

# Sensory characteristics

- Ingredients are selected for their nutrition, functional and sensory characteristics, as well as provenance and seasonality.

<p><b>Using our senses</b> A range of senses are used when eating food:</p> <ul style="list-style-type: none"> <li>sight;</li> <li>smell;</li> <li>hearing;</li> <li>taste;</li> <li>touch.</li> </ul> <p>A combination of these senses helps to evaluate a food.</p>	<p><b>Other factors</b> Other factors also experience the way we feel about food. These include:</p> <ul style="list-style-type: none"> <li>food previously eaten;</li> <li>hunger and satiety;</li> <li>mood;</li> <li>where you eat, e.g. home, canteen, picnic;</li> <li>beliefs and values, e.g. religion, culture and tradition;</li> <li>social aspects, e.g. special occasions, events.</li> </ul>
---	---

**Sensory evaluation and tests**  
Sensory evaluation analyses and measures human responses to food and drink, e.g. appearance, touch, odour, texture, temperature and taste. In order to obtain reliable results, sensory evaluation tests should be set up in a controlled way to ensure fair testing, e.g. no distracting colours, noise or smells; same size portions; coded samples, and water to drink.

**Preference tests** - these types of tests supply information about people's likes and dislikes of a food. They include hedonic, paired comparison and scoring tests.

**Discrimination tests** - these types of tests aim to evaluate specific attributes, i.e. characteristics of a food (such as crunchiness). They include triangle, duo trio, ranking and paired comparison tests.

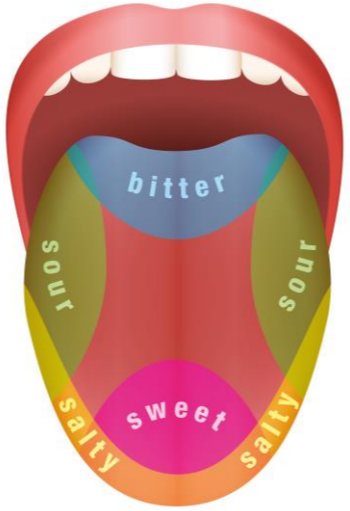
**Key terms**  
**Discrimination tests:** Aim to evaluate specific attributes, such as crunchiness.  
**Preference tests:** Supply information about people's likes and dislikes of food.  
**Sensory attributes:** Words used to describe the appearance, odour, taste and texture of a food product  
**Sensory evaluation:** A scientific discipline that analyses and measures human responses to the composition of food and drink.  
**The olfactory system:** The sensory system used for olfaction, or the sense of smell.  
**Umami:** Savoury taste, often known as the fifth taste.

<p><b>Sight</b> The size, shape, colour, temperature and surface texture all play an important part in helping to determine your first reaction to a food. Often if a food does not look appetising, then you will not eat it.</p>	<p><b>Taste</b> The tongue can detect five basic tastes:</p> <ul style="list-style-type: none"> <li>bitter;</li> <li>salt;</li> <li>sour;</li> <li>sweet;</li> <li>umami.</li> </ul>
--	--

**Taste receptors**  
Our tongues are covered with taste buds, which are designed to sense chemicals in the mouth.

<p><b>Smell (odour)</b> The nose detects volatile aromas released from food. An odour may be described by association with a particular food, e.g. herby, cheesy, fishy. The intensity can also be recorded.</p>	<p><b>Touch</b> Texture can be assessed through touch. When food is placed in the mouth, the surface of the tongue and other sensitive skin reacts to the feel of the surface of the food. The sensation is also known as mouth-feel.</p>
--	---

**Taste receptors**  
Sensitivity to all tastes is distributed across the whole tongue (and indeed other regions of the mouth where there are taste buds), but some areas are more responsive to certain tastes than others.



<p><b>Smell and taste</b> Smell (odour) and taste work together to produce flavour. This is the reason why people with a blocked nose find it difficult to determine the flavours of foods.</p>	<p><b>Hearing/sound</b> The sounds of food being prepared, cooked, served and eaten all help to influence our preferences. The sound of eating food can alter our perception of how fresh a food is (e.g. crunchy carrots).</p>
---	---

<p><b>Umami</b> Umami is a savoury taste, often known as the fifth taste. It is a subtle taste and blends well with other tastes. Umami has its own distinct savoury taste, often associated with ripe tomatoes and cheese.</p>	<p><b>The olfactory system</b> The olfactory system is the sensory system used for olfaction, or the sense of smell.</p>
---	--

	Tasting vocabulary (sensory attributes)		
Sight	Bubbling	Flaky	Opaque
	Caramelised	Firm	Smooth
	Clear	Heavy	Solid
	Coarse	Icy	Steaming
	Crumbly	Juicy	Sticky
Smell	Dry	Moist	Thick
	Acidic	Fresh	Spicy
	Aromatic	Meaty	Strong
	Bland	Mild	Sweet
	Citrus	Pungent	Tart
Sound	Earthy	Savoury	Weak
	Fragrant	Smoky	Zesty
	Brittle	Crisp	Pop
Taste	Crackle	Crunch	Sizzle
	Bitter	Rich	Strong
	Bland	Salty	Sweet
	Floury	Savoury	Tangy
	Hot	Smoky	Tart
Touch	Mild	Sour	Umami
	Piquant	Spicy	Zesty
	Brittle	Dry	Short
	Bubbly	Goey	Soft
	Chewy	Granular	Solid
	Close	Greasy	Tacky
	Cloying	Moist	Tender
	Coarse	Open	Waxy

- Tasks**
- Work through the sensory evaluation worksheets on *Food – a fact of life* <https://bit.ly/2WpSTov>
  - Make a list of the sight, smell, taste, touch and sound of the different food had for lunch yesterday. Describe how these different attributes influenced your like/dislike of the different food.

# Macronutrients, fibre and water

## Macronutrients

Macronutrients provide energy. The macronutrients are:

- carbohydrate;
- protein;
- fat.

Macronutrients are measured in grams (g).

## Alcohol

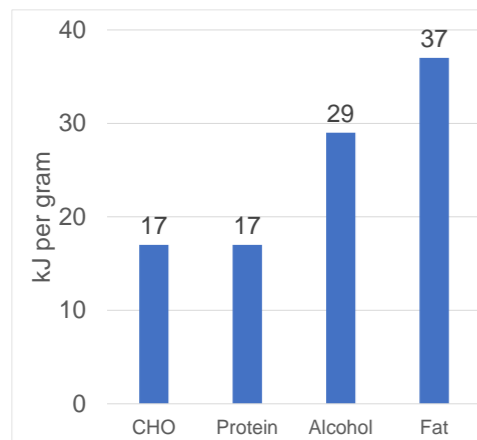
Alcohol is not considered a nutrient, but is a source of energy in the diet.

The government recommends no more than 14 units of alcohol per week for both men and women.

## Energy from food

- Energy intake is measured in joules (J) or kilojoules (kJ), but many people are more familiar with Calories (kcal).
- Different macronutrients, and alcohol, provide different amounts of energy.

	Energy per gram
Carbohydrate	16kJ (3.75 kcals)
Protein	17kJ (4 kcals)
Alcohol	29kJ (7kcals)
Fat	37kJ (9 kcals)



## Protein

- Made up of building blocks called amino acids.
- There are 20 amino acids found in protein.
- Eight amino acids have to be provided by the diet (called essential amino acids).

The essential amino acids (EAAs) are isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan and valine.

In young children, additional amino acids, e.g. histidine and tyrosine, are sometimes considered to be essential (or 'conditionally essential') because they may be unable to make enough to meet their needs.

## Recommendations

- 0.75g/kg bodyweight/day in adults.

Sources:

**Animal sources:** meat; poultry; fish; eggs; milk; dairy food.

**Plant sources:** soya; nuts; seeds; pulses, e.g. beans, lentils; mycoprotein.

## Protein complementation

Different food contains different amounts and combinations of amino acids.

Vegans and vegetarians can get all the amino acids they need by combining different protein types at the same meal. This is known as protein complementation.

Examples are:

- rice and peas;
- beans on toast;
- hummus and pitta bread;
- bean chilli served with rice.

## Carbohydrate

All types of carbohydrate are compounds of carbon, hydrogen and oxygen. They can be divided into three main groups according to the size of the molecule.

These three types are:

- monosaccharides (e.g. glucose);
- disaccharides (e.g. lactose);
- polysaccharide (e.g. sucrose).

The two types main of carbohydrate that provide dietary energy are starch and sugars. Dietary fibre is also a type of carbohydrate.

Starchy carbohydrate is an important source of energy.

Starchy foods - we should be choosing wholegrain versions of starchy foods where possible.

## Recommendations

- Total carbohydrate - around 50% of daily food energy.
- Free sugars include all sugars added to foods plus sugars naturally present in honey, syrups and unsweetened fruit juice (<5% daily food energy).
- Fibre is a term used for plant-based carbohydrates that are not digested in the small intestine (30g/day for adults).

## Fibre

- Dietary fibre is a type of carbohydrate found in plant foods.
- Food examples include wholegrain cereals and cereal products; oats; beans; lentils; fruit; vegetables; nuts; and, seeds.

Dietary fibre helps to:

- reduce the risk of heart disease, diabetes and some cancers;
- help weight control;
- bulk up stools;
- prevent constipation;
- improve gut health.

## Fat

Sources of fat include:

- saturated fat;
- monounsaturated fat;
- polyunsaturated fat.

Fats can be saturated, when they have no double bonds, monounsaturated, when they have one double bond, or polyunsaturated, when they have more than one double bond.

## Recommendations

- <35% energy, Saturated fat <11% energy.

A high saturated fat intake is linked with high blood cholesterol levels.

## Sources:

**Saturated fat:** fatty cuts of meat; skin of poultry; butter; hard cheese; biscuits, cakes and pastries; chocolate.

**Monounsaturated fat:** edible oils especially olive oil; avocados; nuts.

**Polyunsaturated fatty acids:** edible oils especially sunflower oil; seeds; margarine; spreadable fats made from vegetable oils and oily fish.

**Dietary reference values (DRVs)** are a series of estimates of the energy and nutritional requirements of different groups of healthy people in the UK population. They are not recommendations or goals for individuals.

**Reference Intakes** are guidelines for the maximum amount of energy (calories), fat, saturated fat, sugars and salt consumed in a day (based on a healthy adult female).

## Tasks

1. Create an infographic on macronutrients. Focus on the definition of each nutrient, daily recommendations and source.
2. Keep a food diary for four days and calculate the macronutrients provided per day. <http://explorefood.foodafactoflife.org.uk>

## Key terms

**Dietary reference values:** Estimated dietary requirements for particular groups of the population.

**Essential amino acids:** 8 of the different amino acids found in proteins from plants and animals that have to be provided by the diet.

**Macronutrients:** Nutrients needed to provide energy and as the building blocks for growth and maintenance of the body.

**Protein complementation:** Combining different protein types at the same meal to ensure all EAAs are ingested.

**Reference Intakes:** Guidelines for the maximum amount of nutrients consumed.

## Hydration

- Aim to drink 6-8 glasses of fluid every day.
- Water, lower fat milk and sugar-free drinks including tea and coffee all count.
- Fruit juice and smoothies also count but should be limited to no more than a combined total of 150ml per day.

20% of water is provided by food such as soups, yogurts, fruit and vegetables.

The other 80% is provided by drinks such as water, milk and juice.

Drinking too much water can lead to 'water intoxication' with potentially life threatening hyponatraemia.

This is caused when the concentration of sodium in the blood gets too low.

For more information, go to: <https://bit.ly/36KUnji>

# Micronutrients



**Micronutrients** are needed in the body in tiny amounts. They do not provide energy, but are required for a number of important processes in the body.


There are two main groups of micronutrients:

- vitamins;
- minerals and trace elements.

Micronutrients are measured in milligrams (mg) and micrograms (µg) with 1mg = 0.001g and 1µg = 0.001mg.

**Micronutrient recommendations**  
People have different requirements for each micronutrient, according to their:

- age;
- gender;
- physiological state (e.g. pregnancy).

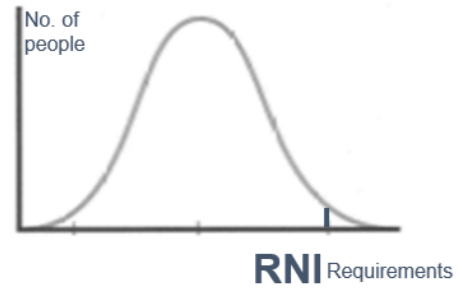


**Vitamins**

Nutrient	Function	Sources
<b>Vitamin A</b>	Helps the immune system to work as it should and with vision.	Liver, cheese, eggs, dark green leafy vegetables and orange-coloured fruits and vegetables.
<b>B vitamins</b>	Thiamin, riboflavin, niacin, folate, and vitamin B12 have a range of functions within the body.	Different for each B Vitamin.
<b>Vitamin C</b>	Helps to protect cells from damage and with the formation of collagen.	Fruit (especially citrus fruits), green vegetables, peppers and tomatoes.
<b>Vitamin D</b>	Helps the body to absorb calcium & helps to keep bones strong.	Oily fish, eggs, fortified breakfast cereals and fat spreads.
<b>Vitamin E</b>	Helps to protect the cells in our bodies against damage.	Vegetable and seed oils, nuts and seeds, avocados and olives.
<b>Vitamin K</b>	Needed for the normal clotting of blood and is required for normal bone structure.	Green vegetables and some oils (rapeseed, olive and soya oil).

**Key terms**  
**Micronutrients:** Nutrients needed in the diet in very small amounts.  
**Lower Reference Nutrient Intake (LRNI):** Is the amount of a nutrient that is enough for only the small number of people who have low requirements (2.5%). The majority of people need more.  
**Reference Nutrient Intake (RNI):** The amount of a nutrient that is enough to ensure that the needs of nearly all the group (97.5%) are being met. The RNI is used for recommendations on protein, vitamins and minerals.

**Micronutrient recommendations**  
The recommendations for vitamins and minerals are based on the **Reference Nutrient Intake (RNI)**.



When looking at low intakes of micronutrients, the Lower Reference Nutrient Intake (LRNI) is used.

**Vitamins**  
Vitamins are nutrients required by the body in small amounts, for a variety of essential processes.

Most vitamins cannot be made by the body, so need to be provided in the diet.

Vitamins are grouped into:

- fat-soluble vitamins (vitamins A, D, E and K);
- water-soluble vitamins (B vitamins and vitamin C).


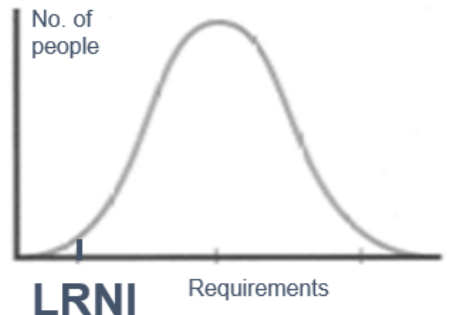
**Minerals**

Nutrient	Function	Sources
<b>Calcium</b>	Helps to build and maintain strong bones and teeth.	Dairy, calcium-fortified dairy-alternatives, canned fish (where soft bones are eaten) and bread.
<b>Iron</b>	Helps to make red blood cells, which carry oxygen around the body.	Offal, red meat, beans, pulses, nuts and seeds, fish, quinoa, wholemeal bread and dried fruit.
<b>Phosphorus</b>	Helps to build strong bones and teeth and helps to release energy from food.	Red meat, poultry, fish, milk, cheese, yogurt, eggs, bread and wholegrains.
<b>Sodium</b>	Helps regulate the water content in the body.	Very small amounts found in foods. Often added as salt.
<b>Fluoride</b>	Helps with the formation of strong teeth and reduce the risk of tooth decay.	Tap water, tea (and toothpaste).
<b>Potassium</b>	Helps regulate the water content in the body and maintain a normal blood pressure.	Some fruit and vegetables, dried fruit, poultry, red meat, fish, milk and wholegrain breakfast cereals.
<b>Iodine</b>	Helps to make thyroid hormones. It also helps the brain to function normally.	Milk, yogurt, cheese, fish, shellfish and eggs.

**Vitamin D**  
Vitamin D is a pro-hormone in the body. It can be obtained in two forms:

- ergocalciferol (vitamin D<sub>2</sub>);
- cholecalciferol (vitamin D<sub>3</sub>).

Vitamin D<sub>3</sub> is also formed by the action of sunlight. Different to most vitamins, the main source of vitamin D is synthesis in the skin following exposure to sunlight. The wavelength of UVB during the winter months in the UK does not support vitamin D synthesis.

For more information, go to:  
<https://bit.ly/36KUnji>

**Tasks**

1. Create an infographic on micronutrients. Focus on the definition of each micronutrient, daily recommendations and source.
2. Keep a food diary for four days and calculate the micronutrients provided per day.  
<http://explorefood.foodafactoflife.org.uk>