg, Iodine in mcg.



Fluoride is added to toothpaste to combat tooth decay. And sometimes even to the



Makes hormone thyroxine for a healthy metabolic rate

Goitre (swelling of the thyroid gland)



Affects thyroid gland, can cause weight gain



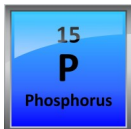
Helps to prevent tooth decay by strengthening tooth enamel

Supports bone health



Staining

Pitted teeth



Bones and teeth are made of calcium phosphate

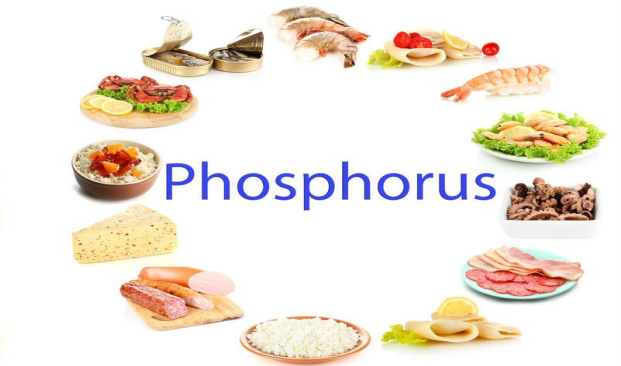
Releases energy from food

Unlikely as found in so many foods

Reduces amount of calcium in body, meaning more fractures

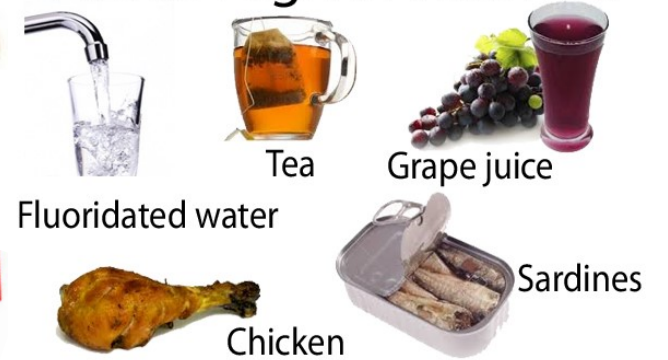


Iodine Rich Foods



Phosphorus

Foods High in Fluoride



Fluoridated water

Tea

Grape juice

Chicken

Sardines

DEFICIENCY

EXCESS

