

KITCHEN AND FOOD MANAGEMENT

Aim

Discuss the provision of kitchen facilities, and the handling of foodstuffs (including food storage and preparation), in order to maximise efficiency, hygiene and service with the restrictions of facilities available.

EFFECTS OF FOOD PREPARATION ON NUTRITION

The quality, kinds and amounts of nutrients in foodstuffs are first determined by the way they are grown. Healthful foods are grown in conditions that provide an optimal balance of nutrients from soil (or in the case of hydroponically-grown produce, from the nutrient solution), sunlight and water. Other factors can improve or reduce the nutrient values of growing foods. For instance, using nitrogen fertilisers when growing plants may accelerate their growth rate, and can cause a small increase in protein content. At the same time, vitamin C content usually decreases. It is also debatable whether using organic or inorganic fertiliser makes any difference to the nutrient content of the plant food, or to its health effect on the consumer.

The initial processing of a foodstuff can also affect its nutrient content. For instance, milling cereals can result in loss of various nutrients (including fat, fibre, certain vitamins and minerals), though the loss depends upon the milling processes involved. Also, many grains are stripped of their nutritious outer husk during initial processing, reducing their overall nutrient value. The nutrient content or flavour of some foods is increased or intensified by drying.

Effects of Cooking

Various food treatments and preparation methods can also destroy nutrients. Cutting, peeling or trimming foods in preparation for cooking will remove nutrients. The quantity and kinds of nutrients removed may vary according to which parts of the foods are discarded. Trimming fat from meat may, for example, be advantageous, as it reduces the animal fat content of the meal, while peeling skin from fruit or vegetables will often result in loss of some of the most nutrient-rich parts of the food.

As discussed in an earlier lesson, cooking can improve the taste and digestibility of some foods, and in some cases, increase their nutritional value to the consumer. Heat also destroys microorganisms that may contaminate food and cause problems if ingested. Heat from cooking is destructive to a wide variety of nutrients, and for this reason, many foods are more nutritious if eaten fresh, or with minimal cooking. Some effects of cooking on food nutrients are listed in the table below.

Other methods of food processing which can affect nutrition include: controlled-atmosphere storage, blanching, canning, freezing, dehydration (drying), toasting, sprouting and pasteurisation.

Beneficial and Detrimental Affects of Cooking

Benefits of Cooking	Problems Caused by Cooking
Converts certain otherwise inaccessible nutrients to a form which can be used by the body.	Destroys some nutrients (particularly vitamin C, and to a lesser extent vitamin B1).
Increases palatability of food, by making it softer	May reduce fibre
Destroys harmful microorganisms	Using baking soda in cooking can increase vitamin C loss
Heating legumes destroys substances which inhibit the uptake of proteins into the body.	
Destroys some toxins in certain legumes.	
Heating flour increases niacin available to the body.	
Cooking egg whites and fish makes biotin and vitamin B1 available.	
Grilling lowers fat content of food	Frying can increase fat content

Pressure cooking generally retains more nutrients than other methods. Microwave cooking has similar nutrient losses to conventional cooking methods.

(Reference: Briggs and Walqvist *Food Facts* Penguin Books Australia).

CONTAMINATION OF FOOD

The main concern in handling, storing and preparing foods is possible contamination, which can adversely affect the healthfulness, taste and appearance of food, or worse yet, cause harm to the consumer. Kitchen processes and procedures are a key factor in avoiding food contamination, and must be carefully managed and monitored to ensure that all staff in a restaurant or other food facility follow correct procedure at all times.

Food can be contaminated in many different ways, some of which are discussed below.

Contamination from Cooking

Materials in some cooking utensils can find their way into foods:

- Aluminium - If acidic foods are used with aluminium cookware (eg. saucepans), increased quantities of aluminium will contaminate food. If such foods are cooked in aluminium over long periods, or left sit in the container after cooking, the problem is increased. There is no conclusive evidence linking aluminium with health risks, but suspicions exist.
- Copper – Similar problems to aluminium: cooking acidic foods will increase copper contamination, and copper can cause destruction of vitamin C in foods. Excessive copper in the body is a toxin.

The safest types of cookware include earthenware, glass, enamel and stainless steel. Materials from fuels (eg. ash from a wood fire) may also find their way into foods. There have been reported cases of poisoning when people have used treated pine off cuts to cook a barbeque. The treatment used on pine to prevent it from rotting, when burnt, releases toxic chemicals. These may be inhaled, or may find their way into food. If using wood for a barbeque, make sure it is untreated.

Contaminants from Food Processing

Various materials used in processing foods can contaminate the foods, though the likelihood of a problem is low. These contaminants may include:

- Cleaning materials
- Lubricants
- Packaging materials
- Chemical residues (eg. glues, solvents etc)
- Other substances (eg. hair, insects, rodent excreta) that enter the food through unsanitary or careless practices probably pose the most obvious threat.

Pathological Contamination

Most foods will become contaminated with pathogens (ie. microorganisms) after a period of time. This time period may be very short (eg. hours) for some foods, under normal room conditions. For other foods, spoilage may take weeks, months, or even years to occur.

Microorganisms

Microorganisms including bacteria, moulds and yeasts may cause putrefaction, decay, fermentation or moulding of food. Small quantities of such microorganisms are common in the environment, and will almost inevitably be found on the surfaces of most foods. Under favourable environmental conditions, these organisms can grow and multiply at an alarming rate, feeding off the foodstuffs. If the surface of a food is damaged or broken, microorganisms are more readily able to penetrate the inside of the food, and can develop even faster.

Enzymes

Decomposition of food can also be hastened through the action of enzymes. Various enzymes occur in fresh foods that are part of the nature, controlling natural mechanisms such as the ripening of fruit. These enzymes will continue to affect the biochemistry of the food beyond peak condition, and in so doing they can contribute to deterioration. For example, fruit and vegetables that are not quite ripe may be acidic.

Enzymes in the plant material will progressively assist changes of acid to sugar, hence bringing about a ripening. Eventually it will pass a stage where it is in optimum condition, and tissues will begin to deteriorate.

Mechanical Deterioration

Physical or mechanical damage to food can cause deterioration. Damaged parts of food will then be more susceptible to attack by microorganisms (or other problems). Damage may come from bruising, cutting, tearing, puncturing, insects, birds or other pests, etc.

Ripening of Fruit

As a fruit ripens, it undergoes a variety of different changes, and susceptibility to attack by microorganisms will increase as it progresses through these changes. These changes may include:

- Abscission
- Softening
- Changes in carbohydrate (ie. increase in sugar content)
- Organic acid changes (decrease)
- Change in colour
- Seed maturing
- Change in respiration rate
- Change in ethylene production
- Change in tissue permeability
- Change in protein content
- Production of volatile oils
- Development of wax on skin.

Consideration needs to be given to these different changes when considering storage and preservation of fruits.

Low Temperature Damage

Storing fresh foods (eg. fruit and vegetables) at low temperatures will slow deterioration by reducing the rate of respiration and metabolism, to a greater or lesser extent. Low temperature doesn't slow all metabolic processes though. Some metabolic processes (ie. cold labile enzyme systems) will stop completely if the temperature becomes too cold. Given that some reactions may still occur and others stop, an imbalance can develop where certain chemicals accumulate through some reactions producing them, but they are not disposed of because the elimination metabolism is stopped. The net result can be an accumulation of certain chemicals to toxic levels resulting in cells collapsing, and areas of tissue where this occurs becomes brown.

Chilling Injury

Can occur in tissues exposed to temperatures below 15°C in some tropical plants. The critical temperature will be lower for other types of tissue. (Note: This is different to freezing injury where ice crystals are formed inside tissues at temperatures below zero). When plant tissue is damaged by chilling, various metabolic chemicals can be released from inside cells (eg. amino acids, sugars, salts etc). Floating freely in tissues, unprotected by the cell walls, these chemicals become a food for microorganisms, particularly fungi. For this reason, fruit may often be more susceptible to rot after cold storage than before (particularly the more susceptible tropical fruits).

Preventing Food Poisoning

Some microorganisms that contaminate food CAN cause illness. Some illnesses are more serious than others. To avoid such illness, food must be handled properly, and every effort made to minimise food contamination. Precautions to take include:

- Cooking at high temperatures to destroy microorganisms
- Storage at low temperatures to minimise microorganism growth.
- Using fresh food, to reduce the time for microorganisms to develop
- Practicing good hygiene to minimise the range and number of microorganisms which might come in contact with food.

Most microorganisms will grow and multiply between 15 and 63 degrees Celsius. The greatest growth for most is around 37 degrees Celsius. Any susceptible foods should not be kept at these temperatures for any period. Preferably, avoid these temperatures altogether during storage and preparation. At lower temperatures, the growth of microorganisms is slowed or even stopped, but the microorganisms may not be destroyed. At higher temperatures, harmful microorganisms are destroyed.

Caution: Frozen foods (eg. meat), may not reach a sufficiently high enough temperature in the centre when they are cooked, even if the outside is cooked at a temperature over 63. To ensure any microorganisms inside meat are killed during cooking, meat should be completely thawed before cooking. This thawing is best done slowly at a low temperature (eg. over 1-2 days in the bottom of a refrigerator).

Hygiene to Practice

- Always wash hands before preparing food
- Never smoke when preparing food
- Never comb hair near food
- Cover wounds, cuts, pimples (eg. with a fresh band aid)
- Don't touch pets when preparing food
- Control insects and other pests in food preparation areas
- Wash all benches and utensils with hot water.
- Don't eat or lick food in preparation, and then bring unwashed fingers or utensils back in contact with food.
- Don't use the same knives, benches etc for preparing different foods without first properly washing them (eg. Avoid cutting vegetables with a knife used on meat a few seconds before).
- Separate storage places for raw and cooked foods.
- Handle cooked food to the minimum (ie. use spoons or tongs, not hands, after cooking).
- Don't keep food warm; keep it either hot or cold!
- Discard any food that is suspicious - If in doubt, throw it out.

FOOD, LAW AND LABELLING

Laws vary from country to country with respect to food. Laws are frequently changed; however, there are some general considerations which are common and constant in many countries:

- Laws require specified information be printed on labels attached to specified types of foods
- Laws control the addition of additives to foods, including preservatives, colourings and flavour enhancers.
- Laws control the storage and preparation of foods in commercial situations, including shops, warehouses and restaurants.

Labelling

Usually a label must include:

- A common name for the food
- Name and address of the supplier or packer
- No statement or pictures that are false or misleading.

Labelling may state ingredients, but should contain no statement relating to medical condition (eg. It should not claim to be beneficial to a particular medical condition. This would make it a medicine, rather than a food).

Ingredients - When ingredients are stated, ALL ingredients must be stated, and listed in descending order of quantity (ie. The greatest quantity ingredients always listed first, and the least quantity listed last). Water can be simply stated as "water added", without any statement of quantity. Some other foods (eg. cheese and alcohol) are exempted from listings of ingredients.

Nutrients

Listing nutrients is normally required when nutrients are added to food, or when a nutritional claim is made. Nevertheless, many manufacturers still include nutrients on a label, even when not required by law.

Nutrition labelling format is set down by law, requiring the label to include:

- Serving size
- Number of serves per pack
- Energy (ie. kilojoules or cal)
- Protein level
- Fat level
- Carbohydrate level
- Sodium level
- Potassium level

If fortified with vitamins or minerals, the amounts of each of these different nutrients must be included, together with a statement of the proportion of the daily allowance in a stated amount of that food.

Dating

This refers to a date marked on the food or package. This may be either:

- Date of packing or processing
- Use by date (When it should be used by)
- Best before date (When it is best to be used by).

Special Purpose Foods

Some foods may be designated as having a special purpose (eg. Approved by the heart foundation, Low Joule food, Carbohydrate modified, etc). There are requirements that must be met to satisfy some of these labellings.

(Reference: Briggs and Wahlqvist (1988) *Food Facts* Penguin Books Australia)

ETHICS

The Ethics of Using Food Additives

In many developed nations most people are part of large urban communities, where living standards are high. As consumer demands become more sophisticated, the amount of food additives used must increase.

A Joint Committee of the Food and Agriculture Organisation (FAO) and the World Health Organisation (WHO) considered this problem and came to the conclusion that the use of additives was justified where they fulfilled one or more of the following functions:

- Maintaining nutritional quality of food
- Enhancing keeping quality or stability with a reduction of food wastage
- Making food more attractive to the consumer in a manner that does not lead to deception
- Providing essential aids to processing.

The control of additives in food is being gradually improved and tightened and testing procedures are becoming more rigorous. In many developed nations, matters relating to the composition, description, labelling and advertising of food are considered by Food Standards Groups; for example, in Britain, this is carried out by the Food Standards Committee.

ALLERGIES, SENSITIVITY AND POISONING

All foods are comprised of chemicals. The bulk of most foods will usually be well-known, safe chemical compounds, from the major food groups (ie. Any combination of carbohydrates, fats, proteins, minerals, vitamins, water).

Other components in foods, usually found in relatively small quantities, may include:

- Alcohol
- Trace Elements
- Flavourings
- Colourings
- Additives (eg. preservatives)
- Dietary fibre
- Drugs (Pharmacologically active substances such as caffeine)
- Toxins (eg. natural poisons such as cyanide)
- Toxic Contaminants (eg. pesticides)
- Non Toxic Contaminants.

Some of these things may upset the body's metabolism. Generally these "other components" are in such small quantities that they are of no major concern for most people.

Some people may be more sensitive to particular "other components", and may suffer when exposed to relatively low levels (ie levels which the general population may tolerate). An allergic response to a food component may show up in any of a variety of different ways, and to a lesser or greater degree of severity. Often a person will be tolerant of many problems when young, but with repeated exposure to an unwelcome chemical compound, the ability to cope with that compound will decrease until a level is reached where problems occur. Similarly, a healthy and young body will often have the vigour to cope with and overcome adverse chemicals in its system; but if that body becomes ill or fatigued, chemicals which may cause problems (even if they were previously no problem).

Common Symptoms of Food Allergies

These may include: diarrhoea, vomiting, abdominal pain, eczema, hives, swollen areas of skin, hay fever, sinusitis, asthma, bronchitis, headaches, irritability, convulsions, dizziness, tiredness, depression, tinnitus (ringing in ears), aching muscles, inflamed bladder. Swelling around the lips and face, difficulty breathing or the sudden appearance of a rash are indicators of a severe anaphylactic reaction.

Foods Which Often Cause Allergies

Common problem foods include: dairy products, eggs, fish, shellfish, chocolate, chicken, pork, veal, tomatoes, mushrooms, brazil nuts, walnuts, wheat, rye, (occasionally other cereals), some seeds (eg. poppy, sesame, coriander), bananas, strawberries, citrus, pineapples, mangoes.

KITCHEN DESIGN

Types of kitchens vary according to the nature of the catering business, the menus, and the volume of production required. If the establishment is a new development, it will have an opportunity to design for specific needs. Still, you will need to consider any future requirements and allow sufficient flexibility to adapt or change the kitchen if the need arises. Invariably, a designer is faced with existing premises and constraints that restrict the freedom of design and usually result in a compromise.

Kitchen space is not as critical as dining room space; however, it is essential to allocate sufficient area for storage, and to ensure that preparation, production and service can take place smoothly, safely and efficiently. If too much space is involved, there will be an extension of traffic flow, with an increase in fatigue and production time. There is a dilemma regarding the choice between a compact design using small numbers of catering staff and providing for a low capacity regular trade, or an extensive layout that is only used at certain times. This is a common problem, but a satisfactory solution is possible if we pay due attention to detail.

Variation and frequency of demand must be considered on merit. If the call for higher output is only occasional, staff can often meet it without problems, provided there is sufficient service area. Space allocation in commercial applications is more restricted than in non-commercial establishments such as industrial canteens, hospitals, schools etc. The smaller the operation, the less thought and attention are paid to layout and design.

Another common consideration is the speed of development necessary for opening a commercial undertaking. If we give insufficient time to kitchen planning, staff may have to live with the management's mistakes; thus, long-term costs and expensive modifications may occur. Apart from the financial viewpoint, we must also consider the human considerations of a working environment. If staff are satisfied and are working in a comfortable environment, they are likely to be more efficient and productive. Good design should result in higher productivity, faster service, more economical working, and most of all, a better quality end product.

Designers should also be concerned with hygiene, installation, maintenance and operating costs. The major factors to consider when designing a catering system are:

- The products, the preparation and service of food and drink items
- The volume of demand per service and the duration of service
- The staff and support services required.

The marketing policy or menu plan, and the purchasing policy (ie. types of food required to satisfy the menu, i.e., fresh, frozen, dried, etc) will determine the catering design.

EQUIPMENT DESIGN

We can subdivide equipment in the food area into the following groups:

- Reception equipment - Items such as floor scales and trolleys
- Storage equipment - Store room items and refrigerators
- Preparation equipment - Equipment for removing packing, peeling and skinning, size reduction, mixing and blending
- Cooking equipment - Equipment designed to apply conduction and/or convection and/or radiation to foods
- Service equipment - Storage for end products, and for presentation
- Cleaning equipment - Washing up, cleaning floors, cleaning other surfaces, and other equipment.

Criteria for Equipment Selection

The selection, operating, location and maintenance of each item of equipment from any of the above groups should conform to certain criteria. For each item, consider the following:

1. Original and Replacement Costs

Planners need this information to calculate the operational cost per hour for each item of equipment. This is normally part of the annual depreciation allowance, based on the replacement cost less scrap value as opposed to the original cost.

2. Expected Life

The life of an item may need to be estimated because manufacturers are not always specific. The life will be affected by the way in which equipment is used. Equipment may be subject to constant or only occasional use, and it may be used by only one operator or by many different operators. The methods of construction can also affect the life; for example, a cast iron frame item may last longer than an item that is simply thin metal sheets bolted together.

3. *Capacity or Size*

Capacity and size are measured in different ways for different pieces of equipment (ie. in cubic meters for an oven or in litres of surface area for a mixer). Determine the actual useable capacity or space rather than the gross figure, as certain areas - like tops and bottoms of conventional ovens, and the top 5 centimetres of a mixing bowl - may not be useable in practice.

4. *Energy Consumption*

Saving energy is a common need, especially in high consumption areas such as catering. Fuels vary in cost, efficiency, and availability and the caterer must use energy properly. He or she should cost equipment for energy consumption, both on stand-by, if applicable, and give a rate per hour of operation.

5. *Maintenance Program*

Manufacturers will advise on recommended maintenance programmes for their equipment. Sometimes they also offer a variety of maintenance contracts.

Do not ignore or delay maintenance until equipment breaks down, as this can result in total disruption of catering. Plan maintenance with on-site engineers. If the establishment does not employ engineers, use a contractor for the maintenance. Ensure the maintenance is completed and registered in an inventory. This not only ensures that the work is done when it should be, but also provides records upon which to base costings.

6. *Cleaning Schedule*

The cleaning, whether daily, weekly or at other intervals, should be recorded and checked on completion. The ease of cleaning and the method employed are important criterion that must be considered at the time of purchase. Avoid equipment with cracks between the surfaces, or with difficult access to parts that require cleaning.

7. *Specific Purpose*

Several items of equipment may be used for more than one purpose: for example, a mixer/blender that has a comprehensive range of attachments. Defining the purpose of any item of equipment with great care is very important, because only in such a way can accurate decisions be made.

8. *Location or Degree of Mobility*

A degree of mobility may enable better use of some items of equipment. Systems now use mobile units with flexible power and service couplings so that ovens, for example, can be moved easily from one section of the production area to another

9. *Safety*

In most developed countries, legislation governs the manufacture and operation of many items of equipment.

Equipment Inventory

Recording information in an inventory system will enable accurate pricing in cost of capital, maintenance and energy per unit of production. To produce an equipment inventory, look in more detail at the equipment used in the areas discussed in the following section. It is necessary to identify the equipment normally found in these areas, and how this affects the subsequent planning processes.

- *Reception Area*

Allow sufficient space for the receiving and checking of goods coming into and out of a catering area. (This may include a weighing machine). Provide a separate area for waste bins, empty containers, recycling bins etc. These might be mounted on a low stand or rollers to simplify washing floors. Provide a separate room for refuse and waste in larger kitchens. This room should have a tiled floor and a central drain to allow lower walls and the floor to be washed down daily. Consider the refrigeration of this room, especially in warmer climates. If bulky items such as cases and sacks are to be handled, make provision for trolleys and trolley parking areas.

- *Storage Area*

Design the stores area in any catering establishment in a way that helps the successful running of the kitchen. The main object is to keep reasonable stocks so that the kitchen can supply a meal whenever one is required. If you have not allowed sufficient storage space, you might need to purchase food more often and perhaps in a hurry. If an excessively large space is allocated to stores, there can be a danger of overbuying/over stocking, so that food might not be as fresh as it should have been.

Before deciding what storage space is needed, consider the delivery position. If deliveries are made daily, you can reduce the amount of storage; if there is a minimum sized order required for delivery, the store must cater to that size. For establishments in isolated areas, deliveries may be less frequent, so a larger store with special facilities (eg. cool rooms etc) may be needed to hold larger amounts of foodstuffs.

Storerooms should have appropriate ventilation and insulation. This may be helped by where they are located within a building. Consider prevailing weather (eg. direct sun, prevailing winds etc).

Storage areas may be divided into the following areas:

- *Dry Store*

Generally the temperature of a dry store should be approximately 9 to 10 degrees Celsius. This may be achieved through natural ventilation and insulation or, in some instances, with the aid of gentle refrigeration. Fittings are best made of non-corrosive metal (eg. stainless steel), if possible, rather than with timber shelving or benches. Metal storage bins are preferable for sugar, flour and dry cereals. Mount these bins on wheels or suitable castors so they can be easily moved in and out of food preparation areas, if necessary. Fit the storeroom with both platform and table weighing machines. Shelves under tabletops should be a minimum of at least 230mm above the floor, to make cleaning easier.

- *Vegetable Store*

The temperature should be around 9 degrees Celsius or lower. This room needs more detailed attention than other storerooms because of the possible rapid deterioration of this type of food. Provide sufficient raised platform space, preferably slatted metal storage, for sacks of potatoes and other root vegetables. This creates circulation of air, which prevents the moisture that causes moulds or rots. Provide open-mesh storage racks or bins for other vegetables. These should be shallow for the storage of green vegetables (in single layers).

Fit the bottom of each rack or bin with a tray to collect dust or other rubbish (mount these collection trays at least 230mm above the floor for ease of cleaning).

○ *Refrigeration Stores*

You cannot store all different types of foods in a normal refrigerated room. Among other reasons, some foods (eg. fish) have strong odours that can taint the flavour of other foods. Authorities usually recommend that special fish storage cabinets operate at 0°C. High humidity is also preferable for storing wet fish or fish fillets. Larger establishments require separate meat daily, and can divide general and cold stores, and total this up through the other rooms. A useful guide for estimating the capacities is 3.4 cu. metres per ton of meat; 4.25 cubic metres per ton of wet fish; and 7.1 cu. metres per ton of mixed daily produce.

Storage Temperatures

Deep Freeze	-18°C
General Cold Room	+ 4°C
Fresh Meat	- 1°C
Frozen Meat	- 8°C
Wet Fish	0°C
Milk and dairy produce	+ 4°C

Deep freeze storage may either be a cabinet model with swing doors, or a lift up lid (chest) type. Both are equally effective. In larger establishments, an actual deep freeze room might be necessary for frozen foods, ice cream, etc. Besides a refrigerator and deep freeze, an ice-making unit may also be needed. The capacity for ice making will depend upon both the establishment size and the climate. Alternatively, if iced drinks are served from the kitchen, installing a separate ice cube (or flake) maker may be necessary.

Managing the Freezer

You should plan what you freeze. Keep a written record of what you freeze and when you freeze it, so you can identify the oldest food, which should be used first. When you remove something from the freezer, mark it off on your record. Plan how much of each crop you put into the freezer, so you don't end up with too much of one thing and too little of another.

Consider:

- The size of your freezer
- How much food you need
- Seasonal variations in supply and quality of produce, and whether or not large quantities will be frozen
- The time needed to prepare and pack food for freezing.

PREPARATION AREAS

All stages of the preparation operations are very important to correct planning, and one should study them carefully. These activities offer many opportunities for savings in time. Having separate rooms for various preparations is not necessary, especially in a smaller operation. Staff can carry out work adequately on special tables within the perimeter of the kitchen area, if there is sufficient demarcation such as an above-bench division, or preferably a low wall division. The following notes refer to different preparation areas or rooms.

Vegetable Preparation

Because many vegetables are bulky, provide deep sinks in the preparation area. These should be dual sinks: one compartment for soaking before trimming, and the second for soaking before cooking. In the larger kitchens, make the preparation and soak sinks mobile. After washing, peeling etc, the water drains into an open gully and cooks transport the semi-dry raw vegetables from the sinks to the appropriate cooking appliances. This saves double handling of raw materials.

The preparation tables should be constructed of metal, but hand slicing requires portable wooden blocks. Allow sufficient storage for preparation utensils, such as knives, etc. Have open-mesh racks underneath the preparation bench to store utensils. Machinery should include a peeler, chipper, and a general-purpose machine for size reduction. There are many needs for size reduction equipment such as dicers, shredders, slicers, graters, etc. in the preparation areas, so maintain a central pool of this equipment in larger establishments.

Salad Preparation

In smaller catering establishments, carry this work out in the vegetable room or area. In larger kitchens, and where salads are served in large quantities, make this room separate. It should be next to the cold rooms, and fitted with stainless steel bench, with removable wooden chopping benches. Have sufficient bench area to set out the salads after preparation. Larger establishments should be fitted with a small cold cabinet for salads, cold meats, hors d'oeuvres, etc.

Meat Preparation

Because of transportation of bulk meat from the cold room, have the preparation area as close as possible to the cold storage. The larger catering establishments might need to be fitted with virtually a complete butcher's shop, because meat carcasses have to be cut up and prepared, and joints minced, etc. for pies and other dishes. Poultry and game require similar facilities. Fit this room with a large chopping block, hanging racks, plenty of stainless steel bench space with portable wood carving blocks, and draws underneath to store cutting knives. The benches should have a stainless steel sink let into the top.

In the very large catering establishments, one can fit overhead tracks and pulleys from the cold store to the preparation area to help the handling of large pieces of meat. A mechanical saw is useful for cutting the larger pieces of meat. The smaller catering establishment may not need a meat-mincing machine, normally an attachment to the general-purpose mixing machine in the kitchen. In larger establishments, however, a mincing machine is essential. Kitchens will require various other machines like a sausage machine, steak tenderisers, gravity feed slicers, bowl cutters, etc.

Fish Preparation

Cooks can often carry this work out in the meat preparation area in smaller establishments, if they make a small division to isolate the work. The fish section should have a bench with a slate or marble top for cutting, and a stainless steel sink. If possible, it is advisable to establish a separate fish preparation area. The sink must be large enough to immerse fish for defrosting and any other preparation. As this type of preparation is wet, it is essential that the design of the preparation tables allows for cracks and crevices to cause seepage underneath. Do not have draws under the benches for knife storage. Store these in a removable, lockable utensil box.

Pastry Preparation

This area should be as close as possible to the cold store to simplify the handling of flour and the other goods used in this section. Some chefs, however, prefer to have the actual flour storage area in the pastry preparation room. A further point to decide is whether this area will be simply for pastry preparation or will also include the bakery. Usually in smaller establishments, this is a separate pastry preparation area only, because the cooking range, or possibly a small pastry oven, would be in the kitchen along with the main battery of equipment. In larger establishments, or where a lot of pastry is to be prepared, the pastry preparation room would be a bakery, where the oven is located.

If a shortage of space does not allow for separate preparation areas, and pastry preparation has to be done in the kitchen area, always do this work in the coolest part of the kitchen. Provide stainless steel benches with flush marble inserts in this area. The stainless steel sinks should be fitted with sufficient drawers under the bench to accommodate cutting and preparation utensils. If flour is stored in the pastry preparation room, fit the storage bins with castors to make them mobile. The equipment required will vary according to the requirements of the pastry or baked goods, but a mixing machine is essential, except in a very small kitchen when a general-purpose mixer can be used. Other equipment includes a dough divider, moulder, pastry roller, small cold cabinet, boiling table, pie/tart machines, scales, cooling racks, proving ovens and stacking racks.

COOKING AREA

This section describes some available cooking appliances and the capacities or outputs obtainable from them, to help owners estimate individual cooking equipment requirements.

Central Range

This is the most important item in the kitchen, and in some smaller hotels and restaurants it may be the only piece of cooking equipment installed. In larger kitchens, though, various cooking processes on a cooking range will need to be broken down, and carried out on specially designed equipment. The cooking range typically has ovens below for roasting, baking, etc. and hot plates above for boiling, simmering or frying purposes. Alternatively, the hot plates may be mounted separate to the oven. The height of both depends on preference, and on space available.

Capacities:

Ovens	0.03 cubic metres per 4.5 kg of meat
Hot Plates	10 square metres of hot plate will accommodate 2.3 litres of pan space.

Convection Ovens

These ovens have become increasingly popular because of their cooking speed, reduced cooking times, flexibility as a general purpose oven, evenness of cooking, uses as a reheat oven for pre cooked frozen foods.

Microwave Ovens

When first introduced, these often produced poor results, such as bland-looking or unevenly heated food, or soggy rather than crisp textures; hence microwaves gained a bad name with many caterers. These early microwave ovens, however, did have the unique ability to rapidly heat precooked food, or to rapidly defrost frozen portions, and quickly became standard features of many food establishments. Some modern microwave ovens have overcome previous problems and have many features that allow them to be used for more than defrosting or heating. Still, many restaurants use microwaves only for limited purposes, not for cooking meals, one reason being that the flavour, texture and healthfulness of microwaved food are often believed to be inferior.

Other types of cooking equipment include:

- pastry oven
- boiling pans
- bratt pan
- deep fryers
- steamers
- fryers
- grillers
- infra red ovens.

Cleaning Area

The main concerns in this area are washing dishes and waste disposal. The wash up area should be situated as close as possible to the service point, to reduce the movement involved in returning the crockery to the service areas, where the majority is stored and reused. Incorporate the following features in all wash up areas:

- An adequate unloading area that can handle peak loads, with a separate area for glasses, silver and crockery
- A pre-soak area convenient to the wash up area, for silverware or for casserole and egg dishes
- Ample sorting and loading racks
- A scrapping area. Remove leftovers from the plates before washing, and place in a refuse container in the receiving area. Smaller establishments could have a rubber-ringed hole in the receiving table with a refuse bin placed underneath, but larger kitchens should have a waste disposal unit mounted into the receiving table
- A straight run out of the washing area, especially if the dishwasher is used. This should be long enough to hold a minimum of three racks
- A dish storing area. This will depend upon the layout and whether or not the dishes are to be stored on the outlet side of the washing area, or returned to the service area for immediate re-use or storage. If the crockery is to be stored for any length of time, enclose the storage racks or cabinets.

- Open-type shelves must be perforated with wire mesh. These shelves should be incorporated underneath the tables for the accommodation of sterilised baskets, wash-up baskets, etc.
- Allow sufficient space underneath the dishwashing table to store scrap or waste bins. If waste disposal units are not incorporated, these bins should be mounted on wheels or castors to simplify their removal to the refuse dispatch department. These features may be modified if kitchens employ trolleys or conveyor return systems.

The washing-up kitchen and general utensils must be in a separate area, as close as possible to the actual cooking area, especially the cooking range where most utensils are used. A large stainless steel washing sink (approx 45cm deep) for pots and pans is ideal. A deep sterilising unit next to the sink is handy for brief immersion after washing. A metal storage rack can be located next to the sterilising unit for storing pots and pans. All of this will ease the flow through the washing process. Depending upon the establishment, special arrangements may be made for hand washing facilities (a separate area), washing/sterilising sink, batch or flight dish washing, and separate arrangements for cutlery, silverware and glass.

Waste Disposal

Organic waste produced in commercial catering may be disposed of through a food waste disposer. Dependent on the temperature, organic waste breaks down rapidly through decomposition. The resultant offensive odours from this process are one of the reasons for purchasing a food waste disposer. This type of disposer should not be used for solid waste such as plastic, bottles, wood, cardboard, paper, etc. If the food waste disposer is used, it creates a problem because storage space has to be found.

The installation of a compactor can cut down this area considerably, as by compression, it reduces the waste fed into it by between one fifth and one eighth of its original size. The compaction process usually takes place inside a plastic bag or cardboard carton, which can be sealed, both organic and inorganic waste can be placed in the same machine.

The caterer who decides to purchase a food waste disposer has a wide choice of machines available to them. Obviously with such a wide variation in power, the choice of the correct unit can be difficult. Most manufacturers therefore employ technical staff who can advise on:

- Whether the drainage allows for the installation of a food waste disposer
- The best position to locate the unit
- The approximate cost of installation.

Use this service at an early stage because the user will then know that they have purchased the correct machine for the job, and sited correctly. Any guide about the required power for a unit should only be approximate because much depends on the quantity and type of waste that needs to be disposed of.

The two main waste producing areas in a catering establishment are the food preparation and plate clearing areas. Generally the type of waste produced in the clearing operation is much lighter than that in the food preparation area.

In smaller catering establishments, one food waste disposal unit will normally cover both jobs, but it is important that the unit is geared to deal with the heavier or preparation waste, otherwise the machine will become overloaded. The main direct commercial advantage of a waste disposal unit is to save labour costs.

FOOD SERVICE

Food service is complementary to food preparation and cookery. The service machinery is closely related. Thus, if the kitchen works on *partie* lines, they similarly organise and divide the room into stations. The owner or headwaiter is in charge of the service. The senior supervisor, or food service manager, is usually in charge of all food service, and this may include service in restaurants, in a lounge, a coffee shop, at a bar, and/or room service.

Service Equipment

The range of equipment available under this heading is very wide, and it is influenced by the method or methods of service chosen to meet the needs of the consumer. Service equipment includes the following items:

- *Bains marie* - a utensil which keeps liquid at simmering point, used to keep foods warm. Usually consists of a pan sitting in or over a larger pan filled with water.
- Hot cupboards
- Infra red lamps/heaters - an overhead heating system which keeps food warm without cooking it or allowing it to dry out quickly.
- Refrigerated and/or heated display units - usually enclosed, to keep foodstuff either cool or warm.
- Counter units
- Conveyor systems
- Serving trays, crockery, cutlery, glass, linen etc.
- Beverage preparation/service units.

FOOD SERVICE MANAGEMENT

The organisation of work in the kitchen will depend on the type and size of operation, and the ratio of semi skilled or unskilled to skilled workers being used (maybe 1:3). Mechanisation and the use of convenience foods have altered jobs in the kitchen significantly, and shrinking profit margins require more efficient and profitable working. It is therefore very important to train and develop staff (succession planning) not only in technical skills but also in supervisory and management skills.

It is essential to control materials (now an increasing cost factor in receipt), storage, preparation, cooking and service, and the elimination of waste. Quality control is practiced on a more sophisticated basis, and standardised operational instructions call for precise menu production to consistent standards.

MANAGEMENT AND SUPERVISION

The task of management is to secure close cooperation between the food preparation and the service (eg. serving or waiting on customers). In a guesthouse or small restaurant, the owner is often in charge of service, and possibly someone else (eg. an employee or relative) might handle the food preparation. In larger operations, both the cook and the waiter (or *maitre de*) are employees, perhaps on equal footing, and there can be potential for conflict of opinions.

The traditional staffing of a conventional kitchen follows the well-known *partie* or *corner* system. Kitchens organise the department into three sections: the larder, the kitchen, and the pantry, with certain ancillaries such as the stillroom, stores, wash up and plunge, all under the command of the head chefs office. In a larger establishment, such as a resort, the organisation might be as follows:

Head Chef (OFFICE)			
Head Chef			
Sous Chef			
Secretaries			
Service Assistants			
Larder	Kitchen	Pantry	Services
Larder (Partie)	Sauce (Partie)	Pastry (Partie)	Still Room
	Fish (Partie)		Stores
	Roast (Partie)		Wash up
Tournants	Vegetables (Partie)		Plunge
Chef de Partie	Soup (Partie)		
First Commis	Grill (Partie)		
Commis Trainees	Breakfast and Staff (Partie)		

This is a basic organisation for a traditional European/Western Catering Service. Variations are possible through the margin of functions according to the production output. In charge of each *partie* is a *Chef de Partie*, helped by a first, second and third *Commis* and trainees who act as *Commis Cooks* (also known as *Tournants* or relief cooks). Also included are a *Chef de partie* and *Sous Chefs* who are qualified as trainers.

A central production unit might take the following form:

Head Chef (OFFICE)			
Sous Chef			
Secretaries			
Larder	Kitchen	Pastry	Services
Larder (Partie)	Soups/Sauces (Partie)	Pastry (Partie)	Transport
Stores	Roasts (Partie)	Bakehouse	Wash up
	Vegetables (Partie)		Plunge

MENU AND PRODUCTION PLANNING

This planning should be the result of a group decision by managers - not just the chef. One appreciates that the skilled chef, in designing his menu, takes into account previous sales figures, which reflect customer preferences. He needs to consider the menu balance, texture, flavour, taste, blend of different cooking methods, and (perhaps) the use of left overs. He will take account of his staff, and their ability to produce any standard or variable menu using the equipment available.

Methods of Kitchen Production

Forms of kitchen production can include:

A La Carte Production

This can be defined as the traditional method of the conventional or *partie* system. The menu offers a wide choice of dishes and prices. On the kitchen production side, a certain amount of *mise en place* or advance preparation is done for each service, for example, garnishes, sauces and the like. Apart from this, all dishes ordered *sur la commande* are cooked to order. This requires a flexible system in the kitchen, and relies upon the work of skilled staff.

Table d'Hote Production

A set menu is easier to organise and produce in a kitchen. It consists of each section of the kitchen department producing a set number of portions of each course at each meal service. The meal can then be dished up and served from a hot plate as required. This is a straightforward service and it is one that can be geared to a personal waiter or waitress service, or to various forms of self-service (eg. buffet). This system is less onerous than a *la carte*, and may not require such a high degree of skill from staff. It also allows generous portions to be produced at lower cost.

Call-Order Production

This is the type of service used to provide room service meals in a hotel. It requires less equipment than for an *a la carte* operation. The menu is normally restricted in size and scope, and is commonly made up of convenient, easy to prepare foods. Typical equipment needed might be refrigerators, grills, toasters, deep fryers, microwaves and convection ovens.

There are also other systems such as a very sophisticated *a la carte* system (where no food is pre-prepared), or a simpler system, where all food is served cold (eg. fruit, ice cream, sandwiches, etc).

DIVISION OF ACTIVITIES IN COOK- FREEZE OPERATION

Plan a cook-freeze operation to ensure a smooth workflow at each stage of processing, and also throughout the overall operation.

The main activities are:

- Storage of meat, vegetables, and dry stores

This is the same as in conventional operations.

- Preparation of Cooking

Food preparation is the same as for traditional methods, with the exception that for quantity, production methods are used. While cooking is similar to a traditional catering system, less equipment (taking up less space) is needed. Production is programmed to cook large quantities, thus fully using large-scale equipment and economising on energy.

- Pre-Packed for Freezing

Consider the container size, making sure it is appropriate for handling. The partitioning is determined by freezing, transport and reheating requirements. Freezing efficiency is best if the depth or thickness of the food is no more than 25 to 38mm.

- Freezing

Blast freezing is the most suitable way of dealing with commercial catering-scale freezing. It is flexible, and can freeze all shapes of product. A very strict specification is needed for the specified amount of food to be frozen to a temperature of minus 20°C. It is important that freezing is as rapid as possible to maintain flavour and texture after reheating. The actual freezing rate varies according to the thickness, texture and characteristics of food.

- Sealing

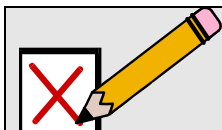
You can store frozen food in reusable containers, or in polythene bags.

- Deep Freeze Holding Store

It is necessary to use a deep freeze holding store to ensure that there is no deterioration of product, and to control supply of food.

- Reheating and Service

Reheating is done by dry heat, moist heat, or microwave heat. All are different. Traditional cooking equipment can be used to reheat pre-cooked frozen foods. Specialised equipment includes forced convection ovens, radiant heat and microwave ovens, and all give different results.



SELF ASSESSMENT

Perform the self assessment test titled 'Test 3.1'

If you answer incorrectly, review the notes and try the test again.

SET TASK

1. Obtain leaflets or information about different types of stoves and ovens. Compare the alternatives in terms of such factors as:

- How easy they are to clean
- Durability (ie. can they break)
- Energy efficiency and cost of operation
- Versatility (What range of cooking applications do they have and how easy are they to use)
- Capacity (ie. Can they cater for larger numbers of people quickly)
- Cost (upfront and maintenance, parts etc).

2. Visit a catering kitchen or restaurant kitchen and observe their staffing processes, operational processes and maintenance processes. Make notes based on your observations.



ASSIGNMENT

Download and do the assignment called 'Lesson 3 Assignment'.