Food Preparation and Nutrition

REVISION BOOKLET 5
THE SCIENCE OF FOOD

Name:
Tutor Group:

Methods for Cutting and Preparing Ingredients

Find the meanings of these key terms:

Slicing		**Scissor Snipping**	
Peeling		**Scooping**	
Chopping		**Segmenting**	
Dicing		**Skinning**	
Grating		**Blanching**	
Coring		**Blending**	
Mashing / Crushing		**Juicing**	
Shredding		**Preparing Garnishes**	

Combining and Shaping Ingredients

Find the meanings of these key terms and suggest a dish for each one.

Combining		Shaping	
Whisking		**By Hand**	
Stirring		**In a Mould**	
Folding		**Using Cutters**	
Creaming		**With a Rolling Pin**	
Rubbing-In		**Piping Bag**	

Binding
Coating
Glazing

Cooking Methods

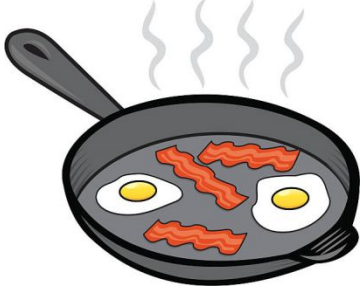
Cooking food makes it safe, allows it to keep for longer and makes it more palatable.
Cooking methods can achieve specific characteristics in food.

Heat Transfer

Heat is transferred by conduction, convection and radiation.
Cooking commonly uses a combination of heat transfer methods.

Complete the table below describing the three ways in which heat is transferred through food and give 3 examples of dishes for each.

Conduction	Convection	Radiation
Definition:	**Definition:**	**Definition:**
Examples:	**Examples:**	**Examples:**



Methods of Cooking

We cook food to make it easier to digest- animal proteins need to be broken down and plant starches need softening.
Cooking adds flavour, makes food look and smell appetising, makes it safe to eat and prevents spoilage.

The main methods of cooking are: in water, in fat and in the oven.

Cooking in Water

Match the word to the description.

BOILING	SIMMERING	STEAMING	POACHING	PRESSURE COOKING
STEWING	BLANCHING	BAIN MARIE		

Deep water but small slow bubbles just off the boil. This can protect some water soluble vitamins. Food like dumplings, rice, egg dishes and fruit.	Cooking food in their own juices in a covered pan. Long slow method which will tenderise tough cuts of meat such as shin and neck (well used muscles by animals).	Deep fast bubbling water can be flavoured. Softens starches, breakdowns proteins but some water soluble vitamins are destroyed or removed. Root vegetables (grown below ground) start in cold water.	Water bath that cooks food gently maintaining a low consistent temperature to cook delicate foods like egg custards, crème caramels and crème brulee.
Short cooking time in boiling water to start the cooking process but prevents colour and nutrient loss. Often cooled quickly ready to be reheated an d finished off quickly maybe during a busy service time.	Perforated container sits over boiling water or special ovens called combination ovens where steam is forced in. Cooks food without forcing any good nutrients out, keeping them healthy. Good for vegetables, potatoes, fish, tender meats and puddings.	A sealed pan allows pressure to build from expanding gases and liquids which shortens the cooking time.	Gentle cooking in a flavoured liquid off the boil and simmer. Cooks delicate items of fish and egg dishes.

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Cooking in Fat

Match the word to the description.

SHALLOW FRYING	DEEP FAT FRYING	SAUTEING	STIR FRYING
	BRAISING	FLAMBEING	

Alcohol (brandy, rum etc.) is added to food which is then flamed burning the alcohol off leaving the flavour.	Quick cooking in very little hot oil. Small even cuts of food including meat and vegetables. With little fat and the quick cooking method which does not destroy nutrients make this a popular healthy method.	Food is immersed in hot fat. It must be deep enough to float freely. Delicate food is often protected by a layer which is coated onto the food, such as batter or breadcrumbs which are stuck on by rolling in beaten egg first.
Vegetables and meat are browned off in hot oil. The vegetables are put at the bottom of an ovenproof dish, meat placed on top and the dish is half filled with stock. Slow cooked in the oven tenderises tough cuts of meat.	Quick method which adds colour to food and the food is normally turned to colour both sides.	Tossing small pieces of food in hot fat which are stirred or tossed around. Ideal for fish, liver, kidney, potatoes and strips of steak.

Safety Rules for Deep Fat Frying:

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Cooking in the Oven

Match the word to the description.

BAKING	ROASTING	CASSEROLING	MICROWAVING
GRILLING			

Quick way of cooking or heating up food. Food needs to have a water content. Does not brown the food. Mainly used for defrosting or reheating prepared foods. Does not require fat so can be used for special diet foods.	Cooking and browning with the aid of fat. Very popular method of cooking large joints of meat, which are often served in restaurant carveries.	Cooking meat with intense heat. Quick method of cooking so not too much moisture or goodness is lost from the food. It does not need any extra fat. Expensive cuts of meat are used. Ideal meats are fillet, sirloin and rump. Meat can be marinated first to add moisture and flavour.
Cooked in dry heat in the oven, giving food colour and a structured texture.	Similar to braising, meat is sealed in a pan on the hob which locks in the flavour. Stock is then added, covered and placed in the oven to cook slowly. This makes the meat tender.	

Tips for grilling:

Protein Keywords

Complete the table below with an overview of the keywords for diet and good health.

Fish		Meat	
Keyword	**Definition**	**Keyword**	**Definition**
Crustacean		Collagen	
Mollusc		Elastin	
Smoking		Myoglobin	
Salting		Muscle Fibre	
Connective Tissue		Maillard Reaction	
Coagulate		Non-Enzymic Browing	
Enrobed		Gelatin	

Meat

Meat is classified as the muscle tissue of dead animals and birds.

Meat is made of muscle cells, which consist of long fibres held together by connective tissue.
Long fibres are connected with tough meat- the older the animal, the tougher the meat. Small fibres are associated with tender cuts.

Preparing Tough Cuts of Meat

Muscles that work a lot, such as the thighs and shoulders of animals, give tough meat, e.g. shin and brisket. They will need longer, slowing cooking methods in wet heat, e.g. stewing, braising, pot roasting and casseroling.

Marinades are added to meat before cooking to add flavour and the acid content breaks down the proteins.
Below, mind map different types of marinades and suggest dishes for each:

What does it mean to tenderise meat? Give examples of ways in which meat can be tenderised.

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The Effects of Cooking Meat

The browning of meat is caused by a reaction with natural sugars and proteins to produce a dark colour.

What is this process called?

_____

Checking for readiness:
You should know the safety rules for cooking meats. Explain how to check that meat products are cooked correctly, including key temperatures.

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Why can steak be served rare but burgers made from mince should be cooked thoroughly?

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How should meat be stored safely? Include key temperatures in your answer.

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Cuts of Meat

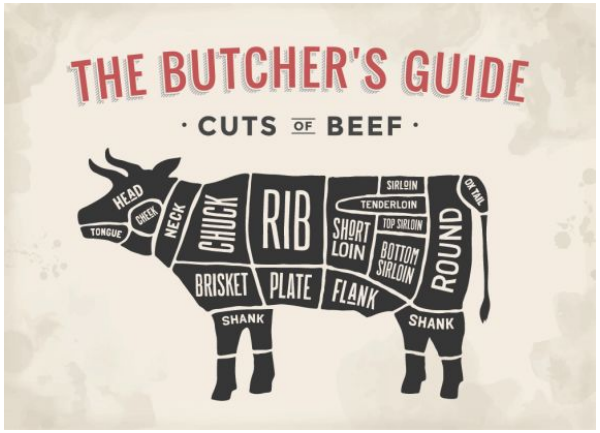
Cuts of meat are prepared by butchers in shops or supermarkets to meet the different needs of consumers.

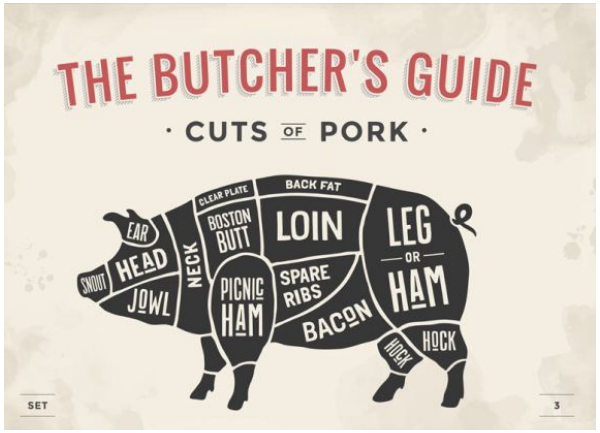
Today the consumer is looking for meat that:

- Can be used in different ways - Cut into convenient portion sizes - Convenient to prepare - Simple to store - Easy and quick to cook - Low in fat

Suggest a recipe which uses the different cuts of meat in the table below.

Meat Cut	Beef	Lamb	Pork
Boneless Cuts			
Boned and Rolled Meat			
Cubes			
Lean Mince			
Thin Strips			





Types of Fish

Fish can be classified according to their origin.

Fish live in fresh or salt water, have fins and backbones. Shellfish have shells instead of backbones.

Fish can also be classified into oily fish, white fish and shellfish according to their colour, fat content and body type.

Complete the table below with different types of fish and use the key to help subcategorise.

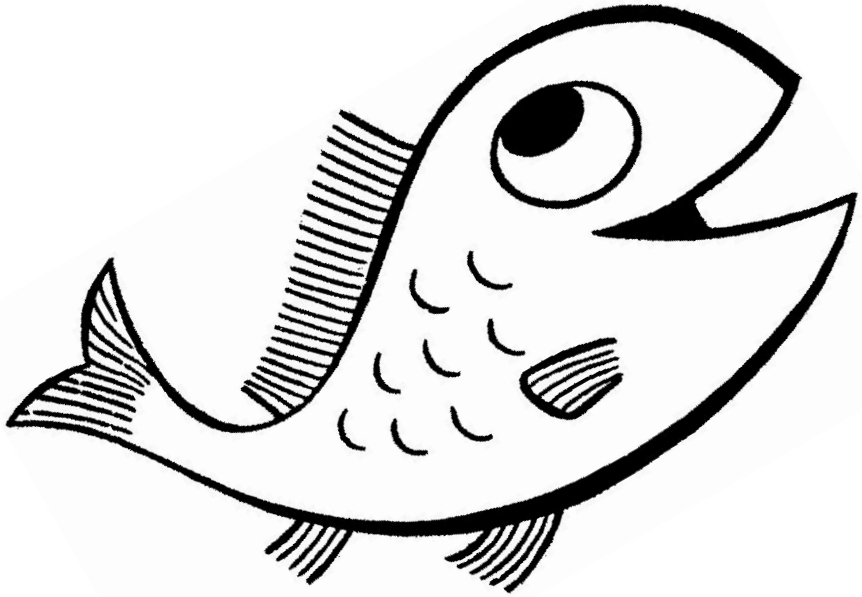
Oily Fish	White Fish	Shellfish

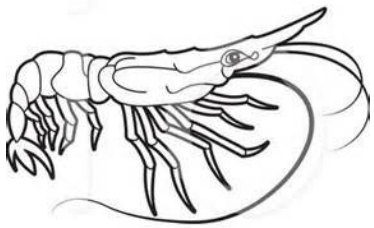
Key

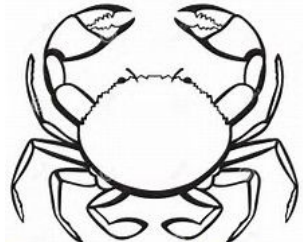
- ❑ Fresh water
- ❑ Salt water
- ❑ Round (white fish)
- ❑ Flat (white fish)
- ❑ Molluscs
  Small soft bodied sea animals which live inside a soft shell
- ❑ Crustaceans
  Soft bodied, jointed sea animals which are covered by a hard, protective shell

Top Tips for Buying Fresh Fish

Label the image below with what to look for when purchasing fresh fish.







Fish is an important commodity in the diet. List which nutrients are found in fish. Why is it recommended to eat a portion of oily fish a week?

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Ways of Preserving Fish

There are several ways to preserve fish for long term storage .

Complete the table below:

Preservation Method	Definition	Type of Fish	How Long it Keeps For	Recipe Suggestion
Salting				
Smoking				
Pickling				
Canning				
Drying				
Freezing				

Protein Denaturisation and Coagulation

Proteins are denatured during cooking. Egg proteins coagulate or set when they are heated.

Denaturisation occurs when the structure of amino acids found in protein are altered. They change shape or unfold because chemical bonds are broken. Protein in foods can be denatured (altered) by heat, reduction of pH level (more acid), enzymes and mechanical action. Protein coagulation is a type of denaturation.

Complete the chart below explaining how proteins are denatured via the following actions, include key temperatures where appropriate:

Heat	
pH	
Enzymes	
Mechanical Action	
Coagulation	

Enzymic Browning and Oxidation

Enzymes can cause the browning of fruit and vegetables. Fruit and vegetables need careful handling during preparation to prevent enzymic browning.

Discuss: What changes have happened to the apple and how can they be prevented.

Explain what oxidisation is compared to enzymic browning, and how it can be prevented.

Dough and Gluten Formation

Keywords	
Gliadin	
Glutenin	
Gluten	
Carbon Dioxide Gas	
Shortcrust	
Choux	
Ratio	
Rolling Boil	
Heavy Dropping Consistency	
Rest	

Bread dough is made with strong plain flour, which contains a high level of protein.

Explain below how enriched dough and pasta are made, and how they differ from basic bread dough.

Enriched Dough	**Pasta**

Pastries

Different type of pastries are used for sweet or savoury dishes.
Give a brief description of each type and an example of its use in food preparation.

Shortcrust	**Choux**	**Flaky / Rough Puff**
Hot Water Crust	**Filo**	**Puff**

The Function of Ingredients in Bread Making

Research and explain the function of the key ingredients used in bread making.

Wheat Flour	Liquid	Yeast	Salt	Other Ingredients Used in Bread Making
				Fat
				Sugar
				Ascorbic Acid

The Science of Bread Making

Research and explain the key stages of bread making and the food science relating to the physical and chemical reactions taking place in the bread.

Sifting the flour…	**Proving Dough…**
Adding warm liquid…	**'Knocking Back' Proved Dough (then shape and give a final prove)…**
Mixing and Kneading Dough…	**Baking…**

What is the Chorleywood bread making process? Explain the difference between this and the process of bulk fermentation?

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Carbohydrates

Complete the table below detailing the functional and chemical properties of carbohydrates.

Gelatinisation	Dextrinisation	Caramelisation
Definition:	**Definition:**	**Definition:**
Scientific Changes that Occur:	**Scientific Changes that Occur:**	**Scientific Changes that Occur:**
Examples in Food Preparation:	**Examples in Food Preparation:**	**Examples in Food Preparation:**

Circle the correct words in the following passage:

The function of starch in thickening a **solid / liquid** is known as **gelatinisation / caramelisation** . For a sauce to thicken it needs to be **chilled / heated** and also **stirred / sieved** to ensure a smooth sauce. A sauce should be heated to a **setting point / boiling point** to prevent it tasting raw.

Sauces

Sauces are either used as part of a dish- for example a pasta bake- or may be served as an accompaniment to a food- for example pepper sauce with a steak.

The main point to consider is how the sauce will compliment the dish.

What can a good sauce add to a food dish?

Complete the table below with examples of dishes that can be improved by adding a good sauce:

	Dish	Improvement
Flavour		
Colour		
Moisture		
Nutritional Value		

Types of Sauces

Complete the table below with the name of each sauce and some examples (sweet and savoury):

BLENDED EMULSIONS ROUX REDUCTION

Sauce	Description	Examples
	A combination of fat and flour cooked for a particular length of time depending on the colour of sauce required. Basic ingredients= fat, flour, liquid and seasoning	
	Milk and cornflour are mixed together and heated until the sauce thickens. There is no fat.	
	Sauces usually made from meat juices. Boiled to reduce the liquid, to intensify the flavour and to thicken the consistency.	
	Sauces made with oil and vinegar which are shaken together with an added emulsifying agent to stabilise the mixture.	

Fats and Oils

There are two types of fat- saturated and unsaturated. Saturated fat comes from animal sources, such as butter and lard. Unsaturated fat comes from vegetable sources, such as margarine and vegetable shortening.

Complete the table below detailing the functional and chemical properties of fats and oils.

Shortening Fats make pastry short and crumbly, and gives colour and flavour.	**Plasticity** The plasticity of fat allows it to be used for rubbing-in, spreading and creaming.	**Aeration** Fats can help aeration in baking, the creaming method aerates a cake mixture and helps it rise.	**Emulsions** Emulsions are mixtures of liquids that do not normally mix, e.g. oil and water.
How does fat shorten a Pastry Mixture?	**What does plasticity mean?**	**During preparation of a creamed mixture:**	**The process of emulsification:**
What happens during the cooking of pastry?	**Fats that are solid at room temperature and uses:**	**During baking of a creamed mixture:**	**Examples of emulsifying ingredients:**
Examples of products that use shortening:	**Fats that are liquid at room temperature and uses:**	**Examples of products that use the creaming method:**	**Examples of products made using emulsification:**

Raising Agents

Raising agents are added to most baked products during the making process using gas, air or steam which, when heated, expands causing the food to swell and rise up. Raising agents produce a risen, light and airy texture in the food. **Unleavened** products don't use a raising agent.

Complete the table below describing how the different raising agents work, with examples of baked products for each.

Mechanical Air will expand when heated, incorporated into the product via:	**Physical** Steam is created in products that contain large amounts of water.	**Chemical** Most cakes and biscuits need Carbon Dioxide to create the light, airy texture.	**Biological: Yeast** Yeast is a living organism grown commercially for bread making and alcohol production.
Sieving	**Air**	**Bicarbonate of Soda**	
Whisking			
Rubbing-In	**Foams**	**Baking Powder**	
Creaming			
Lamination	**Steam**	**Self-Raising Flour**	