

## Type of Sugar

### **Simple (sugary)**

carbohydrates - are rapidly digested causing blood sugar levels rise quickly e.g. Cakes, biscuits, sweets, jam



### **Free Sugar**

Free sugars are those added to food during manufacture, or those naturally present in honey, syrups and unsweetened fruit juices, but exclude lactose in milk and milk products as well as those sugars contained in fruit that is still intact - i.e. not juiced.

It has been recommended that free sugars account for no more than **5% of daily energy intake**.

- 19g or 5 sugar cubes for children aged 4 to 6.
- 24g or 6 sugar cubes for children aged 7 to 10.
- 30g or 7 sugar cubes for 11 years and over

### **Why are free sugars a problem?**

They pose a greater risk of tooth decay and obesity. Added sugar is unnecessary for a healthy diet

### **Ways to reduce free sugars**

- Learn to read nutritional labels
- Gradually reduce adding sugar to become used to it
- Try new flavours such a fresh herbs and spices
- Use naturally sweet foods

## The Nutrition and Health of Carbohydrates

### SIMPLE SUGARS

**Carbohydrate is a macronutrient needed by all animals. It is made by green plants during a process called photosynthesis.**  
Carbohydrates give us energy to keep our muscles and organs working.

### Classifications of Simple sugars

MONOSACCHARIDES – simplest form of a carbohydrate structure

**Glucose** - ripe fruits and veg

**Fructose** – fruits, veg, HFCS

**Galactose** – milk from mammals



DISACCHARIDES - two monosaccharides join together.

**Sucrose** - extracted from cane sugar

**Maltose** - cereals, malt extract

**Lactose** – milk from mammals



sucrose

### Fruit juice VS whole Fruit

- Many drinks contain high levels of sugars and acid so Limit fruit juice to 150ml a day
- It is better to eat a piece of fruit as it exercises jaw muscles and includes extra fibre
- **Intrinsic** sugars are naturally in the food – these have to be digested before sugars are released into the bloodstream
- Free sugars raise blood sugar levels – if this happens a lot over a period of time, it will put stress on the pancreas and could lead to Type 2 Diabetes

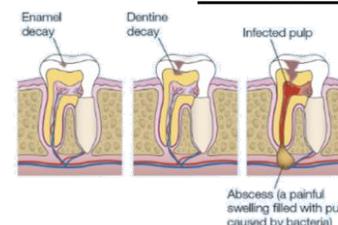
## Diabetes

**Type 2 diabetes is a common condition** that causes the level of sugar (glucose) in the blood to become too high. We all need insulin to live. It does an essential job. It allows the glucose in our blood to enter our cells and fuel our bodies. When you have Type 2 diabetes, your body still breaks down carbohydrate from your food and drink and turns it into glucose. The pancreas responds to this by releasing insulin. But because this insulin can't work properly, blood glucose (also called sugar) levels keep rising. So more insulin is released. For some people with Type 2 diabetes this can eventually tire the pancreas out, meaning their body makes less and less insulin. This causes even higher blood sugar levels.

### **Risk factors**

- Risk increase with age. You're more at risk if you're white and over 40 or over 25 if you're African-Caribbean, Black African, or South Asian.
- You're two to six times more likely to get Type 2 diabetes if you have a parent, brother, sister or child with diabetes.
- You're more at risk if you've ever had high blood pressure
- You're more at risk of Type 2 diabetes if you're overweight, especially if you're large around the middle.

## Tooth Decay



**Fluoride** (mineral) strengthens bones and enamel in teeth to help prevent tooth decay.

Limit sugary foods, keep them to mealtimes

- Drinks can be very high in sugar and acid
- Better to drink water/milk
- Avoid sugary snacks
- Brush teeth twice a day for 2 mins

## Free Sugars

UK recommendation = should not exceed **5%** of total energy from food and drinks ✓

**How can I reduce free sugar intake?**



Swap sugary drinks for water



Swap to lower sugar breakfast cereals (or porridge), and choose fruit as a topping instead of sugar



Swap snacks like chocolate, biscuits, cakes, or sweets for fruit, nuts, plain popcorn, plain oatcakes, rye crispbreads or plain yogurt



Free sugar intake should be no more than

around **7 sugar cubes** (30g) each day from 11+ years

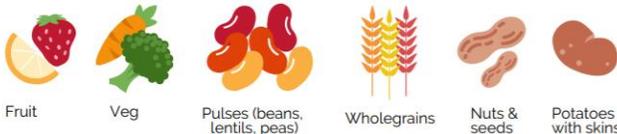


## Fibre

Found in the cell walls of vegetables, fruits, pulses and cereal grains (plants that grow – not animal food). Fibre that cannot be digested helps other food and waste products to move through the gut.

Potato skins, wholegrain bread and breakfast cereals, brown rice, and wholewheat pasta are all good sources of this kind of fibre.

Adults should get 30g a day!



- keep your bowels healthy and help prevent bowel cancer.
- It can help you feel full, which means you're less likely to eat too much, and keep your digestive system healthy
- Some types of fibre found in fruits and vegetables – such as apples, carrots, potatoes – and in oats and pulses can be partly digested and may help reduce the amount of cholesterol in your blood.
- Can help reduce the risk of heart disease, bowel cancer and type 2 diabetes!

### Tips to Include more Fibre in your Diet

- Try to include more vegetables in meals
- Eat plain popcorn
- Snack on fruit – make it more interesting by varying it, chopping it up, dipping it in yoghurt. Fresh, frozen, canned and dried all count!
- Try to add more beans, pulses and lentils to curries and stews
- Go for whole fruits and vegetables rather than juice
- Snack on nuts and seeds
- Leave the skin on potatoes, fruit and veg
- Choose wholemeal bread, or wholegrains like wholewheat pasta or brown rice

## The Nutrition and Health of

### Carbohydrates

#### Starchy Carbohydrates (complex carbohydrates)



**Starchy foods are a good source of energy and the main source of a range of nutrients in our diet.**

**Complex carbohydrates take longer to digest than simple ones, so they gradually increase blood sugar levels and provide a slow, steady release of energy.** This is why a third of your food should come from starchy carbohydrates. Starch, Pectin, Dextrin and NSP are all types of complex carbohydrates.



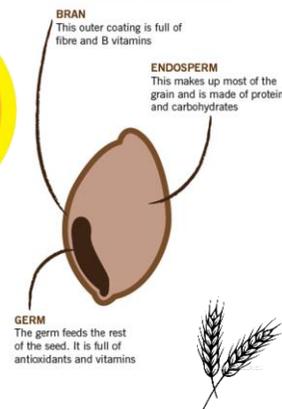
### Breakfast

It replaces nutrients that have been used up during sleep. • Eating a good breakfast helps discourage snacking on sweet, fatty and salty foods during the morning. • Teenagers are growing rapidly – most growing is done during sleep, therefore teenagers need protein to enable growth. • Breakfast should provide **slow-release energy** and B group vitamins, which release the energy and make their muscles, nerves and brain function normally, so that they are able to focus and concentrate on their studies. • It should provide minerals for growth (calcium/phosphorus) and iron for red blood cells (especially for females, due to menstrual losses of iron). • Eating breakfast 'kick-starts' the metabolism, so that all chemical reactions are working well.

- Porridge with milk and fresh, dried or stewed fruit/wholemeal toast with honey, marmite, peanut butter, scrambled or poached eggs/fortified breakfast cereal with fruit, e.g. banana and milk/milk to drink/muesli and yogurt + drink.
- Omelette with tomatoes; baked beans with poached egg on top on toast; scrambled egg and avocado pear on wholemeal toast; toasted muffins with scrambled egg and ham; pancakes and fruit or fruit purée + drink

## Wheat

### 3 PARTS OF A WHOLEGRAIN



Wheat is used in many countries around the world as it is quite easy to grow and is relatively cheap. Some different varieties are grown. Some are stronger than others.

Wheat is the main cereal product, but many cereals have a similar structure. The three important parts are the endosperm, bran and germ. Each of the parts have different jobs.

A process called **milling** separates the different parts of the outer grain.

The white endosperm needs to be separated from the brown outer bran and the germ.

**Coeliacs** can't eat wheat, bran, or rye as they contain gluten, and this causes damage to their intestines

### Milling (primary processing of wheat)

- Step 1 – Harvest** – combine harvesters are used to cut the wheat plants and a revolving thresher separates the wheat grain from the plant
- Step 2 – cleaning/storage** – Grain (seeds) are cleaned and then kept dry until needed
- Step 3** – wheat seeds are crushed between steel rollers, if no other steps are taken, then we are left with **Wholemeal or wholegrain** flour which contains all the layers of wheat grain. The extraction rate is 100% and contains 10% fibre.
- Step 4** - To produce **wheatmeal (brown) flour**, the wholemeal flour can be sieved. This removes the bran from the wheat. The extraction rate is 85% and contains 7% dietary fibre
- Step 5 White flour**- The wheatmeal is crushed until very fine, then sieved again to create white flour. The outside layers and the germ are removed during this process. The extraction rate is 72% and contains 3% dietary fibre.

## Pasta making (secondary processing of wheat)

Pasta is made from a type of wheat called durum wheat, which produces pasta flour called 00 grade flour. This has a very high gluten (protein) content

When durum wheat is milled, semolina and flour are both produced and blended together to produce pasta.

Pasta dough is made by adding eggs and sometimes water to the flour and semolina, and mixing thoroughly to form a soft dough.

## Iron and Iron Deficiency Anaemia

Iron is a micro nutrient. Remember micronutrients are vitamins and minerals. Iron is an example of a mineral found in food. **Iron** Makes haemoglobin in red blood cells to carry oxygen to produce energy in body cells. Iron is needed to make **haemoglobin** in red blood cells to carry oxygen to all blood cells. Vitamin C is required to enable iron to be absorbed during digestion.

Deficiency leads to **iron deficiency anaemia** which causes tiredness, lack of energy, weakness, pale skin complexion, weak and spilt nails.

## Caramelisation

Sugar molecules break down when they reach a high temperature – this causes sugar to turn brown and change flavour. At first it will be runny and sweet, then it turns to a smooth caramel, eventually it turns hard as it cools, more like a candy.

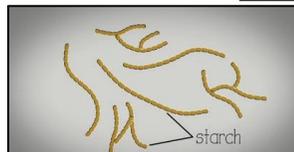
Caramel can burn very quickly, turning dark and brittle, and taste bitter. Savoury foods that contain sugars can also caramelize (such as onions) The sugars in the food are broken down and released, turning the food golden and adds sweetness

# The Nutrition and Health of Carbohydrates

## Viscosity

Resistance to flow, thickness of a sauce or mixture

## Gelatinisation



Starch molecules are made of thousands of **glucose** molecules joined together, either in **long straight chains** or **short chains with branches**.



The starch is stored in plants in tiny 'packets' called **starch granules**. The size and shape of the starch granules varies in different plants.



When starch granules are put into **cold water**, they sink to the bottom of the pan.



When starch granules are put into water and then **heated**, at about **60°C** they start to **absorb** the water, which causes them to **swell up** and get bigger. This makes the sauce start to **thicken**, because there is less room for the swollen granules to move around.



At about **80°C**, the starch granules are so swollen that they start to burst and release starch molecules into the surrounding liquid.



It is important to **stir the sauce regularly** as it is heating up, to prevent the starch granules from staying at the bottom of the liquid, where they would swell up, stick together and cause the sauce to have a **lumpy texture**.



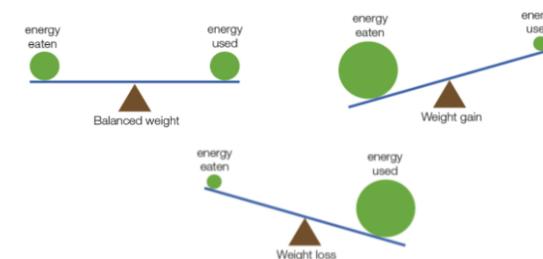
As the cooked sauce cools down, the starch molecules start to form longer chains and the water molecules stay trapped inside them, so the sauce gradually becomes a solid gel.

## Dextrinisation

- Dextrinisation is when dry heat turns a starch to brown. It occurs when starch is broken down into dextrin by dry heat
- Dextrin adds a sweet taste to baked products
- Dextrinisation happens in baking, grilling and toasting
- Dextrinisation contributes to the colour and flavour of toast, bread and croissants

## Energy Balance

As fats are high in calories (Kcals) we need to make sure we are eating the right amounts of them, and /or doing the right amount of exercise to burn excess fat off. Fat can be stored on the body if too much is consumed.



- Amount of energy consumed in food must be used up by BMR and PAL.
- Too much energy consumed leads to weight gain.
- Too little energy consumed leads to weight loss.

How much energy you need from different nutrients each day =

- Carbohydrate: 50%
- Fat: 35% or less
- Protein: 15%

A **raising agent** is an ingredient or process that introduces a gas into a mixture so that it rises when cooked. It is used because consumers expect baked products to have a light, open, soft and spongy texture.

## CARBON DIOXIDE

**Bicarbonate of soda** – carbon dioxide is produced when bicarbonate of soda is used in mixtures. If bicarbonate of soda(alkali) is used on its own it produces a washing soda taste and yellow colour.

Bicarbonate + heat= washing soda + CO<sub>2</sub> + water

To prevent this an acid is added in the form of cream of tartar to make baking powder. They neutralise each other resulting in no taste and just CO<sub>2</sub>

Bicarbonate + cream of tartar + heat = sodium potassium tartrate + CO<sub>2</sub> +water

Baking powder is added to flour to make self-raising flour..

Bicarbonate of soda is only used on its own in strong tasting mixtures like gingerbread where the flavours cover up the soap taste.

**Yeast** – is a micro-organism related to mushrooms . If given the right conditions of warmth, moisture, food and time yeast will use the sugar for energy and produce CO<sub>2</sub>, gas and alcohol.

This process is called FERMENTATION.

The CO<sub>2</sub> makes the bread dough expand and rise. The yeast cells multiply by BUDDING making more cells to produce CO<sub>2</sub> during proving. In the oven the CO<sub>2</sub> bubbles expand to make the dough rise, the alcohol evaporates . Yeast cells die if they come into contact with salt or boiling water.

## Raising agents

### How do they work?

1. The action of moisture, heat or acidity (or all 3) triggers a reaction with the raising agent to produce gas bubbles.
2. As a mixture cooks the gas bubbles given off by the raising agent make it rise by expanding and pushing it upwards and outwards.
3. The gas bubbles become set and provide the required texture.

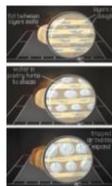
## AIR

**Creaming** – air bubbles become trapped in the mixture when sugar and fat are beaten together (a process called creaming). Each bubble is surrounded by a thin layer of fat. The mixture becomes lighter as the trapped air creates a foam. Egg is added to coagulate and form a wall round the air bubbles so they can expand and make the mixture rise. The egg proteins then coagulate with the heat and set the mixture in its risen state. Starch granules also help to set the mixture. The air then escapes

from the mixture.

### Rolling and folding (puff pastry)

These pastries are rolled and folded many times to trap air. During baking the fat between the layers melts leaving a space that is filled with steam which acts as a raising agent. The trapped air expands on heating to make the pastry rise.



### What is a raising agent?

The gas bubbles in raising agents are air, carbon dioxide and steam.

**Air** – this becomes trapped in mixtures when ingredients are creamed, rubbed in, beaten, whisked, rolled or folded. Sieving can also trap air.

**Carbon dioxide** – this is produced when yeast ferments in bread or the use of chemical raising agents such as baking powder or bicarbonate of soda.

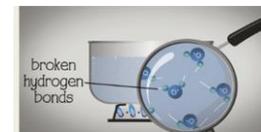
**Steam** – this occurs in recipes with a high water content such as choux pastry.

Gases are introduced in 3 ways:

1. Chemically – baking powder, SR flour or bicarbonate of soda.
2. Mechanically/physically – sieving, beating, rubbing in.
3. Biologically – using yeast.

## Steam

**Steam** is used in batters like Yorkshire puddings, Choux pastry and puff pastry. When water is a liquid the molecules join together with hydrogen bonds. When water is heated to 100°C the hydrogen bonds break and its molecules of H<sub>2</sub>O start to break free and go into the air as steam which is a gas. This works well in recipes with a high water content. A hot oven is required to create the steam which can expand to 1600 times its original volume making it an effective raising agent.



## Planning balanced meals for different life stages (1)

### Pre-school children 1 – 4 years

The best eating habits and lifestyle choices:

- \*Regular meals + drinks
- \*Small portions
- \*Trying new foods regularly
- \*Eating fresh + raw foods as well as cooked
- \*Let children eat until they are full – don't expect them to finish everything



These choices are important because:

- body growth is rapid so all nutrients especially protein are essential.
- energy needs are high
- limiting free sugars limits tooth decay and putting on excess weight

Advice for Parents:

- Serve small portions
- Some foods may cause choking e.g. nuts
- Involve children in all aspects of eating e.g. shopping and meal preparation.
- The Eatwell guide does not apply to this age group.
- Encourage them to care for their teeth

Encourage:

- \*Drinking water + whole milk
- \*Sharing + enjoying food as a group
- \*Happy meal times
- \*Involving children in choosing, buying and preparing meals
- \*Tooth care – cleaning regularly and not eating/drinking too many sugary foods and drinks

Discourage: eating snacks between meals because this can lead to obesity, tooth decay and type 2 diabetes.

### Children 5 – 12 years

The best eating habits and lifestyle choices:	This is important because:
*Regular meals + drinks – especially breakfast (wholegrain + fortified)	Energy needs are high The brain and body need to have a 'kick start' to the day. Fortified cereals have B vitamins (to release energy from foods); calcium (for strong teeth and bones) and wholegrain (for a healthy digestive system). Help to feel fuller for longer to avoid mid morning snacking.
*Following the Eatwell guide	Body growth and development is rapid so all nutrients especially protein are essential.
*Drinking water instead of sugary/fizzy drinks	Hydrates. Limiting free sugars limits tooth decay and putting on excess weight
*Continue to try new foods regularly	Extends acceptance of new foods and flavours
*Eating fresh + raw foods as well as cooked instead of too many ready prepared meals and fast foods	Fresh foods have antioxidants; provide different textures and help to feel fuller for longer. Ready prepared meals and fast foods are high in fats, sugar and salt and low in NSP (dietary fibre)
* Share and enjoy food as a group/family	Develops confidence with food especially new flavours + textures
*Being physically active most of the time *Not spending too much time inactive (sedentary) using the computer and mobile phone	Children can become overweight due to inactivity
*Have enough sleep	Children are rapidly growing and need time to rest.



### Adults

The best eating habits and lifestyle choices:

- Regular meals + drinks. Always eat breakfast.
- Drink plenty of water
- Follow the Eat well Guide
- Take regular weight bearing exercise e.g. running, walking + exercise to stay fit and keep a healthy body weight
- Spend time outside in the sun to make vit. D
- Get plenty of sleep
- Avoid too much stress
- Avoid eating too many energy dense foods (high in fat, sugar) and salt



- Wholegrain breakfast cereals contain fibre required for a healthy digestive system.
- The Eatwell Guide (if followed) will provide all nutrients but especially:
  - Calcium + Vit. D – the skeleton reaches peak bone mass around 30 years of age and gradually starts to lose minerals and become weakened after this age.
  - Iron + vit. C (which helps the blood to carry oxygen around the body) to avoid anaemia by loss through menstruation.
  - The B group of vitamins release energy from foods and allows the brain to concentrate.
  - Energy dense foods may develop: obesity, CHD, CVD, Type 2 diabetes, gallstones, hypertension



## Adolescents (Teenagers) 13 – 19 years

## Planning balanced meals for different life stages 2

The best eating habits and lifestyle choices:	This is important because:
*Regular meals + drinks – always breakfast (wholegrain + fortified) 	Energy needs are high The brain and body need to have a 'kick start' to the day. Fortified cereals have B vitamins (to release energy from foods); calcium (for strong teeth and bones) and wholegrain (for a healthy digestive system). Help to feel fuller for longer to avoid mid morning snacking. The B group of vitamins release energy from foods and allows the brain to concentrate.
*Following the Eatwell guide	Body growth and development is rapid so all nutrients especially protein are essential.
*Eat/drink plenty of calcium rich foods	Minerals are taken into the bones and teeth so that the skeleton reaches peak bone mass when teenagers become adults
*Spend time outside	Vitamin D (with calcium) strengthens the skeleton allowing it to gain maximum bone density. This allows it to reach peak bone mass when they are adults.
*Drinking water instead of sugary/fizzy drinks	Water hydrates the brain and aids concentration. Limiting free sugars limits tooth decay and putting on excess weight. Fizzy drinks may affect how many minerals are taken into the bones
*Eating fresh + raw foods as well as cooked	Fresh and raw foods contain vitamin C (which with iron, helps the blood to carry oxygen around the body) to avoid anaemia. Fresh foods have antioxidants. Raw foods are required for a healthy digestive system as they contain NSP (dietary fibre)
*Eating iron rich foods e.g. red meat, liver, kidneys, wholemeal bread, green leafy veg. egg yolk, dried apricots, lentils, cocoa, curry powder and fortified breakfast cereals.	Teenage start to menstruate so need to intake iron rich foods/ vitamin C for the absorption of iron to prevent anaemia
• Eat plenty of protein foods	Boys: growth and muscular tissue, development. • Girls: more protein for growth spurts/development
* Share and enjoy food as a group/family	Develops confidence with food especially new flavours + textures
*Being physically active most of the time *Not spending too much time inactive (sedentary) using the computer and mobile phone or watching TV	Teenagers can become overweight due to inactivity. Being a healthy weight reduces risk of obesity and development of diabetes.
*Have enough sleep	Teenagers are rapidly growing and need time to rest.
* Eating too many ready prepared meals and fast foods as these are high in fats, sugar and salt and low in NSP (dietary fibre)	can become overweight due to inactivity. Develop Type 2 diabetes and develop poor eating habits for adulthood
*Eat oily fish	Rich in fats called omega 3 fatty acids which may help prevent coronary Heart Disease (CHD). E.g. salmon, mackerel, sardines + fresh tuna

## Elderly Adults

### The best eating habits and lifestyle choices:

- Regular meals + drinks. Always eat breakfast.
- Drink plenty of water
- Follow the Eat well Guide
- Take regular weight bearing exercise to stay fit and keep a healthy body weight
- Spend time outside in the sun to make vit. D
- Get plenty of sleep
- Avoid too much stress
- Eat smaller portions as the appetite decreases and metabolic rate slows down
- Eat plenty of fibre to maintain a healthy digestive system

### This is important because:

- Weight management – to avoid health risks associated with unhealthy weight. E.g. CHD
- There is a decline in immunity to infections e.g. 'flu. A decline in cognitive thought processes and memory and mobility – This group need for range of nutrients to support this e.g. Omega 3 fatty acids help and B vitamins
- Osteoporosis post menopause – oestrogen to protect bone health calcium/phosphorus/vitamin D
- Include Vitamin B12 and folates - lack of these linked to Alzheimers, memory loss and heart disease.
- Digestive function e.g. constipation – ensure high fibre in diet -cereal foods
- Reduce salt intake - links to CHD, blood pressure problems
- Ensure food supplements not used to replace real foods
- Less mobile/active therefore may need to take care with energy balance
- Include the antioxidant vitamins A, C and E may help to prevent cancer and heart disease
- Include vitamin C and iron to prevent iron deficiency anaemia.

