Food Technology Spaces in Secondary Schools

A Design Guide

department for
children, schools and families

‘Food Technology in Secondary Schools’ is an updated extract from BB 81 ‘Design and Technology Accommodation in Secondary Schools: A Design Guide’ TSO 2004

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Avalon Special School
Ringmer Community College
Gateway Academy
West Exe Technology College

Contents

Introduction

From 2011, practical cooking will form part of the broader food technology curriculum at Key Stage 3 and every 11 to 14-year-old will be given food technology lessons in how to make cheap, healthy dishes. This is part of a wider government policy to encourage healthy eating by getting all young people to become involved with and have experience of cooking. To help ensure that every student can learn in up-to-date food technology spaces, in September 2008 the Secretary of State for Children, Schools and Families announced a £150 million ring-fenced capital investment to build food technology areas in secondary schools that are currently without facilities

Introduction

This short design guide on food technology rooms in secondary schools has been produced to help schools plan and deliver these facilities. It is based on Building Bulletin 81[1] , updating the information relating to food. The guidance is intended mainly for schools, designers and local authorities, particularly those involved in Building Schools for the Future (BSF). It covers all aspects of planning and designing successful food technology rooms to ensure suitable spaces for delivering each school's requirements. At the time of writing, the Department is developing exemplar designs for food technology rooms. The final designs - together with a description of the processes that schools and their design teams worked through to arrive at these solutions - will be published later in winter 2009/10.

This guidance summarises current best practice. However, careful and detailed briefing and design development are crucial to ensure the best solution is developed for the particular needs of each school. The information in this document, therefore, is simply a starting point and a checklist for schools and their design teams, rather than a presentation of final designs.

Key ideas and teaching approaches

There is a wide range of teaching practice across food technology, catering and hospitality, which is reflected in a similarly varied approach to designing, arranging and equipping spaces for teaching at various levels. Some clear trends emerge, however, across the spectrum of food teaching, reflecting changes in policy. The renewed emphasis on teaching practical cooking skills, driven by wider concerns in society about health and food, underpins all the guidance in this document.

The immediate need will be for schools without food technology rooms to meet the universal entitlement to food technology by 2011. However, since the spaces will be used to deliver a variety of cooking, food technology, hospitality and catering courses for 11-19 year olds, with a wide range of learning and teaching styles, the design solutions will need to be particularly flexible.

At the beginning of the design process it is essential to:

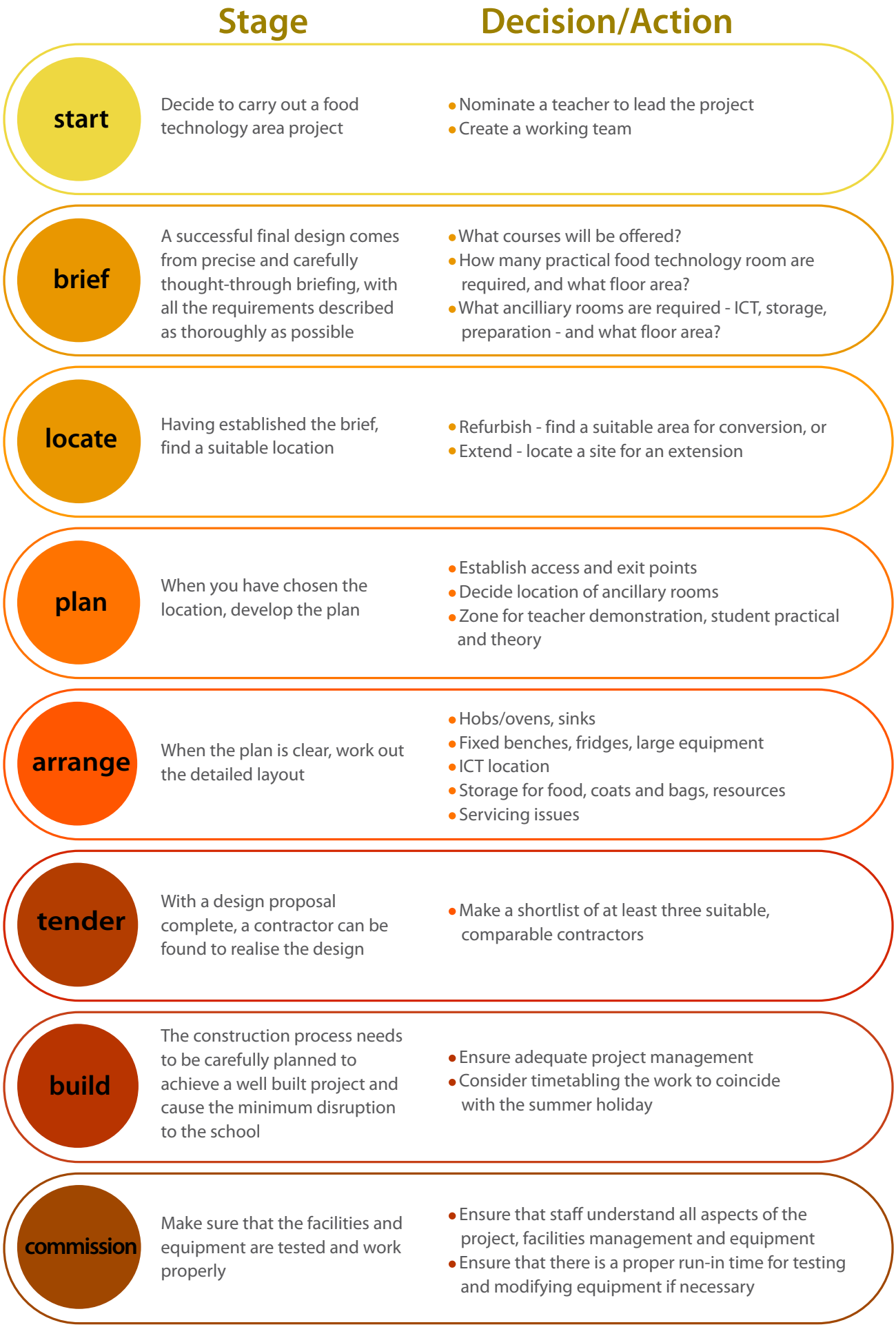
- Analyse the projected curriculum use and student numbers to ensure that the food technology spaces can be optimised
- Test how flexible these spaces would be if a different approach were used (i.e. does the layout still work for a different teaching approach?)
- Consider servicing, environmental design and acoustic requirements

Figure 1 gives a summary of key steps in the procurement process for a food technology space.

[1] Building Bulletin 81: Design and Technology Accommodation in Secondary Schools, A Design Guide. TSO 2004

Figure 1

Decision diagram for a food technology area refurbishment or extention project



1 Planning

This section sets out the principal points of discussion for planning a successful practical food teaching space, including location, options for layouts and the requirements for ancillary spaces.

Planning

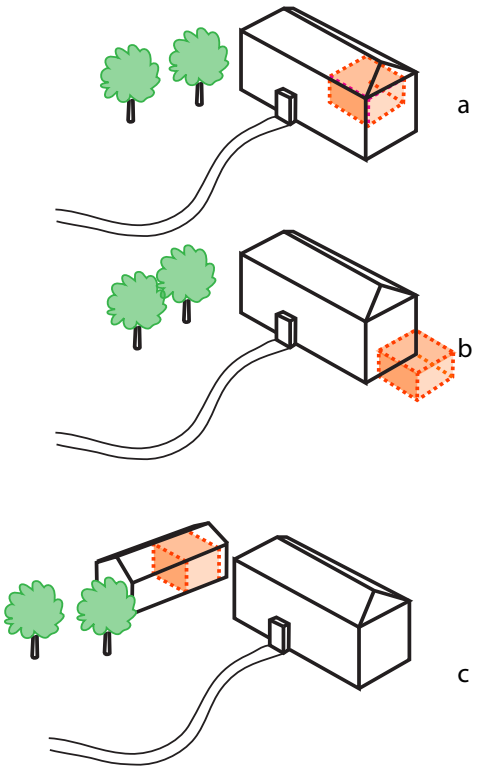
Location

In the majority of schools, practical teaching is provided in one or two food technology rooms as part of the design and technology accommodation[2]. The optimal location for the practical teaching area will depend on the existing school layout. However, there are some general guidelines:

- Cooking spaces are heavily serviced; it will be more economical to locate them close to the primary services distribution (for example, main drain, gas main, electrical distribution).
- Depending on the strategy for ingredients supply, it can be helpful (though not essential) to locate the space close to a vehicle delivery drop-off point or lift.

Figure 2

Finding a location for new food technology rooms as (a) part of existing school building, (b) extension to existing school building, (c) part of new building.



[2] Refer to Building Bulletin 98, Briefing Framework for Secondary School Projects. TSO 2004

Planning 1

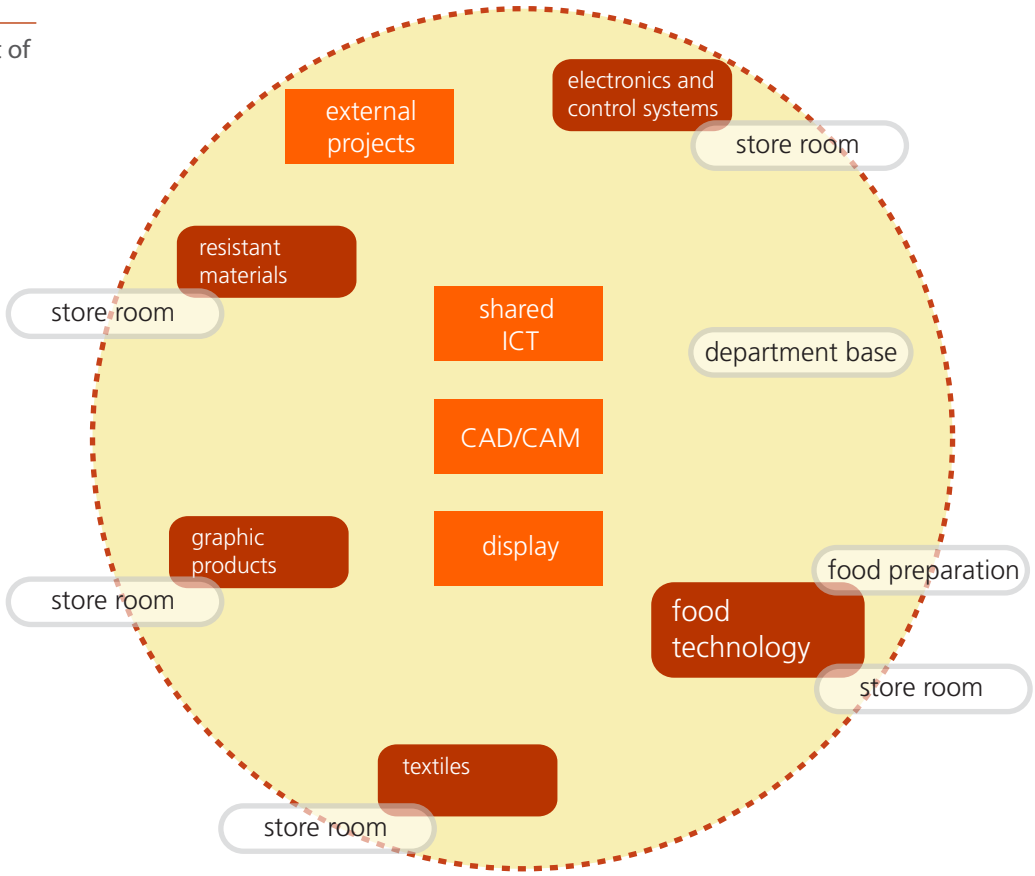
Where the food technology room is to be incorporated in a design and technology suite, good guiding principles for the layout of the suite are:

- The technician's food preparation space should be immediately adjacent to the food technology rooms, not only for the technician's convenience but also for reasons of hygiene.
- The shared ICT/design area should be centrally located, easily accessible to all students and visible from surrounding spaces.
- The departmental base should be centrally positioned next to the ICT/design area for ease of access and to enable partial supervision.
- Related departments, such as science or art and design, should be nearby, thus maximising opportunities for sharing equipment.

This is summarised diagrammatically in Figure 3

Figure 3

Food technology rooms as part of a design technology suite



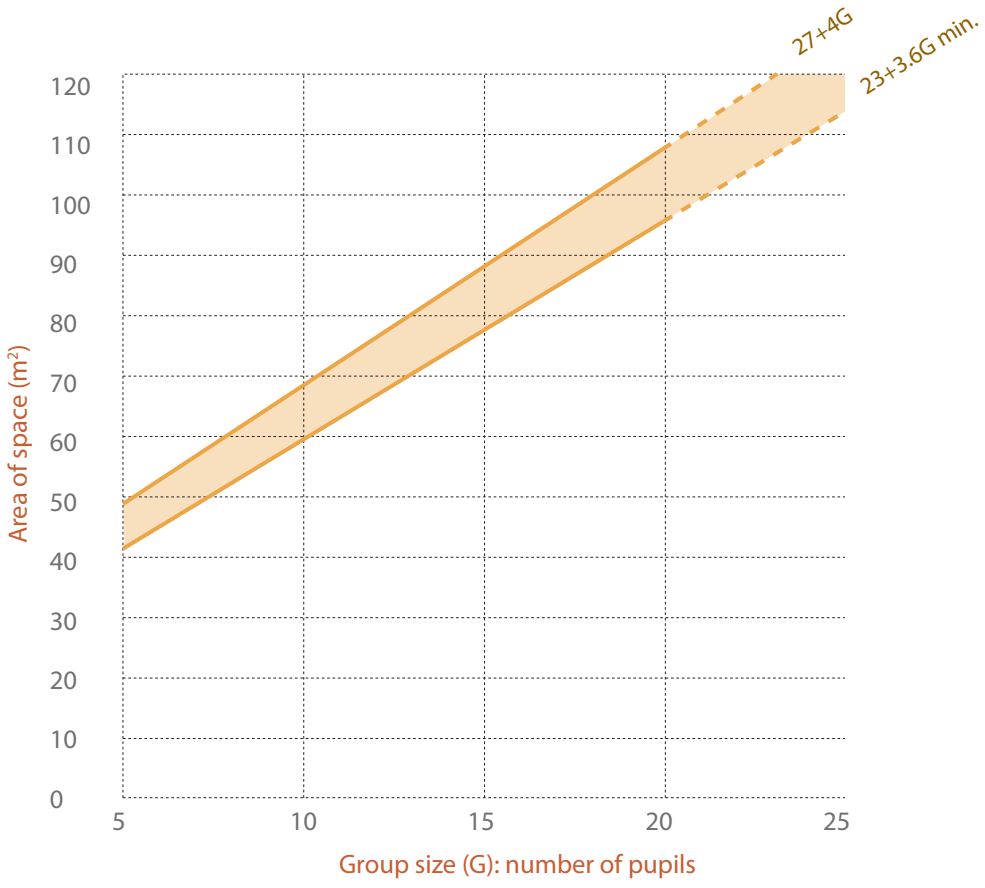
1 Planning

Food technology rooms

The principal space for delivering practical cookery is the main food technology room, described in detail below. The size of the space should be based on group size and room layout and lie within the range shown in the graph (Figure 4) for food technology areas. The space is usually arranged for a typical group size of 20, with a target ratio of one cooker to two students (i.e. 10 cooker and sink combinations).

Figure 4

Recommeded floor area for food technology room, as in Building Bulletin 98



Recommended area ranges for design and technology teaching spaces:
In the formulae, G is the KS3 or KS4 group size. For example, a space for 20 pupils would range from 95m² ((3.6 x 20) + 19) to 107m² ((4 x 20) + 27).

Group size	Area range (m²)
18	88-99
19	91-103
20	95-107
21	99-111
22	102-115

Figure 5 shows a common use pattern for a food technology room (as observed at one of the case study examples, see Section 2); typically, these spaces need to be flexible, since they will have to accommodate both practical and non-practical lesson arrangements. Tables need to be easily moveable to facilitate these transformations.

Figure 5

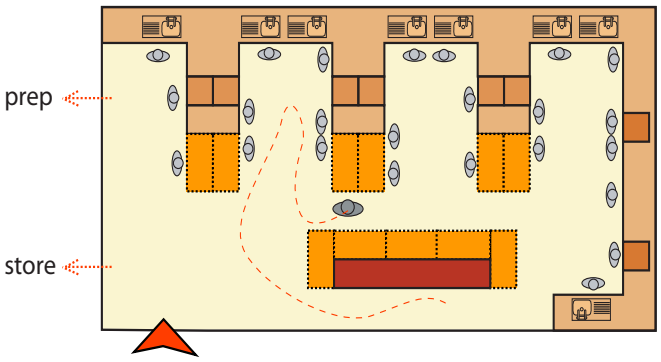
Common use patterns for a food technology roommaking use of moveable benching

Fixed work surface

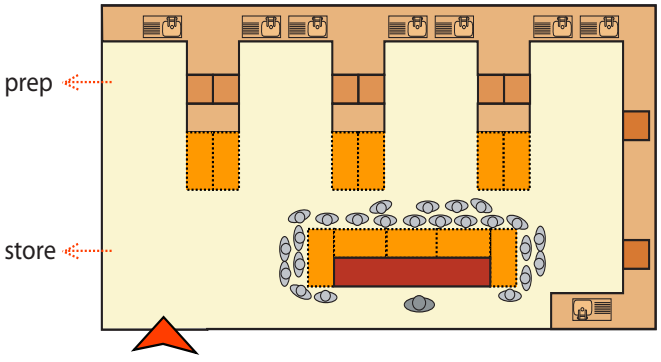
Cooker

Moveable benching

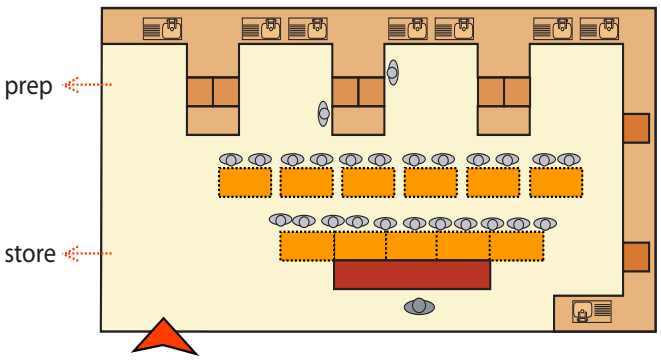
Teacher's table



Practical cooking arrangment
- moveable tables placed to supplement kitchen worksurfaces



Teacher demonstration



Written work
- moveable table in classroom formation

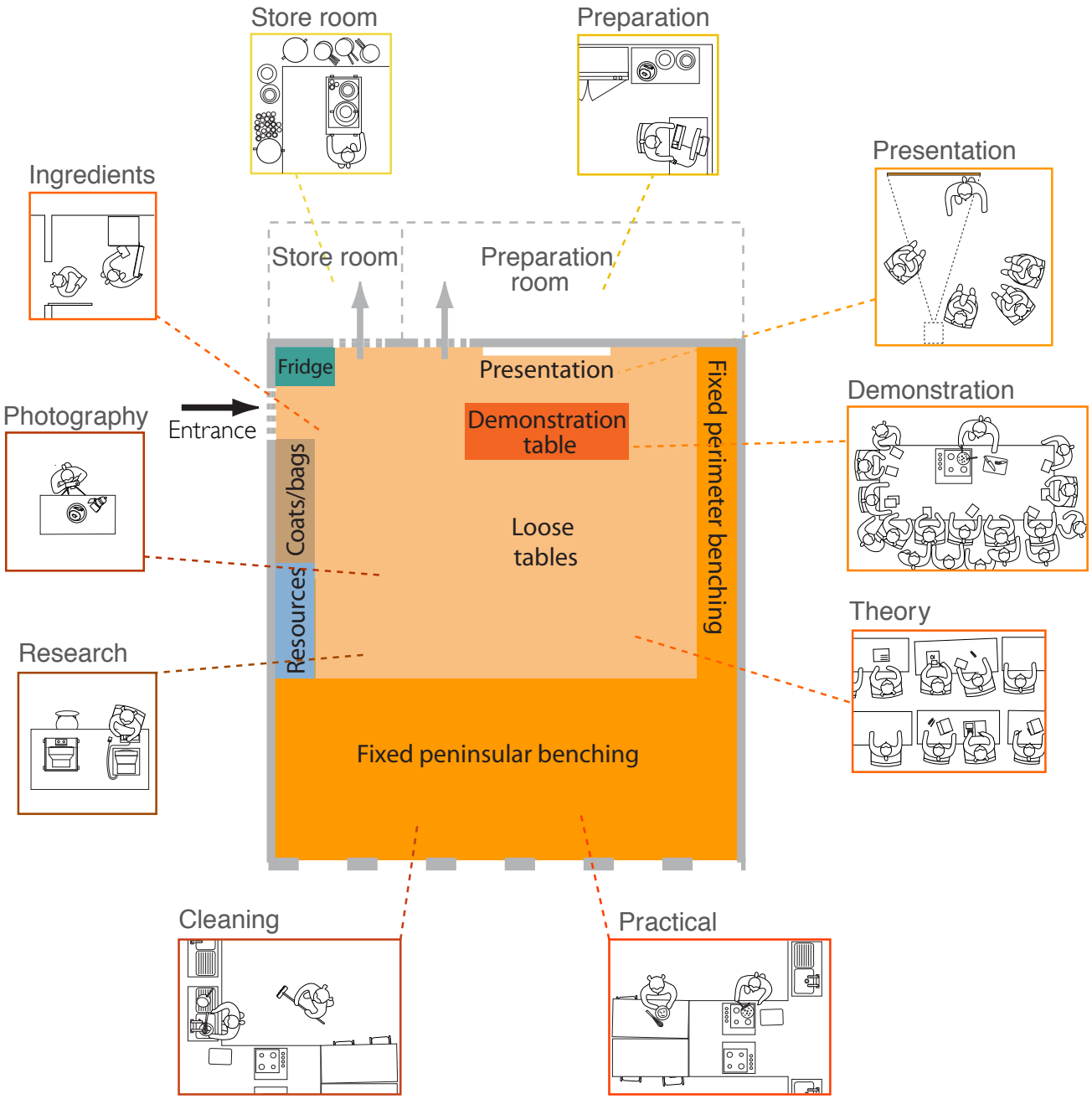
1 Planning

Generic space layouts

Figure 6

Diagram of different activities accomodated in a food technology room

Figure 6 shows a diagrammatic plan of activities, including food preparation in commercial and domestic environments, food testing and consumer evaluation. This diagram is based partly on a peninsular arrangement. Other solutions are shown over the next few pages and in the case studies.



Key points to note on this layout are:

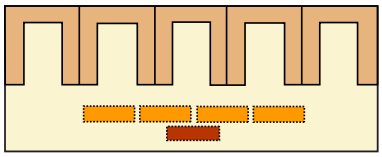
- Serviced fixed peninsular benching creates a series of bays with domestic cooking facilities.
- Some benching should include adjustable height sinks and cookers for wheelchair users.
- Adequate space (see Section 3) must be allowed around food preparation areas, including allowance for disabled students to do practical work.
- Two-thirds of the space has loose tables (suitable for food preparation), which can be re-arranged to suit a variety of activities (for example, positioned alongside peninsular benching to provide practical work surface; arranged in groups for designing; or in a 'U' shape for whole class discussion).
- An adjacent preparation room allows a technician to support teachers and students more easily.
- Fridges for students' ingredients near to the entrance area (and the preparation room) allow students quick access when they leave food at the beginning of the school day and collect cooked items later.
- A storage area for coats, bags, aprons and catering hats is close to the room entrance but away from the food preparation areas. (An alternative is to put coats and bags in an adjacent bay directly accessible from the teaching space).
- The ICT resource area (shown dotted) is positioned next to the entrance so that students not involved in the main lesson can access it. This area could provide a separate food tasting bay to minimise distraction (although tasting can take place as a whole class activity at food preparation tables). It may also be used for food testing and photography. Alternatively (and if a separate ICT space is not available), the general teaching space in the centre of the room can be set up for laptop use.
- Sinks and drainers should be arranged for easy access and use, with space for placing dirty equipment before it is washed.
- An interactive whiteboard, data projector and wireless internet access are desirable.

The following diagrams explore the advantages and disadvantages of different generic room layouts. These are characterised as:

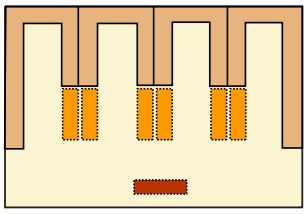
- Peninsular arrangement
- Island arrangement
- Perimeter arrangement

1 Planning

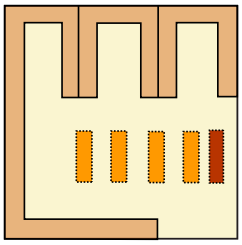
Peninsular arrangement



Long space



Rectangular space



Square space

This is a common arrangement, which creates a series of bays, normally with two hob/sink units arranged facing across the peninsula.

Advantages include:

- The arrangement gives generous worktop space, making it easier to meet the cooker and sink ratios.
- The space is divided into discrete 'kitchen' areas for each peninsula, which makes it easy to split a class into smaller, more focused groups for practical work.
- Sightlines from the student cooking area to the demonstration area/ whiteboard are good if the demonstration area is adjacent.

Disadvantages include:

- It can be difficult to achieve a generous, flexible general teaching area.
- Sightlines from the student cooking area to the demonstration area/ whiteboard are not good if the demonstration area is at right angles.
- Cookers in the centre of the room may create health and safety problems.

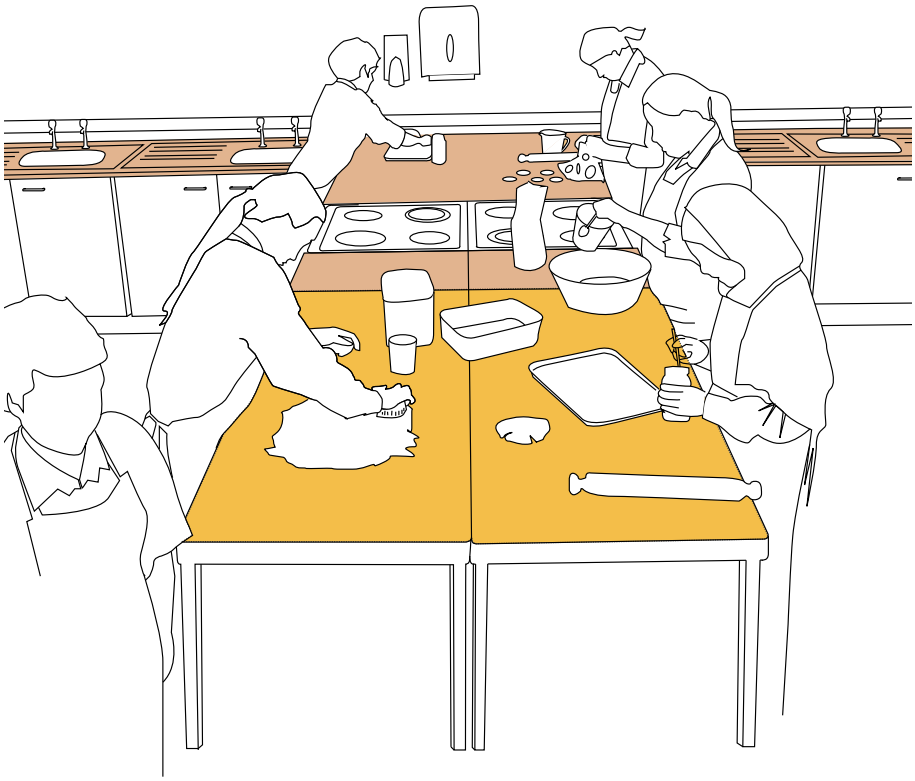


Figure 7

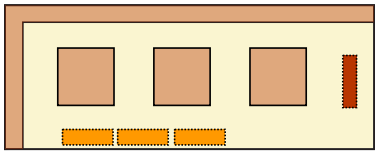
Possible peninsular arrangments in different rooms

Fixed work surface

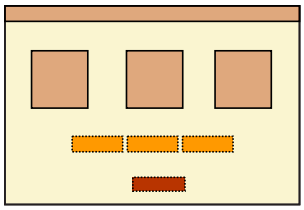
Moveable benching

Teacher's table

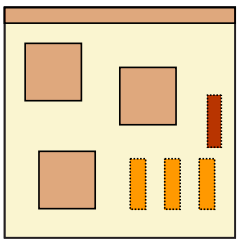
Island arrangement



Long space



Rectangular space



Square space

In an island arrangement, services will generally need to be run through the floor to cookers and sinks in the islands, although gas and electric services could also run overhead. It is not a commonly used conFigureuration but it has some advantages that are worth considering. These include:

- The teacher can circulate quickly and easily between the cooking stations, which could encourage good interactive learning and teaching and a lively atmosphere.
- The teaching focus is kept in the centre of the space, with relatively equal access for all students to the demonstration/teacher zone.
- The potential 'wow' factor and upbeat feel of a space arranged in this way could be good for motivation.

Disadvantages include:

- Most of the space is taken up by the fixed island benching arrangement, so there is not much flexibility or general teaching area.
- Unless equipment storage is well planned (and local to each island), the spaces can become congested in the centre of the room.
- It is difficult to give all students optimal sightlines to the demonstration area/ whiteboard, as some students will have their backs to the teacher.
- Cookers in the centre of the room may create health and safety problems with the circulation of pupils.
- If the teacher's view is obstructed, this could also cause health and safety problems.

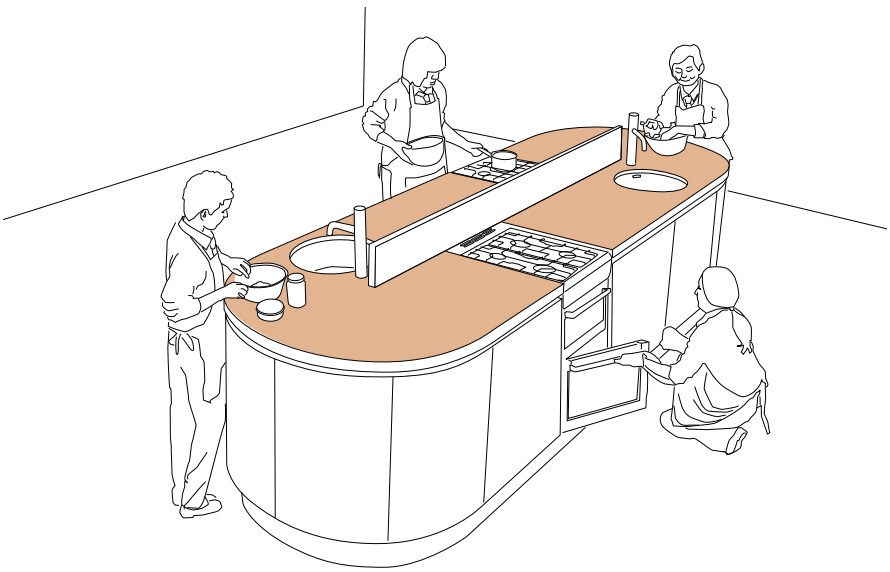


Figure 8

Possible island arrangments in different rooms

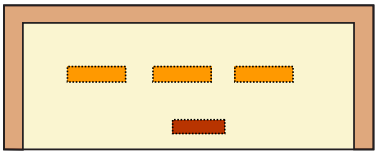
Fixed work surface

Moveable benching

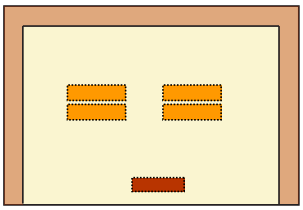
Teacher's table

1 Planning

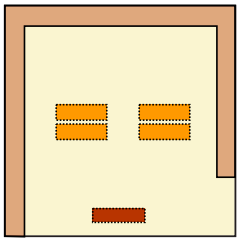
Perimeter arrangement



Long space



Rectangular space



Square space

A perimeter arrangement is relatively common where schools want to maximise the free area for flexible teaching.

Advantages include:

- This arrangement leaves the maximum amount of free central space for flexibility in table arrangement and allows varied and imaginative setting up of the space for different learning and teaching scenarios.
- Sightlines from the student cooking area to the demonstration area/ whiteboard are all essentially the same.
- There are no back-to-back circulation issues.

Disadvantages include:

- It is hard to achieve a high ratio of cookers and sinks to students, since the available worktop area is necessarily limited.
- Students are facing away from the teacher position when they are cooking.
- If the teacher's view is obstructed, this could cause health and safety problems.

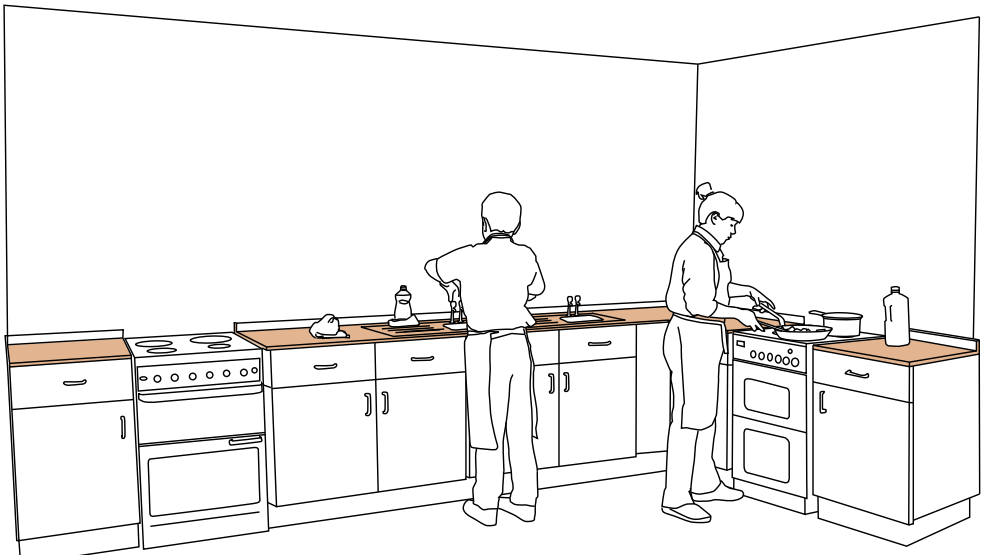


Figure 9

Possible perimeter arrangments in different rooms

Fixed work surface

Moveable benching

Teacher's table

Support facilities

Whatever the chosen layout of the main food technology room, ideally the following facilities should be provided, either as part of or adjacent to the main area:

Storage

Exactly how materials and equipment are stored will vary between schools but there will usually be one store for equipment (pans and electrical equipment such as food processors) and one (with racking) for a limited quantity of dry food. Fresh food will be stored in fridges (with separate provision for raw and cooked foods) and frozen food in freezers, either in the main room, store room or food preparation room (see below). Any cleaning materials or chemicals used for food science must be stored separately from foodstuffs.

Adequate storage, including refrigerated space, should be allocated for dishes prepared by students to be collected from the food technology room at the end of the day. In some cases there may be up to four classes (80 dishes) needing storage. Some schools may prefer this to be accessible independently of the food technology room; others may prefer access only via the food technology room (for supervision reasons). It is worth considering providing a blast chiller for safe storage of cooked food.

Food preparation area/room

It is desirable to have a separate clean space with enough dedicated work surface and storage areas where a technician can prepare materials in advance of lessons. Students' completed dishes, which must be kept in a secure area, can also be left here away from the main teaching area to cool and be stored. The preparation area should be immediately adjacent to the food technology area(s), with good visibility between the two. Facilities usually include a serviced work surface with a sink and storage beneath. There should be space for parking trolleys. There may be large capacity fridges and freezers (for storing students' food and ingredients) in the food preparation area or in the main teaching space (near the entrance) for easy access by students. A dishwasher will be needed that can also be used to teach students how to operate essential equipment. A washing machine and drier may be located in the preparation area or in a separate laundry area; adequate ventilation should be ensured. Some schools have opted to amalgamate preparation and storage areas, but this tends to lead to congestion of the space. Optimal layout for shelving (storage area) and for work surface (preparation) are not compatible.

1 Planning

Approach to ICT

Some of the content of the teaching sessions (such as lesson structures and recipe resources) will be delivered using ICT. Good planning for ICT is therefore a vital component of a successful food technology room. An interactive whiteboard and broadband access are helpful for teaching and demonstration work. In addition, students will benefit from access to computers, either in a dedicated ICT bay or room that is adjacent or nearby, or via laptops in the food technology room (serviced with trolleys), which would require wireless broadband. Choosing the laptop strategy is likely to mean that a space with a flexible teaching area (with movable tables) would work best, since it would allow furniture to be grouped to create an informal laptop ICT zone. Using interactive whiteboards in practical teaching rooms reduces or removes the need for printed hand-outs (for example for recipes), which is helpful in keeping surfaces clear for practical tasks. This clearly works best if all students have good sightlines to the whiteboard.

The demand on ICT will inevitably increase, with applications such as nutritional modelling becoming more widely used. Equipment such as wall-mounted screens and hygienic keyboards, increasingly common in domestic and commercial settings, are a possibility for the future. It is worth considering positioning cameras over the teacher area so that demonstrations can be projected onto the screen or recorded for later use. ICT provision should also be designed so that students can use specialist software packages effectively and to enhance practical work, for example referencing information about the practical task in hand.

Food technology for special schools[3]

The following section is drawn from Building Bulletin 102[4] and gives specific guidance on planning practical teaching spaces for special schools.

Specialist food technology spaces in special schools should be designed to encourage young people to enjoy food and take an interest in their own health and wellbeing. A specially equipped room of 60-65m^2 will be suitable in most situations for up to eight students, with one teacher and one teaching assistant.

[3] Provision should also be made for disabled users in mainstream schools (See Section 3)

[4] Building Bulletin 102, Designing for Disabled Children and Children with Special Educational Needs DCSF 2008

There should also be stores for food (4m^2) and resources (4m^2). The room may be laid out in a similar way to a mainstream school. The notes below provide a basis for designing a layout, subject to detailed discussions with staff on any adaptations and modifications for the type and range of special educational needs. There should be:

- Worktop space for each student, with access to a cooker, sink and drainer (generally one between two pupils but this needs to be checked with the school), some units height adjustable
- Specially adapted fittings which support life skills and independence training, especially important for young people with visual impairment
- A layout that is appropriate for the students, teaching approach and supervision requirements – for instance, whether cookers and sinks are all around the perimeter or arranged in a series of 'bays'
- Clear sightlines and easy access around kitchen units for supervision of young people working alongside each other (there may need to be additional circulation space for clearance between workstations – side-to-side and back-to-back – to minimise interference, avoiding positions directly opposite, which could promote conflict); storage units at high or low level and a refrigerator

There may also need to be:

- Special fittings with light and/or sound signals for young people with sensory impairment
- A corner space, suitably arranged to support a work space, with low sensory stimulation and minimal distraction
- Sufficient circulation space for students to work individually (independently or assisted), in pairs, or in small groups

Where life skills are taught, additional equipment may be needed, which should be specified in the brief.

In some situations, for example in a school for students with BESD (behavioural, emotional and social difficulties), a social skills training base or common room may be provided next to the food technology space.

There also needs to be:

- An hygienic environment
- Easy access to emergency cut-out controls for services[5]

[5] Refer to: BS 4163:2007 Health and Safety for Design and Technology in Schools and Similar Establishments

1 Planning

Making the best use of a space

The following suggestions are intended to help create a flexible and effective space:

Flexibility

- Furniture can be used to subdivide an area without creating permanent barriers. For example, a 'clean' research and design area can be defined in a practical space by cupboards for resources.
- Group discussion does not always have to focus around the main whiteboard. Informal exchanges of ideas can happen in a number of ways; and providing additional vertical surfaces for writing/drawing can encourage students to express their ideas in a spontaneous way. Examples include using whiteboard material for covering tall cupboard doors or having mobile flip charts, whiteboards or interactive whiteboards available to share.
- Food technology rooms, particularly those with larger central free spaces, can be used for occasional events and role play activities such as café or catering set ups.

Display

- Dynamic displays can be created by putting wall displays (for example, posters or photos of students' food products) on a wall or shelf.
- Units with castors can be moved to where display is needed, such as next to a group of tables, as an inspirational resource. (This might include completed food products.)
- Wall shelves above benching are useful for display but neither shelves nor cupboards should be positioned over a cooker.
- A good range of cookery books is a vital resource for food technology rooms and adequate storage for them is essential.
- Glass shelves in front of internal glazing act both as storage and as a way of introducing students to items of equipment, for example, showing food samples prepared in an adjacent preparation room.
- The backs of storage units (if visible) can be used for two-dimensional display and the tops of units for three-dimensional display.
- Interactive whiteboards can offer display opportunities, showing changing slides to offer stimulation and inspiration for students.

2 Case studies

This section showcases four case study examples, selected to help schools and design teams in the process of developing their own solutions. There are two 'refurbishment' examples, one of which is dedicated to students with special educational needs, and two 'new build' examples.

2 Case studies

Ringmer Community College

Case study 1: Refurbishment

Case studies Ringmer Community College 2

Key data

Age range:
11-16

Number on roll:
797

Teaching:
Food technology KS3 and KS4

Room 1 area:
81m^2

Equipment:
10 cookers, 8 sinks

Storage area:
4.5m^2

Room 2 area:
92m^2

Equipment:
10 cookers, 9 sinks

Storage area:
7.5m^2

Shared preparation area:
16m^2

Description

This project is a recent refurbishment of existing food technology spaces. The arrangement is of serviced fixed peninsular benching, which creates a series of bays with domestic catering facilities. The concept is that each of the peninsular areas works as a discrete kitchen. About one third of the space has loose tables, which can be re-arranged to suit a variety of activities, for example, positioned alongside peninsular benching to provide practical work surface, or in rows to create a 'classroom' for theory teaching. The College places a strong emphasis on practical skills and practical sessions are arranged in two-hour slots to allow for ambitious practical projects.

'The room is designed to create a number of bays which model domestic kitchen arrangements.'

Teacher

'The space is so much better than before. It is light and airy and much easier to cook in.'

Student, Year 10

2 Case studies Ringmer Community College

Key points

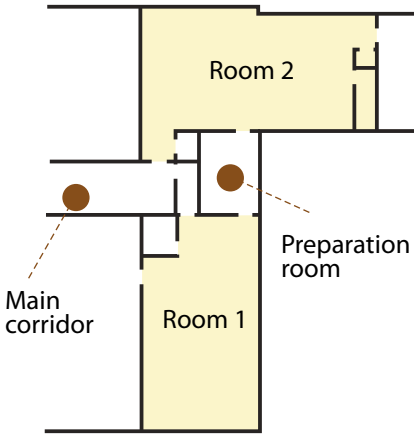


Figure 10

Plan of food technology rooms at Ringmer Community College

- An adjacent food preparation room means a technician can support teachers and pupils more easily.
- A fridge for ingredients and finished products near to the entrance area allows students quick but supervised access when they leave food at the beginning of the school day and collect it at the end.
- Both practical teaching rooms have dedicated stores for dry goods, equipment and utensils, where some student written work is also stored. One room uses an adjacent corridor space for storing coats and bags, so they are kept out of the practical teaching space but are still visible; the other uses dedicated open shelves.
- The spaces have no heating provision, yet even on cold winter mornings apparently heat up quickly.
- Opening windows provides ventilation and there is no local cooker extract (hobs are a mixture of gas and electric). Positioning windows on adjacent walls helps with air movement.
- The school has a lease arrangement for the cookers, which means that equipment is maintained by a third party and regularly replaced with updated models.
- Room 1 has better sightlines from the student position to the teacher cooking positions.

Ringmer Community College

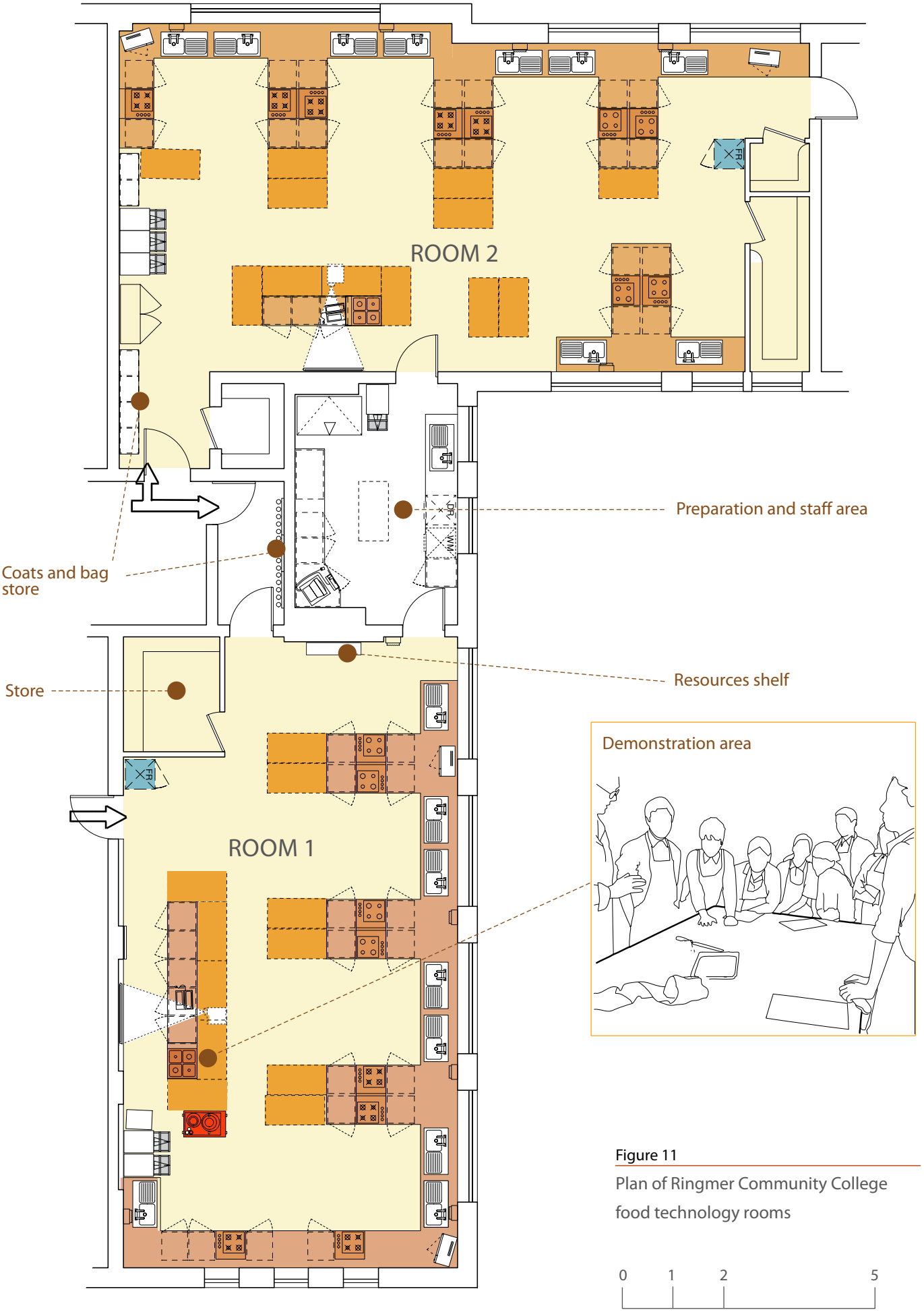


Figure 11

Plan of Ringmer Community College food technology rooms

2 Case Studies

Avalon Special School

Case study 2: Refurbishment

Case studies Avalon Special School 2

Key data

Age range:
14-18

Number on roll:
48

Teaching:
Practical cooking skills

Room area:
41m^2

Equipment:
3 hobs, 2 ovens, 2 sinks
(1 sink, 2 hobs adjustable height)

Storage area:
1.5m^2

Description

The food technology room is heavily used in the school timetable, reflecting its importance as a key educational resource focusing on developing important life skills. Every class uses it for at least one session per week. Pupils learn about nutritional and menu planning, shopping, cooking and storing food.

'This is one the most heavily used, and useful teaching spaces in the school.'

Teacher

'This is a really good room and I enjoy lessons here.'

Student

2 Case studies Avalon Special School

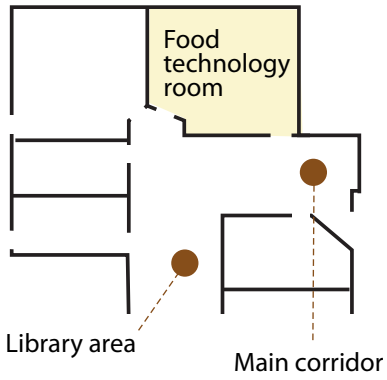


Figure 12

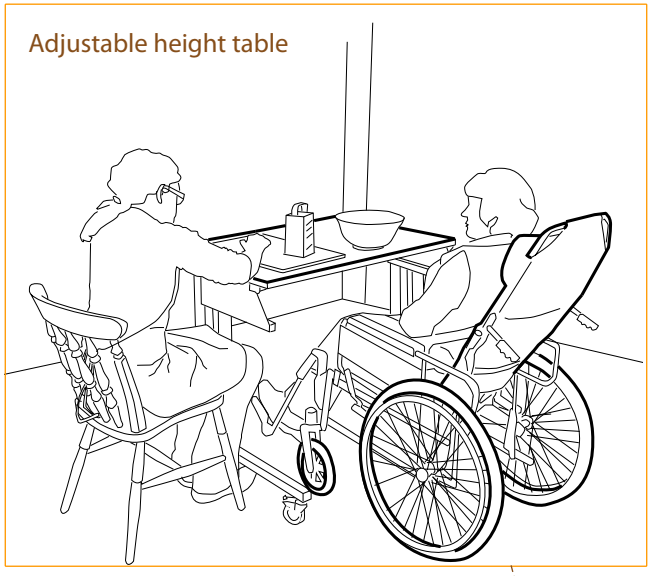
Plan of food technology room at Avalon Special School

Key points

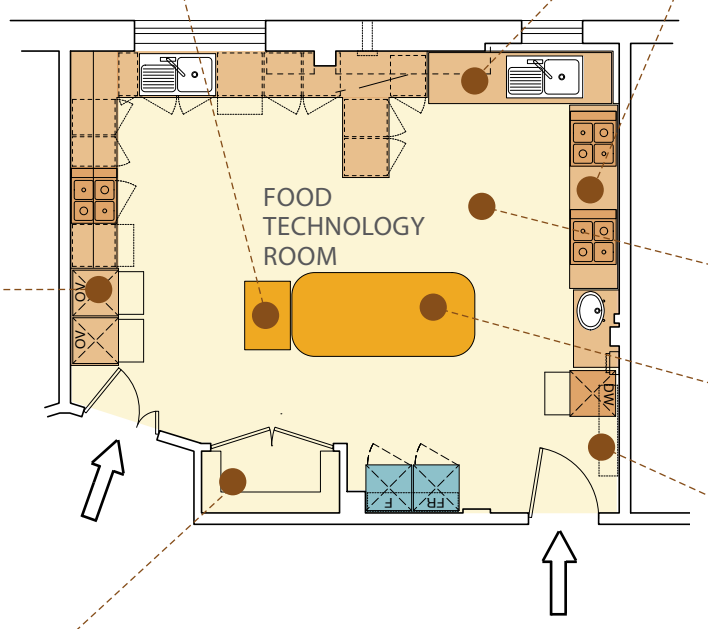
- The arrangement of the space is well suited for teaching small groups (up to six), which works best for the school.
- There is a generous central area, with movable, adjustable height furniture. This area is the focal point for demonstration and provides sufficient room for students with mobility equipment to work and move around.
- The ventilation strategy includes a high level extract fan on the external wall and internal cooling/heating air re-circulation units. There is no local extraction for the hobs.
- There are straightforward, manually operated adjustable height sink and hob surfaces, with plenty of space for students with mobility aids to use the equipment.
- The central equipment cupboard is well placed, giving easy access for resources required during the lesson.
- ICT provision in the space could add useful learning and teaching capability.
- Adjustable height ovens would also be useful.
- Some of the detailing of the fittings could be revised (for example mitred joints of laminated boards, which permit water ingress).
- The hobs would be safer if they were the induction type, which only heat up on contact with a saucepan and cool down more quickly.

Avalon Special School

Adjustable height table



Adjustable height surfaces



Ovens at mid height

Large circulation area

Large adjustable height table

Air conditioning unit

Equipment store

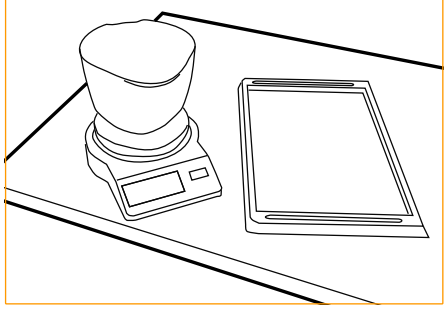


Figure 13

Plan of Avalon Special School food technology room

0 1 2 5

2 Case studies

Gateway Academy

Case study 3: New build

Case sudies 2

Key data

Age range:
11-18

Number on roll:
806

Teaching:
KS3: Food technology

KS4: GCSE Hospitality and Catering

Room 1 area:
110m^2

Equipment:
11 cookers, 11 sinks

Room 2 area:
110m^2

Equipment:
11 cookers, 11 sinks (2 hobs, 1 sink adjustable height)

Storage, preparation & laundry area:
15m^2

ICT:
15m^2

Description

In this newly built Academy, there is a strong emphasis on equipping students with a range of skills, which are then deployed in a creative, self-aware and self-motivated way to build confidence and ability in cooking and related coursework.

There are two generous practical food technology spaces with large central areas, which are flexible and can be used for demonstration, testing, and even catering layouts for events.

'The large central area is useful sometimes, particularly for special catering events, but I would like to add some peninsular units to increase the available work surface area.'

Teacher

'It is much easier to cook here than in the old school. The equipment is better and it is easier to find things that you need quickly.'

Student

2 Case studies Gateway Academy

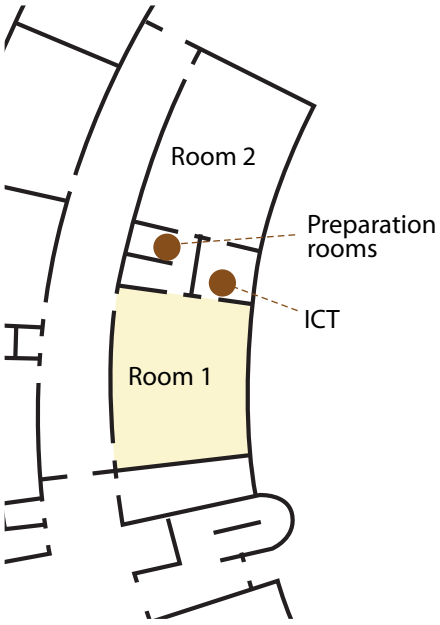


Figure 14

Plan of food technology rooms at Gateway Academy

Key points

- There is a good mix of natural and electric lighting and a well-organised layout that facilitates high quality learning and teaching.
- There are good ancillary areas, including a food preparation area, laundry facilities, good storage provision for student ingredients and finished products, and an ICT area. One of the spaces has adjustable height sink and hob surfaces. The lighting grid gives good distribution of diffuse light.
- The room layouts are in classic perimeter arrangement. The disadvantages of this are that students are facing away from the teaching position and there is limited preparation work surface for each workstation. However, since there is no obvious visual distraction (as in a peninsular arrangement where two workstations face each other, or in an island arrangement where up to four workstations face together), it is possibly easier to create a higher level of focus and concentration on the practical work being undertaken in a perimeter arrangement.
- The food technology rooms lack coat and bag storage.
- The interactive whiteboards would work better if they were located centrally in the space.
- More working space for each oven/sink combination (which would require adding peninsular benching extensions) would be beneficial, since some workstations have inadequate preparation area.
- Although the large external wall extract fans are useful, they are noisy[6].
- Food storage and preparation areas are amalgamated; dedicated separate storage would help prevent the preparation area becoming congested.

[6] Refer to Building Bulletin 93, Acoustic Design of Schools, for more information

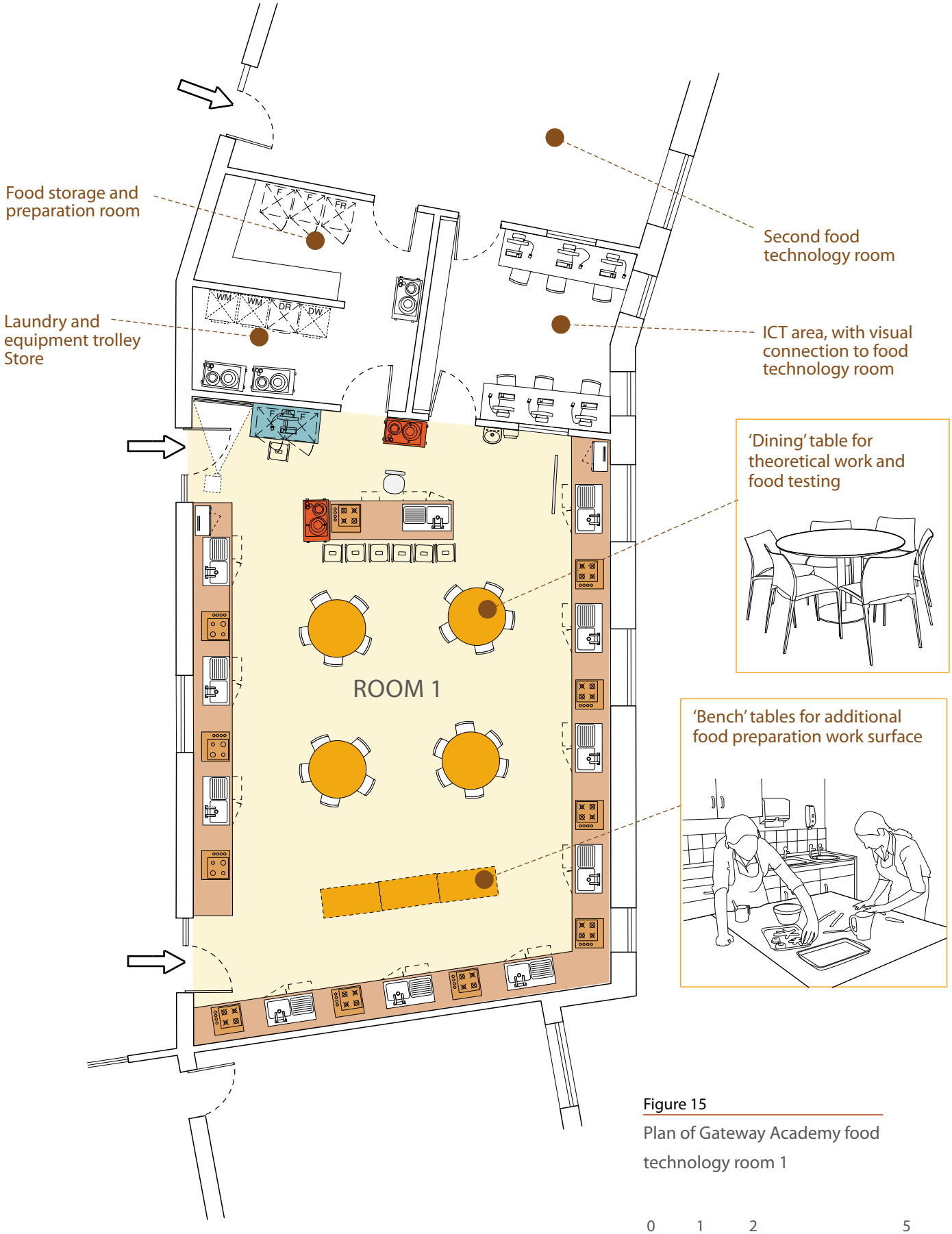


Figure 15

Plan of Gateway Academy food technology room 1

2 Case studies

West Exe Technology College

Case study 4: New build

Case studies West Exe Technology College 2

Key data

Age range:
11-16

Number on roll:
1283

Teaching:
KS3 Food technology, KS4 GCSE Food technology, GCSE Catering, BTEC First Diploma in Hospitality

Room 1 area:
114m^2

Equipment:
8 cookers, 8 sinks

Room 2 area:
108m^2

Equipment:
8 cookers, 8 sinks (1 hob, 1 sink height adjustable)

Room 3 area:
107m^2

Equipment:
8 cookers, 8 sinks

Storage area:
12m^2

Preparation & Office areas:
15m^2

Laundry
14m^2

ICT:
35m^2

Description

The College has three food technology spaces and covers a range of levels from first principles of cooking at KS3 to sophisticated catering capability, even providing event catering for its own conference centre for outside users. The school also runs community courses such as 'Cooking for fathers'.

'Large cupboards opening into the central circulation area make it easy for students to get the practical cooking equipment they need quickly.'

Food technician

'I am making sashimi rolls for the conference event.'

Student

2 Case studies

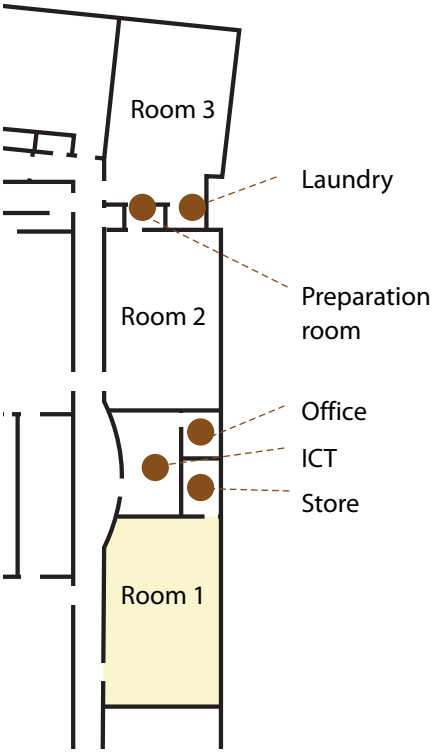


Figure 16
Plan of food technology room at West Exe Technology College

Key points

- The three food technology rooms provide an interesting range of layout options. Room 1 (see detailed plan on p37) is divided between an area with peninsular cooking bays and an open general teaching area. This was judged by teachers and students to be the most consistently effective of the three layouts and does seem to be a very successful use of the available space, providing good worktop area and reasonably generous general teaching space.
- A clever feature in all rooms is the open sections of benching with stools stored beneath, which allows the bays to become effective theory work areas.
- Another benefit of the Room 1 layout is the large double cupboards located at the end of the peninsulas, with doors opening into the circulation area, providing fast access to equipment for practical sessions.
- There are blast chillers in two of the food technology rooms, which make it easier to quickly chill and store students' cooked items at the end of a lesson.
- There is a dedicated ICT bay, which is useful. However, the glass screens at each side of the ICT space seem to create distraction between the three adjacent spaces; but this could perhaps be overcome if the space were more easily supervised by being directly accessible from the practical rooms.
- Hobs are provided with individual extract fans but these are rarely used because of the noise they create collectively.
- More integrated ventilation and cooling could be a benefit. Windows have vertical slatted blinds, which have a tendency to billow into the room.
- The equipment, particularly the cookers and cupboards, are showing signs of wear, despite their relative newness, which suggests that higher initial equipment specification might prove to be better value overall.
- The interactive whiteboards in Rooms 1 and 3 would be better placed more centrally.
- There is insufficient coat and bag storage provided in all three practical spaces.

West Exe Technology College

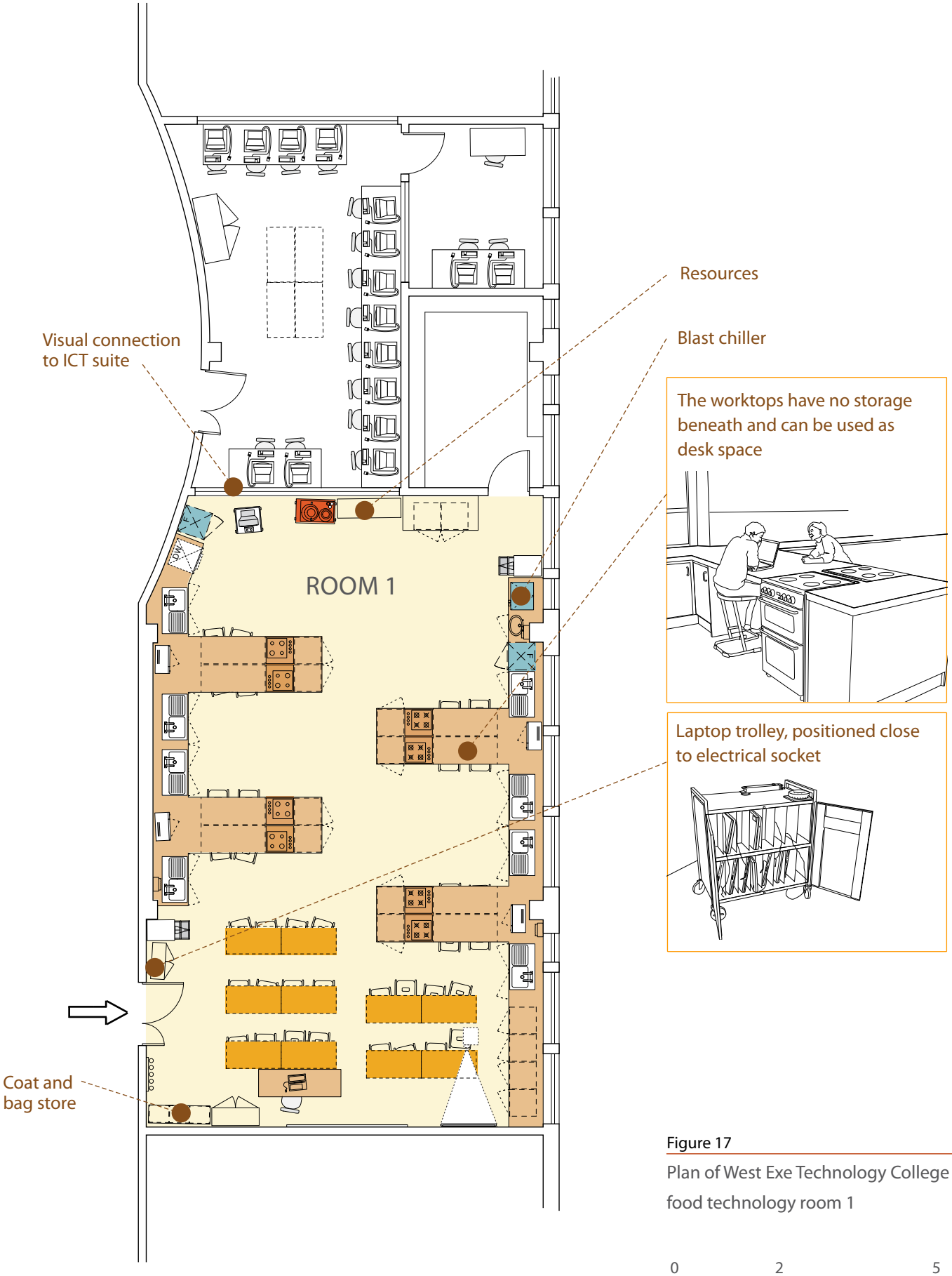


Figure 17

Plan of West Exe Technology College food technology room 1

3 Furniture and equipment

This section describes the type of furniture that is appropriate to cooking spaces. Issues such as flexibility, ergonomics, construction and aesthetics are also discussed. Guidance on finishes and fittings is covered at the end of the section.

3 Furniture and equipment

The height of a work surface is an ergonomic consideration and has safety implications. Before determining the height of a work surface, it is important to know what activities will take place and the height range of users. A number of documents (see References) give recommended heights for various furniture types and cross reference them to students' ages[9]. It must be noted however that these are often general recommendations and in certain extreme cases a variety of sizes of furniture may need to be provided. For practical cooking spaces, the tables used for food preparation are usually higher (850-900mm) than a standard table height for sitting activities (710mm) and consequently the correct height furniture (often stools) needs to be selected to ensure that the tables can be useful for both practical and theory work.

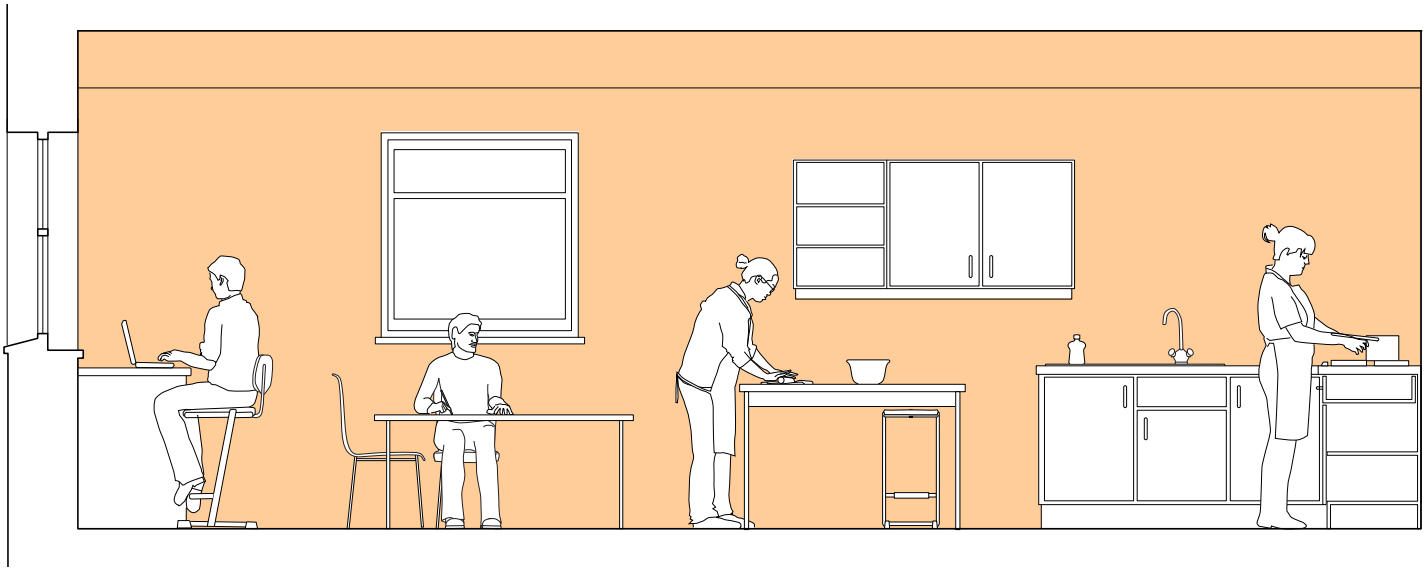
At least one specialist adjustable workbench/table should be provided in each area to allow disabled students to do general and practical work. This table may need to be shaped to allow students to operate equipment. Specialist advice should be sought on this issue.

The width and depth, or plan size, of furniture is a consideration that is often overlooked. Tables should be large enough to allow students to sit side by side and carry out a variety of activities comfortably using a range of resources. Ergonomics should also be borne in mind when storage areas are designed. The

[9] Refer to EN1729 for chair and table sizes

Figure 19

Furniture at different heights to suit different activities



Furniture and equipment

Flexibility

Cooking spaces need to provide facilities for general research and design activities as well as practical activities[7]. Furniture should be chosen to maximise flexibility both within and between learning spaces.

Ergonomics

Ergonomics is concerned with issues of comfort and safety for the person using the space. It therefore covers the design of individual furniture and equipment items as well as safe distances in layouts.

Figure 18 shows recommended safe working areas around sinks and cookers in food preparation areas. These dimensions take into account the need for extra safety around cookers, including space required when taking something from the oven. The shaded areas show an overlap of 250mm, which is applicable when benching is back to back (for example, in a peninsular arrangement). This means that in a bay arrangement there would be 1750mm between benches (2 x 100mm-250mm). It is assumed that the area between the cooker and the sink is never used as a main circulation route.

Furniture should be designed and used to ensure students and staff can work comfortably and safely. Dimensions are a particularly important ergonomic consideration; inappropriately sized furniture can affect the comfort and concentration of students and lead to back and neck pain in later life[8]. Sufficient leg clearance under tables, adjustable chairs for use with computers and the design of table underframes are just some of the ergonomic issues to consider when choosing furniture for schools.

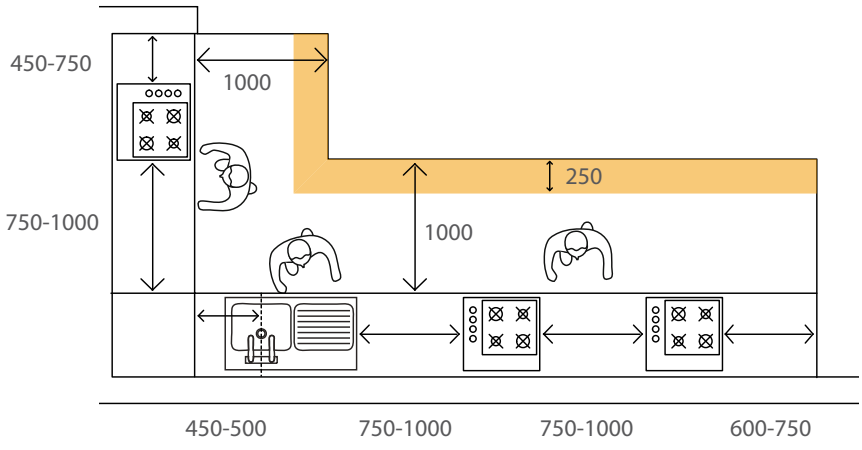


Figure 18

Recommended safe working areas around sinks and cookers. Orange area shows potential safe overlap on back-to-back arrangements

[7] Where possible it is good practice to use a separate clean 'design space', keeping the food technology room for practical activity only

[8] Refer to www.schoolfurniture.uk.com

heaviest loads (for example, electrical equipment such as food mixers) should be stored at waist height, where removal is safest; sufficient shelving should therefore be provided at this level.

Tables and benches

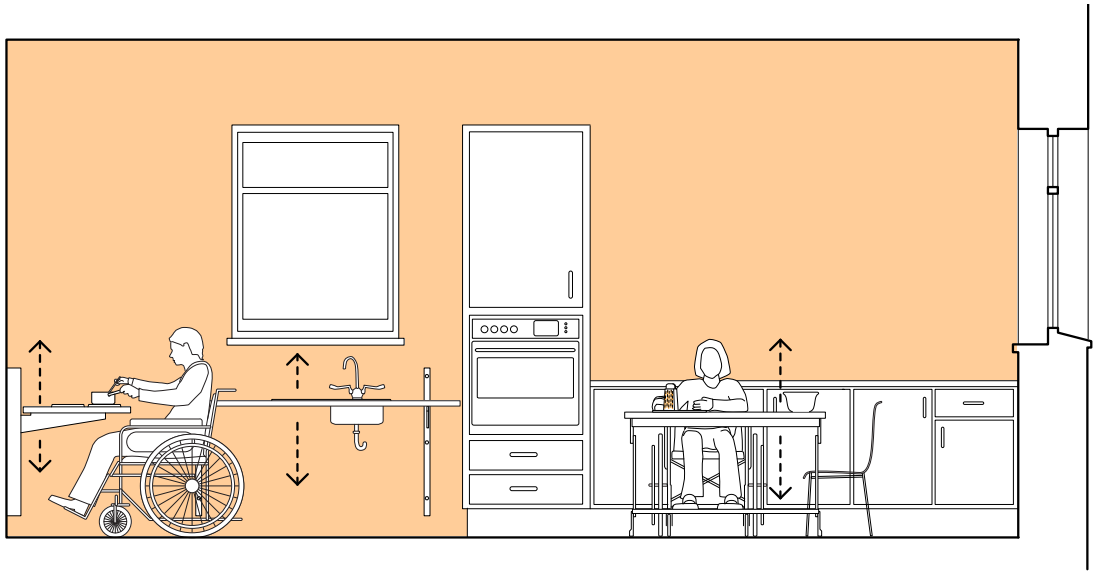
There are various kinds of tables and benches, which may be fixed or loose. The following paragraphs look at the range, separating them into four types:

- Basic tables
- Specialist tables
- Teachers' tables
- Perimeter benching
- Trolleys

Guidance is also given on materials. While there are times when specialist tables or benches are required, it should be borne in mind that the more specific the function an item of furniture can perform, the less flexible it will be.

Figure 20

Height adjustable furniture and mid height ovens make equipment accessible in an SEN classroom



3 Furniture and equipment

Basic tables

Basic tables are used mainly in resource areas for general non-ICT work, and also in practical areas where activities are 'light' duty. These tables are generally at sitting height (standing height tables usually require the stability given by a more robust frame, see below) and are generally 1200 x 600mm or 1500 x 750mm. In food technology rooms where there is sufficient general teaching space, sitting height tables may be useful for theory work, discussion, tasting, presenting and serving food produced in practical sessions.

Tables with braked castors are sometimes referred to as trolleys. They can have the same specification as specialist tables and form part of the specialist table range, although not all frame shapes are suitable. Castors must be the appropriate size for the height and loaded weight of the trolley. (The height of the work surface needs to take into account the size of the castors.)

Specialist tables

Specialist tables, also known as 'heavy duty' tables, are similar to basic tables but are more robust in construction. They are often used as computer tables or for practical work. Two heights are generally recommended: 710mm (for sitting activities) or 850 - 900mm (for standing activities). However, there is an argument for a slightly lower standing height table of 800 - 850mm in food spaces to account for the range of activities in food preparation, many of which require a downward force[10].

Teachers' tables

Teachers' tables are used for demonstrating practical tasks and should ideally have a combined gas and electric hob and generous layout space for gathering students around. They will often house ICT equipment for demonstration, with a computer linked to the projector and an interactive whiteboard. They could also usefully incorporate an overhead camera for photographing finished products.

Perimeter benching

An adjustable work surface may be needed at the perimeter to accommodate a disabled student. The independent standing height table described above could be used, with an additional height adjustment mechanism. There should be a specialist adjustable height bench with hob and sink inset.

[10] Refer to Furniture and Equipment in Schools: A Purchasing Guide for more information on quality issues, http://www.teachernet.gov.uk/docbank/index.cfm?id=5641

Furniture and equipment 3

Perimeter benching (including peninsular benching) usually contains most of the room's services as well as providing additional working area. In practical food technology rooms there is a tendency to use domestic generic kitchen style cupboards and drawers beneath the perimeter benching. However, this does not necessarily suit the storage requirements of the space. Larger cupboards where students can go to find particular equipment, easily accessed from general circulation areas, often work better than distributed equipment. Therefore either open benching or more carefully targeted storage should be considered. Perimeter benching is usually installed at pupil standing height unless activities dictate otherwise. ICT equipment should ideally be positioned on sitting height tables rather than benching, although the standing height benching can be useful for short periods of working, particularly when laptops are being used. Benching for standing to work with ICT should ideally be higher than a bench accommodating practical equipment[11].

Trolleys

Trolleys are useful for carrying equipment that is used for practical lessons but which is best stored in a locked area (such as sharp knives). They can also be a useful way of speeding up access to specific equipment that is needed for a particular practical session, which can be set out in advance in a trolley and distributed rapidly.

Table and benching materials

Basic tables, specialist tables and perimeter benching all generally have plastic laminate work surfaces over a manufactured board core and are edged either in solid wood, plastic strip or the core material itself. The edge material should be strong and well bonded because these tables may be subjected to a good deal of heavy use. Solid laminate (a series of paper laminates glued together to form a dense material) can also be used; here the worktop material also forms the edge. Whatever material is chosen, tables for use with computers should have a low reflectance finish to prevent problems with glare. With increasing use of laptops, some of which may be wireless, schools should consider applying this requirement to all tables. Finishes should be smooth to ensure they are easy to clean, water and heat resistant and, if fixed, fully sealed to avoid water penetration. Laminated upstands should also be well sealed and preferably post-formed in order to avoid water ingress on edges where two glued laminate surfaces meet. Deeply scratched

[11] Refer to www.schoolfurniture.uk.com

3 Furniture and equipment

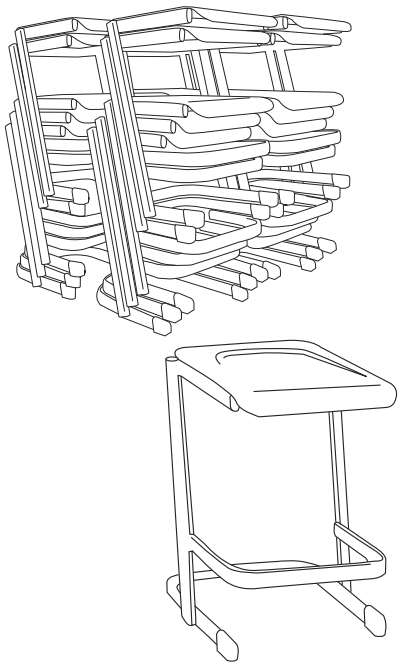
surfaces can harbour dirt and bacteria, so stainless steel, which is hard and therefore difficult to scratch deeply, is often used in commercial catering facilities. Its use may therefore be considered throughout school food technology rooms for both perimeter benching and loose tables.

Solid surface acrylic polymer materials, though relatively expensive, are an option worth considering for work surfaces in food technology rooms. They have the advantage of being resistant to heat, impermeable at corners (which are formed) and can be locally sanded if scratched.

Seating

Three types of seating are desirable to suit the diverse nature of food technology:

- Stackable chairs
- Stools
- Adjustable chairs



Stackable chairs

Stackable moulded plastic or laminated wooden chairs are useful as they are inexpensive, relatively easy to clean and lightweight. It is important to check the comfort of these chairs, however, because some are more suitable than others. When used with loose tables they should be easily movable to allow an area to be set up for group activities.

Stools

Stools are generally used with standing height tables. Ergonomically designed moulded plastic or wooden seats are preferable to flat seats as they are more comfortable. Stools with back rests are more comfortable over a long period, although they allow less freedom of movement for students and are harder to store under tables when not in use. Rooms that are clear of seating are safer for practical lessons.

Stackability for stools might also be desirable. The height of stools prevents students resting their feet on the floor, which restricts postural change, though footrests help overcome this problem to some extent. The ability to adjust seat height is particularly advantageous when computers are being used. Fully

adjustable chairs (both seat and back) enable students to align themselves correctly in relation to the computer screen and to rest their wrists comfortably at the keyboard. A swivel seat is particularly useful in rooms where computers are placed on the perimeter, as students can easily turn to face the centre of the room for occasional class discussions or directions from the teacher.

Adjustable chairs

Adjustable height chairs should be able to accommodate all sizes of student but if particularly short students are unable to rest their feet flat on the floor, footrests should be provided.

Storage

Restricting storage unit type allows spaces to be interchangeable but equipment must be stored in the safest and most appropriate way possible. This section identifies three types of storage:

- Storage units
- Shelving systems
- Coat and bag storage

Storage units

A range of storage units that are mutually compatible (in terms of plan size, available components and style) allows spaces to be used efficiently and flexibly and resources to be shared.

- Mobile cupboard and tray units have the advantage that they can be moved to where they are needed. For space efficiency, units can be kept under perimeter worktops and then moved to the centre of the room when students need better access to particular resources or if students want to sit at the worktop. However, space must be allowed in areas where mobile furniture is to be 'parked'. The use of trays across all the food technology spaces allows resources to be transported more easily from unit to unit.
- Static units, which should be from the same range as the mobile ones, include tall cupboards (which are good for high volume storage, particularly if store room space is tight), low cupboards, tray units and plan chests. These lower units can provide additional work surface, display area and space division.
- Tray units are most suitable for use under perimeter work surfaces, as the trays

3 Furniture and equipment

can be pulled out and resources inside them more easily viewed. Doors for storage units should ideally open to 270°; where possible they can be folded back to sit by the side of the carcass unit to prevent obstructions and tripping, particularly where they are against circulation routes. Like tables, the surface of the cupboard top must be robust and edges well sealed. Horizontal edges of doors should also be well sealed to prevent water ingress.

- Resource trolleys are particularly useful for storing and transporting small amounts of equipment and materials. They may contain plastic trays, which can also be used in cupboard units in the teaching spaces, store rooms and preparation areas. When layouts are being planned it must be remembered that a trolley needs a parking space in both teaching and storage rooms.

Most food technology rooms use an essentially domestic style of cabinet fit out. These are commonly constructed on a 600 x 600mm carcass module, and are then fitted with modular door, shelf, door and handle fittings. The module is designed to accept standard equipment sizes (hobs, ovens, sink and drainer, washing machines and dishwashers, fridges and freezers). Carcass material tends to be foil or laminate surface particleboard of various types. Carousel fittings make the most use of corner cupboard units, especially in peninsular layouts. Food technology rooms have a harder wear profile than most domestic kitchens and in order for cabinets to have a good lifespan they need to be specified carefully for robustness. This means that hinge, drawer runner and handle fittings are recommended to be commercial rather than domestic quality.

The use of soft-close cupboards and drawers should be considered, as this may encourage more careful use of furniture and therefore increase the longevity of the fittings.

Some schools prefer to use open tables or benching instead of cupboard units in their food technology rooms; this assumes all resources are kept in the store room and wheeled in on trolleys. This is particularly true for commercial catering layouts, which are generally made up of a series of open units to enable layout changes. Open units without plinths also allow for easier cleaning and a more centralised approach to storage. This system is often more successful with schools that have a food technician, who can organise and maintain a central storage strategy. Some storage units may double for display – those with glass doors, for example. In some cases storage/display units may need to be lockable to protect valuable or potentially dangerous items. Occasionally, specialist storage units may be required for specific items of equipment.

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Shelving systems

There are many types of shelving system that can be used to store teaching materials and equipment and students' projects in store rooms. (Occasionally they may be used in classrooms.) The four main options, which vary in the flexibility they afford, are:

- Purpose built fixed timber batten: this shelving can reduce flexibility but allows shelves to fit accurately into a store room.
- Adjustable height timber shelving: this shelving can be freestanding, though it is more usually fixed back to the wall. Re-locatable pegs allow shelves to be adjusted, providing greater flexibility than with fixed batten shelving.
- Top-hung storage: this system is suitable for both store rooms and classrooms. It incorporates a wall-mounted shaped metal section from which droppers and shelves may hang at any point. This system may not be suitable in conjunction with very lightweight walls.
- Cantilevered brackets in fixed metal droppers: this adjustable system is also suitable for store room and classroom use and enables shelving to clip in at various heights.

To ensure safe manual handling, the user should be able to see and assess the weight of a stored item easily. For this reason, the shelf should not be so deep as to prevent this. The heaviest loads should, in any case, be stored at waist height (usually around 1000-1100mm), where removal is easiest and safest. High-level storage of heavy items should be avoided. (Adjustable shelving allows shelves to be positioned at the optimum height for the weight they are storing and the height of the person who is working in the area.)

The angle of reach should be taken into account when the height of shelves directly above cupboards is being determined. To allow resources to be organised effectively, shelves should be no deeper than 200mm for small ingredients and 350mm for large tins and electrical items. Shelves should never be positioned over a cooker. Some schools prefer to put all their resources in store rooms, with no storage furniture in classrooms. It is worth remembering, however, that shelving systems provide opportunities for three-dimensional display of more interesting resources.

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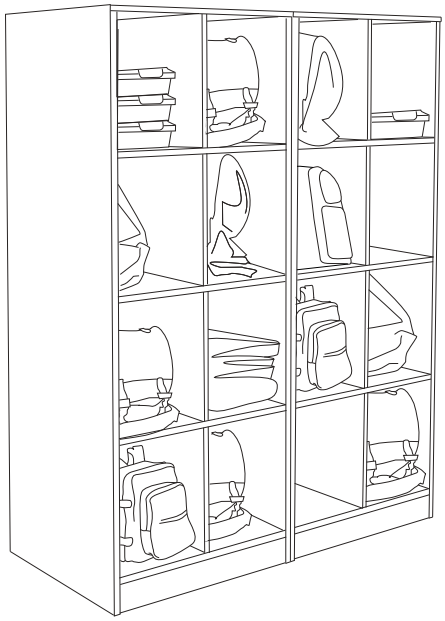
Coat and bag storage

Storage for coats and bags is an important factor, with both health and safety and planning implications, and should be considered early on in a project. Some schools have lockers for students' books, with coats stored in classrooms; others provide centralised lockers large enough for coats and bags, so classroom storage is needed only for resources used for the lesson in progress.



In schools without centralised lockers, a separate dedicated area adjacent to the food technology room may be provided for coats and bags. If this is not possible - and they have to be brought into the food technology room - they should be kept away from the food preparation area, with storage for aprons nearby. Coats and bags must not cause an obstruction and there should be some means of storing them near the room entrance. Schools may want to consider housing two smaller storage units in different parts of the classroom to avoid congestion; however, having more than one coats and bags zone does make spaces more difficult to organise. Freestanding units are the most flexible approach, allowing the room to be rearranged. Units that contain a series of open, box-like shelves encourage a more organised environment, particularly if it is only bags that need storing. It is important that each compartment is big enough so that bags do not overflow onto the floor.

Equipment

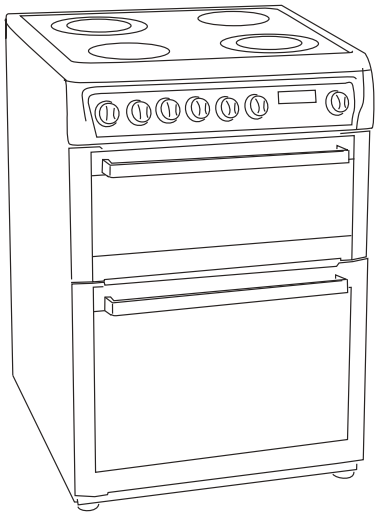
Some schools may choose to provide both domestic and commercial catering facilities. This section looks at:

- Cookers (hobs and ovens)
- Fridges
- Sinks

Cookers

Food technology rooms should ideally have a number of cooker types (gas, electric and halogen-style) to allow students a range of experiences. Having separate hobs increases layout possibilities. A separate hob and oven with a side-hinged door also allows easier access for wheelchair users, although there should be clearance for the wheelchair under both appliances. (It is preferable

Furniture and equipment 3



for at least one hob [and sink] to be set within an adjustable height bench. In some situations, an adjustable height oven might also be needed). As a safety feature, some schools may decide to provide induction hobs, which only heat up when a metal pan touches the element. In terms of location and installation, it is useful to remember the following:

- Ideally, a teacher should be able to demonstrate cooking techniques on both a gas and an electric hob, so both types should be provided in an area where students can gather.
- Cookers should not be positioned directly in front of a window; if this is unavoidable, blinds set within a frame must be provided to ensure visibility of lit hobs.
- Notice or display boards should not be sited above cookers.
- Electric cookers should be permanently wired into the room, with an isolator that is clearly labelled to identify the appliance being supplied.
- Gas cookers should have a chain fitted so that the cookers cannot be pulled out of position and the flexible gas connection strained.
- Microwave ovens are sometimes used, normally located as benchtop equipment rather than built –in.

Fridges

Fridges should be large enough to store the ingredients and products of at least one class; freestanding larder fridges are ideal. It is good practice to have separate fridges for raw and cooked ingredients. Fan assisted fridges perform well, as the temperature remains constant and they can be checked easily for health and safety compliance.

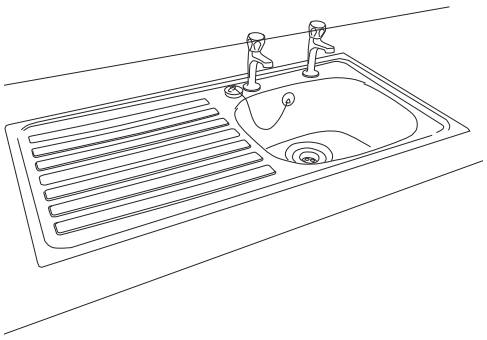
It is worth considering providing a blast chiller unit to reduce the temperature of hot foods quickly. The food can then be refrigerated for storage.

Sinks

There is usually one sink to two students. Some schools opt for double-bowl sinks, to keep food preparation separate from washing-up; this should be checked at an early stage, as it might affect layout and space requirements.
There should be at least one dedicated washbasin in each food technology room for washing hands. However, since it is not practical for all students to use this in a short period, they need to be able to wash their hands at any sink.

3 Furniture and equipment

Stainless steel commercial sink units are generally free-standing or re-locatable. A series of loose tables can be put together to form a run of side benching. Schools sometimes prefer tables with open underframes, as under-bench cupboard units are often difficult to clean and manage.
The room layout should allow for adequate bin areas, which may include recycling bins.



Work surface materials

Resistance to water penetration, heat and impact are critical to work surfaces in a food technology room. Below is a brief description of the most widely available materials and their properties.
Some materials may attract greater fitting costs, although that will depend on the system being used, as some systems can be manufactured completely off site.

Wood

Wood is susceptible to scratching and cutting. Hot pans will burn it or leave marks but it has the advantage that it may be sanded and re-polished during refurbishment. It can be unhygienic if it is not kept properly sealed; all seals need to be well maintained to prevent water reaching the wood itself.
Beech is commonly used for worktops. It is a very durable wood which, if correctly sealed, has good resistance to water. Schools may want to purchase wood that has come from a sustainable source. An alternative is a material made up of small sections of solid wood laminated together. These small sections come from younger trees, helping the development of a sustainable resource.

Synthetics

There are two main types of plastic used for worktops: homogeneous and laminated. Homogeneous synthetics, which allow any shape of worktop to be made without the need for a join, include:

- Cast epoxy resins
- Polymethacrylates
- Polyesters

All the homogeneous synthetics have good all-round resistance but cast epoxy resin is the strongest material. The polymers may be stained by excessive heat, although the mottled surface finish of some of these materials can help to mask

stains. Using a grinder on certain materials can also help remove stains; resin filler can then be used to fill in the 'hole' but a certain degree of skill is required to re-sand to a finish as smooth as before.

Laminated plastics are made up of layers of paper impregnated with resins. There are two main types:

- Solid laminates
- Laminates on a chipboard base (laminate in a variety of thicknesses)

Solid laminates are a series of paper laminates bonded together to form a solid material and have a similar resistance to the polymers. They have the advantage over laminate on a chipboard (or similar) core in that they are stronger, less pervious to water penetration, can be cut to any shape (as there is no need for a separate edge), and if the surface is damaged it does not reveal a weaker and more porous core material.

Stainless steel

Stainless steel is often associated with professional kitchens. Steel is highly durable and can be shaped in long lengths off site. The splashback and the sink can be made out of the same piece of steel, ensuring that there are no awkward corners or gaps for food to get lost in. Stainless steel is hygienic and is the only surface that can be bleached safely. It can, however, be scratched and dented.

Quartz

Quartz worktops are made from minimum 90 per cent crushed stone mixed with acrylic resin and colour pigments. They are non-porous and easy to maintain, durable and hardwearing, heat, scratch and stain resistant.
Quartz worktops are heavy (30mm worktop weighs approx. 72kg per square metre) and can have similar transport/installation access issues to solid stone. They have unobtrusive but visible joints. Quartz is hygienic and long lasting and is suitable for use around sink units and food preparation areas. A low maintenance material, it is best cleaned with a damp cloth and a mild detergent.

4 Finishes and fittings

This section deals with floor and wall finishes, colour, window blinds and door vision panels.

Finishes and fittings

Flooring

Generally, the following characteristics are important when flooring is specified for a food technology space:

- Safety performance, including slip resistance
- Strength and resistance to wear
- Ability to withstand chemicals used in cleaning
- Resistance to static
- Hygiene
- Appearance
- Cost (both initial capital cost and maintenance cost)
- Maintenance
- Acoustic properties
- Flammability[12]

Slip resistance is a particularly important consideration for food technology rooms. Water, oils and dust (such as flour) can all make a floor slippery. Often flooring relies on a rough surface to ensure slip resistance but this can be at odds with the need to clean the floor. The level of slip-resistance of a floor will be reduced by an uneven substructure, which may lead to excessive wear in certain places. Uneven floors may also lead to tripping, or slipping if water spillages create pools. These considerations are of particular concern in an existing space.

The use of anti-static flooring is recommended. When specifying floors, long-term maintenance costs should be borne in mind; the initial low cost of flooring can soon be offset by excessive time spent cleaning.

As with all areas of building maintenance, a good level of housekeeping should be kept up and spillages quickly cleared away, to avoid accidents and damage to the floor itself. Preventative measures are preferable, including good cleaning regimes, measures to reduce the likelihood of spills and mat wells in external doorways to prevent mud and dirt entering the building. Taking the floor finish in a curved coving detail up the wall avoids corner dirt traps. The manufacturer's recommended cleaning method should always be followed and proprietary cleaning products used. In certain circumstances using inappropriate cleaning methods may damage the surface finish.

It is important to establish with the relevant people at an early stage, and by

[12] Refer to Section 5, Building Bulletin 100: Design for Fire Safety in Schools

4 Finishes and fittings

consultation with the manufacturers if necessary, whether fixed furniture and equipment should be installed before or after flooring is fitted.

Typical flooring types are outlined below.

Vinyl

Vinyl is available in sheet or tile form and is waterproof and impervious to oil, fat and domestic chemicals. Sheet vinyl is relatively easy to lay but joints must be well sealed to ensure that water or other liquids cannot permeate to the underside. Vinyl tiles have the advantage that they can be replaced easily if damaged; but they can curl, tear or de-bond more easily. Slip-resistant versions are available, often with small particles of metal embedded into them. Vinyl is a relatively soft material and can be cut fairly easily, making it vulnerable to metal legs (on stools and chairs) without plastic end-caps. Thicker vinyl provides more sound absorption.

Linoleum

Linoleum is made from renewable ingredients and natural raw materials, which makes it a more sustainable resource. It is available in both sheet and tile form and is finished with anti-static agents. A wide range of colours and new cutting techniques allow for numerous inlays and floor patterns, some of which can help students with visual impairments. Linoleum can be slippery, particularly when wet, and reference should be made to the manufacturer before specifying for areas where non-slip is essential. The material is soft and therefore offers some acoustic benefits.

Carpet

Carpet may be appropriate in non-practical areas such as resource areas; an anti-static carpet may be necessary where there is a high level of ICT, as a build up of static in the floor can affect electronic and electrical components. Dense-fibre carpets are the most durable and a slight pattern shows less staining. A carpet that resists water absorption will be suitable in some 'wet' areas (but not food preparation areas). Carpet can help improve the acoustic quality of a space.

Ceramic floor tiles

Ceramic floor tiles are available in a variety of sizes and shapes and can have a

patterned relief, which can generally stop them being slippery (but does make them more difficult to clean). Specialist skirting tiles may be useful where floors are washed frequently. Larger tiles are more likely to crack, particularly on an uneven floor. Tiles can be grouted with a non-slip filling; smaller tiles, with a greater proportion of grouting, will therefore be more advantageous in this respect. Quarry tiles are stronger than other ceramic tiles, very hardwearing and easy to maintain; but textured, slip-resistant varieties must be used in practical areas. Quarry tiles are usually unglazed and will therefore stain with oils and fats. Since tiles are hard, they are noisy, less comfortable for teachers who stand on them all day and unrelenting to delicate objects that may be dropped on the floor.

Rubber flooring

Rubber flooring is hardwearing and warm. A variety of relief patterns give it a non-slip quality but, as with all flooring that relies on a relief pattern to ensure slip-resistance, dirt can build up around the patterns, so appropriate cleaning is essential. Sheets come in limited sizes and, as more than one may be required in a room, it is essential that joints are correctly sealed to prevent water ingress.

Wall finishes

In food technology rooms, where a good level of hygiene is required, the walls must have a washable surface. Splashbacks-backs behind food preparation areas may be made of stainless steel, Perspex, solid laminate or aluminium sheet; however, splashbacks-backs behind hobs must be heat resistant. If they have visible fixings, it must be possible to clean them easily. Tiles are less effective on walls because bacteria can be harboured in the grouting, although larger tiles with less grout do reduce this problem. Wall and ceiling linings must comply with Section 5 of Building Bulletin 100[13], which gives requirements for inhibiting spread of flame, and with Section 6 if the wall forms part of a fire compartmentation.

The type of paint finish for food technology rooms should be carefully selected to minimise maintenance, since the surfaces are subject to high levels of wear and tear and occasional high humidity and condensation.

[13] Building Bulletin 100: Design for Fire Safety in Schools

4 Finishes and fittings

Colour

The key considerations when room surface colours are chosen are: the need to maximise light levels; visibility; maintenance; and psychological effect.

Generally speaking, neutral colours provide the most flexible background for a learning space, with colour provided in displays. The following key points are worth considering:

- Dark colours reflect much less light than pale colours and can make a space feel smaller. They should therefore be avoided on walls and ceilings (which should be white), though pale floor colours are impractical.
- Contrasting tones and shades (for example on door frames) can help people with visual impairment orientate themselves.
- Glossy finishes can be glaring and should not be used on the horizontal surfaces of furniture, particularly for use with ICT.
- Bright colours and strong patterns should be avoided on horizontal working surfaces as they can be distracting.
- Highly contrasting patterns and colour combinations can be disturbing to some students and should be avoided.
- Colour can affect behaviour and mood. For example, passive cool colours, such as blue-green, light green and beige, are thought to aid concentration, while bright colours can be disturbing or over stimulating to some people.

Blinds

Some form of daylight and sunlight control will be needed in most spaces to ensure good visibility of the electronic whiteboard and/or computer screens. Blinds - vertical, horizontal or roller - are frequently used for this purpose. Vertical blinds are cheaper than horizontal and easier to clean but are more delicate and offer less controllability. Horizontal aluminium blinds are the most controllable but do gather dirt. Metal slats on south-facing rooms can heat up and act like radiant panels. Roller blinds provide some lighting control but this cannot be combined with a view out for students.

Because all three types of blind are susceptible to damage, it is important to specify high quality durable fittings and install them in a way that minimises the chance of damage occurring. For safety and to avoid damage, pull cords should be tidied away and a mechanism for doing this should be provided on the wall. Both vertical and roller blinds must be waterproofed for wet areas, particularly food technology rooms. It should be possible to secure blinds so that they do not blow against hot burners. Tinted film to reduce solar gain and glare is an option that can be considered in addition to or instead of blinds; this may be particularly suitable for retrofit situations.

Vision panels

Vision panels in doors are particularly valuable in food technology areas, where maximum supervision is needed. Lower level vision panels need to be included for wheelchair users, perhaps with a centre line around 1000-1200mm.

5 Services and environmental design

Practical food technology rooms require careful servicing and environmental design to work well. This section deals with electrical, water, and gas servicing, ventilation, heating and lighting. Careful coordination of servicing and furniture layouts is required at the design stage to ensure that there is effective and unobtrusive routing of gas, electric and water runs.

Services and environmental design

Services

Electricity

BS 4163: 2007 provides comprehensive guidance on the design and maintenance of electrical systems in design and technology areas (including food technology), with references to relevant regulations and guidance. This section provides a brief overview.

New fixed installations and alterations should conform to the Electricity at Work Regulations 1989 and to BS 7671: 2008 (see References). All electrical equipment should be of an appropriate Index of Protection (IP) rating. For example, if there is a risk of water and/or solids ingress, the equipment should have a rating of at least IP 44. For details of specifications and of tests to verify degrees of protection, reference should be made to BS EN 60529.

Electrical supplies for food technology equipment

Cookers in food technology rooms should be wired from local isolators. There should be a 13-amp supply for gas cookers to supply clocks and timers. Microwave and combination ovens can be connected via a 13-amp plug. All electrical equipment should be of an appropriate IP rating. Supplies to commercial-sized fridges and freezers should be on dedicated circuits.

Structured data cabling (network cabling)

Structured data cabling is a fundamental part of the services installation of a modern food technology facility. The type of cabling (for example, category 5e or category 6) should be carefully chosen, and installed and commissioned in accordance with industry standards. A patch panel should be provided for a local server, with connections for wireless network hubs and final data points. Newer Managed Learning Environments (MLEs) do not always need local servers.

Portable equipment

Where portable equipment is provided, details of potential benching layouts (together with the electrical loading of each supply point) must be assessed during the early stages of the development to ensure the potential loading of circuits is fully considered. Only portable equipment rated at less than 13 amps should be fitted with a normal BS 1363 plug top.

5 Services and environmental design

It is important to provide a sufficient number of well positioned power sockets. Individual students will use a wide range of electrical equipment and poorly positioned sockets cause real problems of trailing leads. Socket outlets to be used for mains-powered portable equipment (indoors or outdoors) must be protected by an RCD with a trip rating of 30 mA or less, conforming to BS EN 61008-1, BS EN 61009-1 or BS 7288. It is recommended that every socket outlet is protected in this way.

All socket outlets should be positioned away from sinks to reduce the risk of electrically powered equipment being placed in water. In food rooms, socket outlets should be positioned to ensure that an electrical cable attached to a piece of equipment does not have to cross a hot cooking surface. Electrical supplies and SVGA cabling will be required for interactive whiteboards and ceiling-mounted projectors. Floor sockets are not suitable for food technology rooms.

Gas

Mains gas is used to service cookers in food spaces. Wherever mains gas is supplied, there must be some way of readily isolating and restoring the gas supply to each room. The principal isolating gas tap should be easily accessible but not readily accessible to students. To prove that all downstream isolation valves are in a closed position prior to the restoration of gas supplies after a shutdown, a weep by-pass pressure-proving system can be used in large installations. The automatic weep by-pass pressure-proving system will facilitate safe daily isolation and restoration of the gas service and also automatic interlocking to ventilation systems and fire alarm systems where they are required. Specialist advice should be taken before fitting leak-sensing controls, emergency shut-off valves, or ventilation control or fire alarm interlocks to gas supplies, as they should not be fitted to some equipment. Advice on gas installations is given in the publications IGE/UP/11 and BS 4163 (see References).

Water

Students need ready access to hot and cold water. In food technology rooms there must be hot, cold and drinking water. Sinks should be fitted with bottle traps. In commercial kitchens it is good practice to provide all taps for washing-up with water at a supply temperature of 55-60°C – this higher temperature than is suitable for normal handwashing is needed to remove grease and helps to kill

bacteria. In schools the teaching staff should be consulted about the temperature of hot water supplies to kitchens and food technology rooms. High temperatures present a risk of scalding and in many cases a lower temperature will be required for use by pupils. However staff may still need higher temperatures, e.g. for washing greasy dishes. At washbasins, lower temperatures e.g. of 43-45 degrees Centigrade will be required which will require the use of thermostatic mixing valves. The Water Supply (Water Fittings) Regulations 1999[14] require backflow prevention to be fitted to water supplies to equipment such as domestic washing machines and dishwashers, which will contain a category 3 fluid (one which can cause contamination of the water supplies in cases of back syphonage). These requirements are retrospectively enforceable under the Water Industry Act, 1999.

Food areas may be equipped with domestic or in some cases a small commercial dishwasher, along with washing machines, which will need adequate water supply.

Environmental design

Environmental standards including heating, ventilation, lighting and acoustics are covered in the publications listed in the References. The following summarises the main requirements.

Ventilation

For advice on ventilation of food technology areas, see Section 2.3 of Building Bulleting 101[15]. Providing adequate ventilation in food technology rooms is a significant technical challenge, since there is a need for occasionally high rates of air change, without excessive noise. Grille outlet and ductwork required to deliver and extract the air are normally accommodated in a ceiling void.

All ventilation must be adequate for the number of occupants. It should also dilute fumes and water vapour as well as vaporised fats generated by cooking in food technology rooms. Where flueless gas appliances such as cookers are installed, adequate ventilation is required to safeguard against the possibility of incomplete combustion producing carbon monoxide.

[14] Refer to Water Regulations Guide at www.wras.co.uk

[15] Building Bulletin 101: Ventilation of School Buildings

5 Services and environmental design

Carbon monoxide detectors are strongly recommended to warn occupants of dangerous incomplete combustion, which can occur if the ventilation is insufficient for combustion or if the cookers are badly maintained. Because of the high ventilation rates required in such spaces, pre-heating of the ventilation air should be considered. Guidance is available in BS 6173 on air supplies required to support combustion where cookers are installed.

The Education (School Premises) Regulations 1999 give ventilation rates for different occupancy levels. These require that controllable ventilation should be provided at a minimum rate of three litres of fresh air per person per second for each of the maximum number of people the area will accommodate, and that the spaces should be capable of being ventilated at a minimum rate of eight litres of fresh air per second for each of the usual number of people in the space.

The Workplace (Health, Safety and Welfare Regulations) 1992: Approved Code of Practice and Guidance, L24, 1996 also applies when a space is in use. The guidance states that the fresh air supply rate should not normally fall below five to eight litres per second per occupant (regulation 6, page 9). Factors to be considered include the floor area per person, the processes and equipment involved and whether the work is strenuous.

The risk assessments produced by CLEAPSS[16] (the Consortium of Local Education Authorities for the Provision of Science Services) for pollutants assume at least three air changes per hour in spaces of average size. If the ceiling height is low, a higher ventilation rate will be required to achieve the same air-change rate.

Ventilation should be achieved by natural means wherever possible. However, some form of mechanical ventilation will be required in most food areas at least some of the time, to deal with the heat-gain and water vapour produced by cooking and other equipment. Mixed-mode mechanical/natural ventilation systems rather than full mechanical ventilation systems will probably be the most economic solution. Heat recovery on local extract fans and on supply and extract systems may be helpful in winter to minimise ventilation heat losses. However, there will need to be bypass or separate arrangements for summer ventilation. Cleaning of grease from any heat-recovery systems must also be considered. Summertime overheating can be a problem, particularly if solar gains are added to the heat gains from appliances[17].

[16] Refer to www.cleapps.org.uk

[17] For guidance on summertime overheating whilst avoiding the use of air conditioning, for example, passive thermal design and night cooling, see Building Bulletin 101

Services and environmental design 5

The following points should also be taken into account:

- Food technology rooms should ideally be enclosed so that dust cannot contaminate food.
- Opening windows may need to have fly guards to prevent insect contamination.
- Food stores, refrigerators and freezers must be maintained at the correct temperature.
- If refrigerators or freezers are kept in store rooms, there must be sufficient ventilation so that the general conditions remain cool. Any ventilation and extraction systems should be designed by specialists to create appropriate conditions for comfort and health. Adequate combustion air, as required by BS 6173, means that ventilation controls may need to be interlocked with gas supplies (for example, on kitchen extraction systems), unless an alternative means of reducing risk to a practicable level can be demonstrated by other suitable methods of working. Also, in some situations fire alarm systems must be linked to extract fans so that they are shut down in the event of a fire. Specialist advice on these matters will be required from a suitably qualified engineer.
- Adequate provision should be made for exhaust air from tumble driers.

Heating

An appropriate temperature must be maintained at all times, particularly in practical areas and preparation areas, because low temperatures and draughts can make it more difficult to handle materials or operate equipment, while high temperatures and inadequate ventilation may lead to fatigue. Convector heaters should be avoided in dusty areas as they blow out recirculated dust. Radiators can be a suitable solution. The main challenge in designing a good heating solution for practical teaching spaces for food is the sudden and rather unpredictable pattern of heat gain caused by the use of multiple cookers in a teaching session. The temperature in the space can undergo a very rapid rise. High thermal building mass can help to even out these fluctuations but this will need to be coupled to a means of purging excess heat to prevent heat accumulation. Specialist advice is recommended to balance the heating and ventilation requirements of these spaces.

5 Services and environmental design

Lighting

The quality of light is very important, both for safety reasons and to contribute to the general atmosphere of a teaching space. Much can be achieved through the design of the building form, selection of luminaries (light fittings) and use of colour. Ideally, all teaching spaces should be lit by natural light, supplemented in deep rooms by electric light. For practical cooking spaces, a good, even distribution of light is desirable, since it is likely that students will be undertaking detailed work, often with sharp blades, in all parts of the room. Building Bulletin 87[18] recommends a level of 300 lux for general lighting in most teaching areas and 500 lux wherever visually demanding tasks are done.

It is better that light sources provide well distributed, diffuse light rather than directional beams, which can cast problematic shadows on the task areas.
An even spread of light without deep shadows will also minimise tripping hazards. Directional lighting is useful in display areas, however.

It is an advantage to be able to vary the lighting environment by providing, for example, separate controls to different areas (such as over a projection screen or whiteboard) or dimming switches. The main room light controls should be easily accessible from the teaching position, so that teachers can quickly make adjustments. Lighting controls such as daylight sensors can reduce running costs. Movement-sensing controls are best avoided in food technology areas, as it can be dangerous for the lights to switch off unexpectedly when people remain still. Building Regulations Approved Document L requires lighting controls to be fitted in some instances, although some lights should always remain uncontrolled.

Some form of daylight and sunlight control (such as blinds) will be needed in most spaces to ensure good visibility of the electronic whiteboard.

Good rendering of colours is important and lamps of CIE colour-rendering group 1B should be provided. Where food is being photographed, it is recommended that 'daylight' bulbs are used to give a satisfactory result. If a lit display unit is enclosed, it will need to be designed to avoid the build-up of heat, as this can be a fire hazard. Luminaires that are designed to minimise glare and reflection on the vertical plane should be used in areas where there is a number of computers (such as shared resource areas). However, glare and reflection on the horizontal plane are usually

[18] Building Bulletin 87 (2nd edition), Guidelines for Environmental Design in Schools, DCSF 2003

equally important and the type of luminaire chosen should also minimise this kind of glare[19]. Sealed lighting units should be provided in dusty areas to avoid dust build-up and to reduce maintenance costs.

Acoustics

Food spaces should be designed to have a suitable acoustic environment for the health and safety of the occupants and for teaching. The teacher's voice should be able to carry to all parts of the room (from any position) but the space should not be too acoustically reflective, which would exaggerate the effect of noise from practical cooking sessions. A particular challenge is to achieve high air changes when required, without creating high levels of fan noise interference. Consideration must be given to the noise level and its effect on hearing, speech intelligibility and the audibility of warning sounds for safety purposes. Where possible, steps should be taken to reduce noise generation at source. Building Bulletin 93, Acoustic Design of Schools, contains performance standards for acoustics (indoor ambient noise levels, sound insulation, reverberation, etc.) and guidance on how to achieve these standards. The noise of extract fans should comply with indoor ambient noise levels required by Building Bulletin 93 unless they are intended to be switched off during class presentation/ discussion. Fire alarm sounders and flashing beacons may be required in areas with high activity noise levels and where students have impaired hearing.

Sustainability

Food technology spaces are high users of electrical and gas energy for preparing and storing food and washing utensils, equipment and laundry. Schools can minimise the environmental impact of food technology rooms by:

- Specifying equipment with the highest energy certification (i.e. 'A' rated appliances)
- Designing to minimise electrical lighting requirement by good use of daylight and by using lighting controls
- Fitting heat recovery capability on extraction ventilation
- Specifying furniture, materials, fittings and equipment with a low embodied energy and high recyclable content
- Ensuring that freezers and refrigerators are switched off if possible during vacations

[19] Refer to Building Bulletin 90 for guidance on lighting design www.teachernet.gov.uk/lighting (to be superseded by (Draft title) - Lighting Guide 5: Educational Premises, Lecture, Teaching and Conference Rooms, which will be downloadable from the Society of Light and Lighting (SLL) Website - http://www.cibse.org/index.cfm?go=page.view&item=68

Appendix:
The health and safety system

The health and safety system

Regulations are made, in most cases, under the Health and Safety at Work Etc. Act 1974 (HSWA) and deal with the workplace. These regulations (which include EU legislation) refer to 'employers' and 'employees'. In the case of schools, employers will be assumed to be the local authority, school governing body or proprietor and the employees, the teachers and support staff. Students are classed as a third party and may not be covered by the regulations but are covered under the general requirements of the HSWA.

Approved codes of practice offer practical examples of good practice and give advice on how to comply with the law. They have a 'special legal status' which means that if someone is prosecuted for a breach of health and safety law and it is proved that they have not followed the relevant provisions of the approved code of practice, a court can find them at fault. However, compliance with the law can be shown in some way other than through the approved code of practice.

The main purposes of guidance are to interpret the law, to help people comply with the law and to give technical advice. Guidance is not compulsory but a person following the guidance will normally be doing enough to comply with the law.

BS 4163: 2007, Health and Safety for Design and Technology in Schools and Similar Establishments, Code of Practice, HSE

This code of practice provides guidance for people responsible for planning design and technology facilities (including food technology) in schools and similar establishments where materials are manipulated and processed, equipment is used and design and/or manufacturing takes place (for example, food, textiles, graphics, electronics, technology, craft, engineering, manufacturing and computer areas).

The recommendations cover supply and safe use of equipment, machine tools, materials and chemicals, personal protection, and safety management, with particular reference to the hazards involved.
Contents include:

- Health and safety management
- Planning and services
- Teaching areas, equipment, tools and processes
- Materials
- Terms and definitions, and references

6 Appendix: The health and safety system

BS 4163:2007 replaces BS 4163:2000.

Control of Substances Hazardous to Health Regulations 2002 (COSHH)

The COSHH regulations assign responsibility for assessing the use of hazardous substances to ensure this is controlled without risk to health, including food technology rooms.

COSHH requirements fall into four categories:

- Assessment
- Prevention
- Control
- Management

Risk assessment is the crucial first step; schools must assess the risks associated with the storage and use of hazardous substances. This is covered in BS 4163 (see above); and CLEAPSS publishes Model Risk Assessments for Design and Technology in Secondary Schools, which covers all material areas, identifying hazards and their control. Forms of control include personal protective equipment (PPE) and local (extract) exhaust ventilation (LEV) installations but where possible prevention is preferable to control.

The Food Safety Act 1990

This Act contains specific requirements for food that is sold or supplied. The school kitchen is covered by the Act but not necessarily the food technology teaching room. The Act has implications for work in mini-enterprise projects and where activities are intended to mimic commercial catering. Some of the main points are listed here but schools should check the legal position regarding food safety with their local environmental health officer.

- The law will apply in a school food technology room if food is either sold or supplied to any person who is not the maker of the food product.
- If a school sells or supplies food it must register as a food business with its local authority and be liable to visits by an environmental health officer.
- For a school to be a registered food business it must sell or supply food items for a total of five or more days in any consecutive five-week period. This is a requirement of the Food Premises (Registration) Regulations 1991 (as amended).

Appendix: The health and safety system 6

- The main concerns of the Food Safety Act are the provision of safe food in a clean environment. Specific requirements, such as hand-washbasin provision, equipment requirements (including adequate refrigeration), suitable wash-down surfaces, both horizontal and vertical, the obligations on management and requirements for food handlers are laid down in regulations made under the Act, viz. the Food Safety (General Food Hygiene) Regulations 1995 (as amended) and the Food Safety (Temperature Control) Regulations 1995 (as amended).
- When students make food for their own consumption in lessons, this is considered to mirror domestic kitchen activity. These are therefore not subject to the requirements of the Act. However if, for example, there is an outbreak of food poisoning in a food technology room, it is against the requirements of food law that the school is likely to be judged. It is good practice to instil in students an understanding of personal hygiene and safe food handling techniques.

The Electricity at Work Regulations 1989

These regulations place a duty on employers to ensure that as far as possible all electrical equipment and installations are constructed and maintained so as to prevent danger. For fixed installations, BS 7671, Requirements for Electrical Installations, is the standard usually followed in this country for the design and construction of electrical installations. Its associated Guidance Note 3 on inspection and testing gives guidance on the maintenance of fixed installations. These publications are available from the Institution of Electrical Engineers (IEE). Guidance on maintenance of appliances is available in HSE publication HSG107, Maintaining Portable and Transportable Electrical Equipment. Guidance is also available in the IEE publication, Code of Practice for In-Service Inspection and Testing of Electrical Equipment.

The Workplace (Health, Safety and Welfare) Regulations 1992

These regulations apply to all workplaces, including schools. The regulations cover aspects of health and safety in the workplace (replacing a number of old regulations) and set out the responsibilities of both employer and employee. Issues of direct relevance to design and technology include:

- Maintenance
- Environmental issues

6 Appendix: The health and safety system

- Room dimensions (the 11m^3 per employee recommended in the Approved Code of Practice does not apply to teaching areas)
- Workstation layout and furniture
- Free floor space and circulation routes

The Management of Health and Safety at Work Regulations 1999

These regulations set out general duties for employers concerning the management of health and safety for their employees. They cover four basic aspects of health and safety:

- Planning
- Organisation
- Control monitoring
- Review

The regulations have little direct relevance to the design of school buildings. However, certain management procedures may result in specific requirements for the design and layout of design and technology areas.

The Personal Protective Equipment (PPE) at Work Regulations 1992 (as amended)

The regulations aim to ensure that employers provide adequate PPE for their employees. PPE is defined as any item that protects a person against any health and safety risk. It does not, however, cover any equipment that may be required as a direct result of COSHH regulations. Like COSHH, the PPE regulations regard prevention as an initial action. PPE should always be regarded as the last resort to protect against risks to health and safety; safe systems of work should always be considered first. Direct reference is made in the regulations to the accommodation of PPE, such as coat pegs for protective clothing.

References

7 References

References

Note: all relevant DCSF documents are downloadable via
www.teachernet.gov.uk/schoolbuildings

General school design

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The Education (School Premises) Regulations, The Stationery Office, 1999.

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Manual Handling Operations Regulations 1992: Guidance on Regulations, L23, HSE Books, 1998.

Furniture

EN1729 Part 1 and 2 (2006) European Standard for Educational Furniture
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DfEE Building Bulletin 87, Guidelines for Environmental Design in Schools, see the latest version on www.teachernet.gov.uk/schoolbuildings
DfEE Building Bulletin 90, Lighting Design for Schools, The Stationery Office, 1999.
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BS 6173, Specification for Installation of Gas-fired Catering Appliances for Use in All

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Types of Catering Establishments (2nd and 3rd Family Gases), British Standards Institution, 2001.
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Control of Substances Hazardous to Health, L5, HSE Books, 2002.
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Five Steps to Risk Assessment, INDG 163 REV1, HSE Books, 1998.
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7 References

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Model Risk Assessments for Design and Technology in Secondary Schools and Colleges (Revised), Consortium of Local Education Authorities for the Provision of Science Services (CLEAPSS), 2000.
Note: Available to members and associates only; contact CLEAPSS on 01895251 496. A CD-ROM with this publication and additional leaflets and information have also been published.
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Workplace Health, Safety and Welfare Regulations 1992: Approved Code of Practice and Guidance, L24, HSE Books, 1996.

Fire safety

Building Bulleting 100: Design for Fire Safety in Schools DCSF 2007
www.teachernet.gov.uk/fire

Food safety

Food Safety (Temperature Control) Regulations 1995 (as amended), SI 1995/2200, The Stationery Office, 1995.
Food Safety Act 1990, The Stationery Office, 1993.
Food Safety (General Food Hygiene) Regulations 1995 (as amended), SI 1995/1763, The Stationery Office, 1995.
Food Premises (Registration) Regulations 1991 (as amended), SI 1991/2825, The Stationery Office, 1991.

Organisations

Becta www.becta.org.uk Becta is the government agency leading the national drive to ensure the effective and innovative use of technology throughout learning.

CLEAPSS (The Consortium of Local Education Authorities for the Provision of Science Services) http://www.cleapss.org.uk A nationwide subscription advisory service, supporting science and technology teaching in schools. Provides practical

References 7

advice on matters such as health and safety. At the time of writing, all LAs in England, Wales and Northern Ireland are members and hence all their officers and schools have free access to the services, as do the vast majority of independent schools and colleges that are associate members.

The British Standards Institution http://www.bsi-global.com For access to British Standards publications, including BS 4163, Health and Safety for Design and Technology in Schools and Similar.

The Design and Technology Association http://www.data.org.uk DATA provides a guidance service to staff on health and safety and risk assessments.

The Health and Safety Executive http://www.hse.gov.uk The HSE website has useful health and safety information and publications on topics including wood dust and Control of Substances Hazardous to Health (COSHH) procedures.

The National Association of Advisers and Inspectors in Design and Technology http://www.naaidt.org.uk The website provides a discussion forum for design and technology teachers and advisers. The NAAIDT also produces publications and organises training on health and safety matters.

TeacherNet http://www.teachernet.gov.uk/schoolbuildings For DCSF design guidance, including Building Bulletin 98, Briefing Framework for Secondary School Projects and Furniture and Equipment in Schools Projects.

SSAT http://www.specialistschools.org.uk gives practical support to transforming secondary education in England by building and enabling a world-class network of innovative, high-performing secondary schools in partnership with business and the wider community.

7 References

Key to plans

Furniture

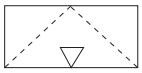
- fixed benching
- moveable workbench
- stool
- chair

Storage

- equipment trolley
- filing cabinet
- coat and bag storage unit
- coat hooks
- cupboard
- fitted kitchen drawer unit
- fitted kitchen cupboard unit

Kitchen Equipment


- sink


- chest freezer


- blast chiller

- freezer

- fridge


- electric cooker


- gas cooker


- electric hob


- microwave

- oven

- dishwasher

ICT


- flat screen desktop computer


- desktop computer


- laptop


- TV/video trolley


- interactive whiteboard

Laundry

- clothes washing machine

- clothes drier

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