

Section 5—Food Provenance learn sheet

Food Production

Milk.

Milk comes from a variety of animals; in Britain we drink mainly cow's milk. Fresh milk has a layer of cream on the top. **Homogenised** milk is forced through tiny holes in a machine. This breaks up the fat and dispenses it, and it doesn't reform as a layer. Lactose intolerant people can substitute animal milk in their diet with milk made from soya, rice, coconut, almond or oat.

Primary Processing - milk is processed to produce a variety of different types:

Pasteurised—this extends shelf life.

Skimmed—this is pasteurised but has had all or most of the fat removed.

Semi-skimmed—this is pasteurised but has some of the fat removed.

Ultra-heat treated (UHT) - also known as 'long life', this has a shelf life of up to six months.

Sterilised—this has a longer shelf life, is homogenised and has a slightly caramel flavour.

Dried—does not need refrigeration until reconstituted; its made by evaporating the water from the milk, which leaves a fine powder; its non bulky to store.

Canned:

Evaporated—milk that has had water evaporated off; its sweet and concentrated, homogenised and is sealed in cans and sterilised.

Condensed.—evaporated milk that hasn't been sterilised; it has added sugar and is very thick.

Secondary Processing can be used to process milk into other dairy products:

* Cream—the fat removed from milk is used. Types of cream are single, whipping, double and extra thick. Cream can be further processed to make soured cream, clotted cream, and crème fraiche.

* Butter—cream is churned to make butter. It can be salted and made into regional varieties, e.g. ghee continental.

* Cheese—this is milk in its solid form. There are many regional and international varieties of cheese, depending on the methods or animal milks used to produce them.

* Yoghurt—milk has a bacteria culture added to it to make yoghurt. Probiotic products contain live bacteria that are beneficial to the digestive system.

All dairy products need to be stored in the fridge, except dried and canned milks.

Wheat

Wheat is the main cereal product. It is used in many countries as it is quite easy to grow and relatively cheap. Each grain of wheat is made up of different layers that have different functions and contain different nutrients.

Primary Processing wheat can be processed to produce a variety of flours, this is done by milling. The grains are blended with other varieties and washed to remove grit and dirt. Huge roasting rollers crush the grains at varying speeds. The crushed grain is sieved and this produces flour. If white flour is wanted, the bran is removed by further rolling. The process is adjusted to produce the required type of flour.

Secondary processing flour can be further processed to make it into other products such as pasta or bread. Pasta is made from a variety of strong wheat called durum wheat. The flour is further processed by adding it to egg and making a paste, which can be rolled and shaped to make a variety of pastas. Bread is made by mixing strong flour with liquid and a raising agent such as yeast.



Key Words:
Homogenised
Primary processing
Pasteurised
Skimmed
Semi-skimmed
UHT
Sterilised
Evaporated

Food Processing

Preservation

High temperature

Method	Details	Further Information
Canning	Foods are placed in liquids in cans, sealed and heated to 121°C.	Loss of water-soluble vitamins B & C. change in taste of the food.
Irradiation	Strictly controlled X-rays are passed through the food to delay ripening.	Vitamins A, C, E & K may be lost. Food looks fresh and tastes the same.
Pasteurisation	Used mainly for milk, heating it to 71°C for 15 seconds, the rapidly cooling it to 10°C. limited shelf life.	Little or no change to taste. Loss of vitamin B2. often fortified with vitamin D.
Sterilisation	Heated to 104°C for 40 mins or 115°C for 15 minutes. Used mainly for milk and juices to prolong storage.	The process causes a slight caramelisation of the milk sugar content, resulting in a creamy flavour.
UHT	Heated to 140°C for up to 5 seconds then put in an airtight container. Allows milk to be stored for up to 6 months.	There is a slight colour change in taste, colour remains the similar and little change to nutrients.

Low temperature

Method	Details	Further information
Freezing	Food is preserved for up to one year n temperatures between -18°C & 29°C	Generally, no changes to food or nutrient content.
Chilling	This just extends shelf life	
Cold storage (CA)	This just extends shelf life in an atmosphere of carbon dioxide	

Drying

Method	Details	Further Information
Sunlight	An old method, which allows moisture to evaporate from the food in the Sun, e.g. fish, meats.	Dehydrating foods can affect colour, e.g. purple plums turn dark brown. They may develop a wrinkly surface/skin. The texture may change as well as the concentration of the flavour. Vitamin C and B6 (and others) maybe
Oven drying	Warm ovens are used to dry foods slowly.	Loss of vitamins A & C
Roller drying	Used for foods that are reconstituted as 'instant' foods e.g. baby foods.	
Spray drying	This method is used for some foods that are damaged by high heats.	
Accelerated freeze drying (AFD)	Food is frozen and the temperature is then increased to make the ice vaporise.	There is no change to the nutrient content of the food and flavour, colour and texture is mostly unaffected.

Chemical

Method	Details	Further Information
Vinegar (pickling)	The strong acid solution preserves the food, e.g. chutney, onions	Changes to taste, flavour and texture. Shelf life is increased
Sugar	Fruit is preserved e.g. jam making	
Salt	Meat and fish can be salted. Brine solutions can be used to preserve vegetables and canned fish.	
Smoking	Food is cooked by exposing it to heat from wood fires	Distinctive smoke taste
Alcohol	Fruits are prepared and stored in brandy	Changes to taste
Vacuum packaging	Oxygen is removed from a sealed package, e.g. fish, cheese	Long shelf life with fresh appearance and taste.
Modified atmospheric packaging (MAP)	Sealed packages have oxygen removed and the gas content inside changed, e.g. ready prepared salads	



Key Words:
Preservation, Temperature
Drying, Chemical preservation

Food and the Environment

Food Origins

Seasonal foods are home-grown products that are traditionally grown or produced during particular seasons of the year e.g. in the UK strawberries are harvested between June and September.

Transportation development around the world has meant that when seasonal products are not available they can be imported from hotter climates where they are grown all year round.

Food Miles are the distance food travels from its point of origin to your table. The planes, boats and lorries used to transport food around the world all create carbon dioxide gas (CO₂), which is a contributory factor to global warming and **climate change (carbon footprint)**. Food miles can be reduced by supporting British farmers, use local farm shops, eating seasonal products, buy foods that have been produced closer to Britain.

Reducing carbon emissions. **Recycling** and producing less waste also helps to reduce carbon emissions. Reducing the amount of packaging or using biodegradable packaging. Recycling (re-using) using local collection facilities or bottle banks. (note that recycling may use more energy than making packaging from new resources and some chemicals used to clean recycled products can harm the environment)



Food waste and landfill Nearly a third of all food produced ends up in **landfill** sites where it gives off methane gas as it decomposes. This gas adds to GHG emissions. **Food waste** can be reduced by: using FIFO storage, wise shopping and planning ahead, only preparing the food you need, using food before it goes out of date, using left over food to make other dishes. Home **composting** is efficient, easy and clean.

Sustainable food means that food will continue to be available for many years to come. Intensive farming can diminish the quality of food stocks for future generations. **Fruit and vegetables**—follow healthy eating guidelines and eat more fruit, vegetables, grains and pulses, and less animal protein. Home-grown garden or allotment fruit and vegetables provide a cost-effective variety of vegetables. **Fish** can be made more sustainable by, restricting catch sizes, imposing minimum sizes of fish for sale, widening the selection of fish being eaten to more species, putting back young fish so that they can go on to breed and reproduce. Dolphin-friendly tuna makes the consumer aware that no dolphins have been accidentally trapped in nets during fishing. Fishermen have allocated strips of ocean in order to fish sustainably in different areas of the world.



Key Words:
Transportation, food miles, climate change, carbon footprint, recycling, packaging, landfill, food waste, composting

Food Provenance and Production Methods

Traceability:

Means the ability to track any food, feed, animal that will be used for consumption. This is so when a risk is identified it can be traced back to its source to isolate and prevent the problem.

Modern Intensive Farming:

Produces food on a large scale for low cost. This has resulted in: fewer small farm communities, a greater number of larger business farms, large numbers of animals and poultry being kept in massive buildings and fed on high nutrient feeds in a short period of time, the widespread use of antibiotics, growth enhancers, fertilisers and pesticides, small farm fields being opened up—woodland destroyed to make room for large machinery access. These methods are also employed all over the world, resulting in large surplus of food being produced.

Farming Methods

Barn-reared Animals: live in an environment similar to intensively-reared animals. They have access to natural light from windows. The live in a lower density of animals/sqm. They have access to environment enrichment such as fresh straw.

Organic Foods: are grown naturally without help from any chemical or synthetic treatments. They rely on natural compost and manure as fertilisers. Organic foods are **GM** free. There is no prove that organic food is more nutritious—it is a lifestyle choice.

Free-range Farming: allows animals or poultry access to outdoor areas for part of their lives. Hens that re free-range



eggs that are more nutritious and tasty. Animals reared this way also have better meat quality. Organic and free-range farming are more ethical and have a lower negative environmental impact.

Hydroponic Farming: is the production of food using specially developed nutrient-rich liquids rather than soil. Hydroponic farming takes place in vast polytunnels or greenhouse in carefully controlled conditions. It is an expensive method, so is only used for high-value crops.



Fish Farming: increasing demand for fish has seen stocks diminishing in the wild through overfishing. The reduction may be due to lack of controls or the use of factory ships that strip the sea of every type of creature. Hatcheries release young fish into the wild. Some fish farms are on land, with fish never exposed to natural resources



Genetically Modified (GM) Foods: Is a form of intensive farming widely used in agriculture, it is carefully controlled and regulated. GM foods are produced to be more resistant to plant disease, insect pesticides and viruses. The DNA in the product can be changed in order to change the characteristics of a product. E.g. higher milk yield in cattle resulting in cheaper production. There is a concern about the use of GM in food production e.g. playing with nature, potential risks to long term human and animal health and allergic reactions.

Key Words:
Traceability, Field to fork, Barn-reared animals
Organic, Genetically Modified, Free range farming
Hydroponics, Hatcheries, Fish farms, Intensive farming



Sustainability of food

Global Climate Change Issues

There are several issues arising from global climate change: air temperature and rainfall rising and falling have an effect on soil. Crops can fail as a result. Flooding of areas of land, both coastal and inland. CFCs have depleted the atmosphere's ozone layer and this can have a reduction in yield in some crops with Ultraviolet radiation affecting them. Photosynthesis of plants relies on carbon dioxide; increased cloud cover as a result of global warming restricts this from being efficient. Changes in climate can affect the pests that attack crops, and can change the foods that some helpful bugs use, e.g. bees dying and so not pollinating plants.

Sustainable food

Sustainable food should be produced, processes and distributed in ways that contribute to thriving local economies and sustainable livelihoods. Protect the diversity of both plants and animals and avoid damaging or wasting natural resources or contributing to climate change.

Fairtrade ensures fair income/prices for farmers in developing countries, giving a steady income. It invests in the locality and better working conditions.

Tackling Sustainability of Food Sources

Ways to address food sustainability are:

Prevent soil erosion from winds, high rainfall and flooding.

Look to improve crop varieties to match climate change.

Crop rotation to reduce soil erosion and health.

Irrigation systems in drier areas.

Increase crop diversity.

Improve soil organics by using animal waste.

Develop wind breaks.

Change the dependence on fossil fuels for transporting foods.

Carbon Emissions

As our **green house gas (GHG)** emissions increase, the planet traps more energy from the sun. this damages the Earth's ozone layer. This in turn causes changes to climate, and ultimately food and water supplies throughout the world. Livestock, especially cows, produce methane gas, which is 20 times more harmful than CO₂.

Tackle deforestation issues—trees remove CO₂ from the atmosphere. Large areas of forest are being cut down in order to graze animals or grow crops



Key Words:
Green house gas
Crop rotation
Fairtrade
Red tractor

Food Assurance Schemes

These are guaranteed standards of animal welfare or food safety that the consumer can rely upon.

Red tractor logo tells the customer that the food has been produced, processed and packed to specific standards such as, food hygiene safety, standards of equipment used in production, animal welfare and responsible use of pesticides.

