

SEA FISH INDUSTRY
AUTHORITY

SEAFISH

Maintaining fish quality

Acknowledgements

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Benefits of systematic training

This instructor's manual has been designed to assist on-the-job training of staff employed in the sea fish industry.

Below are listed some of the benefits which can be obtained by following a programme of systematic training.

1. Reduces the time taken to learn a new skill or procedure.
2. Achieves, maintains or improves standards of quality.
3. Raises staff morale and reduces staff turnover.
4. Reduces the number of accidents caused by ignorance or carelessness.
5. Raises standards of safety and hygiene.
6. Increases the flexibility and adaptability of staff.
7. Reduces customer complaints and increases customer satisfaction.
8. Raises performance standards and improves job satisfaction.
9. Reduces wastage levels and therefore increases profitability.

Guide to the Manual

1. Introduction

Before using this training manual it is **important** that you read the following notes carefully.

2. How to use the manual

There are five suggested session outlines which, if used in sequence, make up a logical staff training programme.

These sessions may also be delivered as a series of individual or grouped sessions spread over a period of time. This may enable you to plan your training more easily to suit your business hours or staff availability.

You may omit sessions, or parts of those sessions, which cover procedures not adopted by you and which are additional to your needs.

3. Materials supplied

Session outlines	<i>(coloured white)</i>
Information sheets	<i>(coloured green)</i>
Example sheets	<i>(coloured pink)</i>
Questionnaires	<i>(coloured blue)</i>

3.1 Session outlines

These contain the objectives and topics to be covered for each session.

These outlines are essential for planning each session but, as they are only suggested outlines, you should use your own experience and expertise to expand the basic points and to cover each topic in as fine a detail as you require.

Each session outline covers the suggested theory, demonstration and trainee participation activities which are required to enable learning to take place and is sub-divided as follows.

3.1.1 Title

This refers to the general subject matter of each specific session covered.

3.1.2 Objectives

These express what a trainee will be able to do after completing each particular session.

They also provide a means of assessing whether sufficient learning has taken place.

3.1.3 Total time indicator

Each session outline has a nominal total time indicator which is allocated to the various topics to be covered during each session.

The figures quoted are for guidance only and serve to indicate the relative importance or complexity of the stages to be covered.

3.1.4 Key words

These provide a quick reference to the points to be covered.

3.1.5 Points to cover

These provide a brief description of the subject matter identified by the key words.

3.1.6 Additional notes

These indicate the appropriate use of information sheets, example sheets and questionnaires.

This column space may also be used by you to make any personal notes or improvements you may wish to make *e.g. additional points to cover, specific workplace practices etc.*

3.1.7 I.N.T.R.O.

This is an abbreviation of the word 'introduction'. It occurs at the start of each session, should occupy no more than five minutes of time, and serves to remind you of the following points:

- Interest** - Gain your trainees' attention and their interest in the topics to be taught.
- Need** - Convince your trainees of their need to learn.
- Title** - Give the title of the session.
- Range** - Give a brief explanation of what will be covered in the session.
- Objectives** - Explain what your trainees will be able to do at the end of the session.

There are many different ways of introducing a training session but it is important that you adopt a style which suits both you and your trainees.

3.1.8 Development

This section occupies the greater part of each training session and outlines the sequence of knowledge and skills which you are required to teach your trainees through presentation, demonstration and trainee practice.

The amount of time spent in expanding and developing a particular session will vary depending upon the material to be covered, the speed at which the trainees learn and the depth to which each topic is to be covered.

3.1.9 Consolidation

This section covers the reinforcement of learning which has taken place, for example, by the use of questionnaires and practical tests.

These assessments will help you to evaluate how much each trainee has learnt from the training session.

Individuals learn at different rates and the degree of consolidation required will also vary depending upon each trainee's ability, the complexity of the task and the standard of performance you require.

3.2 Information sheets

These provide more detailed information on specific topics.

They may be used as background information for the instructor and may also be photocopied for trainees to keep as reminders, where appropriate.

Some information sheets are designed to be used as a questionnaire during periods of consolidation.

The relevant information sheets are included as appendices to each session outline and are identified at the appropriate places in the additional notes columns.

3.3 Example sheets

These sheets are designed to aid the learning process by supplying the trainees with examples of situations that they are able to relate to, and giving them the opportunity to discuss the implications of their chosen answers or courses of action.

They are identified at the appropriate places in the additional notes columns.

3.4 Questionnaires

When using the multiple-choice questionnaires you will find that some questions have two similar or equally correct answers. These questions have been deliberately designed in this way to stimulate discussion between the trainees and yourself, and to reinforce the learning process.

4. Administration

Always ensure that:

- 4.1 You set aside enough time to complete the topics that you intend to cover during your training session without forcing the pace.
- 4.2 The trainees have sufficient time and are in a suitably-relaxed frame of mind to complete the session.
- 4.3 You have pen and paper available for each trainee to use.
- 4.4 You have read through the material which you intend to cover beforehand and are thoroughly conversant with the subject matter to be taught.
- 4.5 You have a quiet area available for the training sessions, except for practical work when it is advisable to use the actual equipment in the workplace.
- 4.6 All necessary teaching aids are available and in working order *e.g. electrical equipment*, before the start of each training session.
- 4.7 Short rest periods, strategically placed, are included within your training sessions. These rest periods not only break up a session for easier learning but also allow trainees to 'switch off' for a short time thus making them more receptive when the session resumes.

How to design a training session

When designing or planning a training session it is important to consider the following learning principles.

Motivation

- Trainees need to know:
- **What** they are trying to achieve *i.e. the title and objectives of the session.*
 - **Why** they need to learn *i.e. the reason for learning, e.g. more responsibility, increase in status, better and safer systems of work etc.*
 - **How** they are going to be trained *i.e. the teaching methods you are going to use, e.g. telling/showing, showing/doing, telling/discussing, showing/practising, etc.*

Easy stages

New information is best absorbed in easy stages and the most effective way to present information is in small steps placed in a logical sequence.

Each stage or session should take into account the rate at which the trainee will learn.

During the early stages of training, a trainee may find learning quite strenuous and the amount to be taught should be judged to stretch the trainee sufficiently without producing mental fatigue.

A trainee can only absorb a certain amount of information in a given time and new information is always more meaningful if it can be linked to existing knowledge, skills and experience.

Sessions should therefore be designed to build upon the existing knowledge, skills and experience of your trainees.

Reinforcement

This is an important learning principle which should be considered as follows:

1. Learning two or more parts of the same subject in sequence will assist reinforcement because they share a common relationship.
2. Repetition of the main points of the session and a final summary will assist reinforcement because this will allow the trainee time to absorb the new information.

Revision

This is used to clear up any doubts that the trainees might have, to review progress, to identify any obstacles that may have inhibited progress and to establish a common base for moving forward.

Revision can also be used during, and at the end of, a series of sessions dealing with the same topic or subject.

Practice

This is essential if the trainee is to develop the ability to perform an activity to the required standard of performance.

The number of practice sessions will depend upon the difficulty of the activity and how often it can be practised within the time available.

The most important part of practice sessions is to provide feedback in order to inform trainees about their performance and to reinforce correct and safe methods of working.

Evaluation

Two simple methods are available to enable you to assess trainees' learning - testing knowledge and testing skills.

Knowledge may be tested by asking the trainees questions on the subject that has just been covered. If a trainee has difficulty in answering, try rewording the question to assist recall.

Skill testing may be conducted by asking trainees, in turn, to demonstrate the activity to describe what they are doing and to explain why they are using that particular method. Allow the trainee to continue, only interrupting if an unsafe or undesirable technique has been acquired.

If the activity has been completed successfully, give praise as this helps to gain personal commitment from the trainee.

Setting objectives

A complete training objective or learning outcome consists of three basic elements:

Terminal behaviour (specific) i.e. what the trainee will be able to do (observable behaviour) at the end of the session (terminal) e.g. *use a pressure hose to clean processing machinery.*

Conditions (acceptable) i.e. under which the trainee will have to work e.g. *whilst conforming to health, safety and hygiene regulations.*

Standards (measurable) e.g. *remove all visible traces of contamination.*

When setting objectives it is helpful to remember **SAM** - **S**pecific, **A**cceptable and **M**easurable.

For a training session on cleaning procedures, for example, one of the learning outcomes might be:

At the end of this session trainees will be able to use a pressure hose to clean processing machinery (S) whilst conforming to health, safety and hygiene regulations (A) in order to remove all visible traces of contamination (M)

REMEMBER

It is very rare for a trainee to achieve something unless **you** can effectively plan and direct **your** efforts towards that end.

If you don't know where you are going, how do you know when you get there!

Use of questions in training

Generally, little thought is given to the design of questions. In ordinary life, questions are often asked that produce either a yes/no answer, or just echo the opinion of the questioner e.g. *'Don't you think that . . ?'* or *'Wouldn't you agree that . . ?'*

This approach to asking questions may be acceptable in normal situations but asking carefully planned questions is vital to almost all training situations because it makes the trainee think and helps the learning process.

Listed below are some of the reasons why we ask questions during training:

1. To revise previous knowledge before continuing a session.
2. To promote trainee participation in order to maintain their interest and involvement.
3. To assess what has been learnt and hence measure the effectiveness of the training.
4. To lead a trainee and encourage them to reason out the next logical step.
5. To recall attention after an interruption, or to assess if a trainee has been paying attention.
6. To evaluate a trainee's level of knowledge and ability.

A knowledge of question types and their correct use is essential for effective training.

Good questions

Good questions to use during training activities are generally those that require a detailed answer to be given.

Try to ensure that the question begins with words like:

Who, What, Why, When, Where, How . . ?

Bad questions

Bad questions to use during training are those that:

- Produce a yes/no answer e.g. *'Can you recognise a cod?'*
- Are ambiguous (invite more than one answer) e.g. *'Did you use a knife, clean the cutting board and wipe down?'*
- Are not clear and concise e.g. *'How often do most people clean down the bench?'*
- Are rhetorical (need no answer) e.g. *'Everyone knows that hygiene is important, don't they?'*

Although carefully planned questions are important to assist the learning process, being able to handle the answers is often equally as important.

There are three possible answers that you may receive in response to a 'good' question:

ACTION TO TAKE

- | | |
|-------------------------------|---|
| 1. A correct answer | Acknowledge that the answer is correct and use this to develop the session further. |
| 2. A partially correct answer | Either, use further questions to obtain the full answer, or indicate which part of the answer is correct and encourage the trainee to reason out the full answer by asking supplementary questions. |
| 3. A wrong answer | Initially, assume that the question has been misunderstood and rephrase it, ensuring that it is clear, simple and concise. If the correct answer is still not forthcoming, recap the relevant key learning points and try to lead the trainee by asking relevant supplementary questions. |

It is always a good check of your training ability to see how well a trainee answers your questions:

The better the answers, the better your training!

Correction coaching

Coaching is a highly individual matter and you will develop your own appropriate techniques.

The need for correction coaching arises when, for example, a trainee has obvious difficulty in recalling recently-acquired information, or in performing a task that they have already been shown.

The reason for this difficulty might be due to one or more factors. For example:

1. The training was carried out incorrectly in the first place.
2. Trainees are using the wrong product or equipment.
3. Trainees have forgotten or have lost concentration.
4. Trainees are using incorrect methods of work.

Although a trainee fault may have been identified it is important to analyse the real cause or reason for this error and to establish whether the fault lies with the trainee or with some other factor not related to training at all *e.g. product or equipment faults*.

Correction coaching is only appropriate when there is a clear need for further training.

When using correction coaching it is not always necessary to repeat the whole training session; it may only be necessary to cover that section dealing with the relevant procedure or practice.

When preparing a session on correction coaching remember that the structure of the session is similar to a normal training session but is carried out more informally:

Benefit	Make the trainee aware of the errors and explain the benefits of correcting them.
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Analysis

Break down the task into appropriate and logical stages.

Provide clear and concise demonstrations and explanations.

Ensure that the trainee can relate each stage to the whole activity being demonstrated easily.

Use questions continually, not only to obtain feedback but also to keep the trainee alert and thinking about the activity.

Allow the trainee time to practise.

Assessment

Check the learning using either written or practical tests.

If the learning has still not been absorbed correctly, additional coaching may be necessary or further practice time allowed.

Ensure that time is set aside at a future date for re-assessment.

The structure of a coaching session can be remembered by the initials **BAA**.

This will help to remind you that, although trainees may follow your instructions like sheep, it is up to **you** to provide them with the motivation and enthusiasm to perform with flair and to display initiative.

REMEMBER

Coaching techniques are usefully informal with the emphasis placed on encouraging the trainee to become personally aware of any faults in their performance and to find methods for their self-correction.

What is quality

Total Time Indicator - 120 mins

Objectives - On completion of this session trainees will be able to:

- State why fish quality is important and describe three methods for controlling fish quality.
- Identify good quality fish and shellfish.
- Describe the visible changes which occur in fish during the processes of deterioration and spoilage.
- Describe the natural, human and biological processes responsible for fish spoilage.

Summary of Topics to Cover	Time Indicator
Introduction	5 mins
Why quality is important	20 mins
Recognising good quality fish	50 mins
Fish spoilage	35 mins
Consolidation	10 mins
	120 mins

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES												
<i>I.N.T.R.O.</i>	See: Guide to the Manual	Hand out Information Sheet No. 1 <i>The Importance Of Fish Quality</i>												
<i>DEVELOPMENT</i>														
WHY QUALITY IS IMPORTANT	Food retail outlets and supermarkets in particular stock a wide range of foodstuffs for sale. This wide range reflects the customers' demand for a variety of foods. Most people get into the habit of buying and eating certain kinds of food and, once a person stops buying a particular food because of poor quality, it can be difficult to regain that customer's confidence in the product.													
Quality and price	<p>Although fish was once considered to be cheap food compared with other forms of meat, increasing costs in the fish industry have pushed up the price of fish to similar levels.</p> <p>Once a food moves towards the luxury end of the market, customers expect consistent high quality in return for the higher prices demanded.</p>	<p>During the period 1973-1985 a <i>Seafish</i> survey of retail prices showed the following increases:</p> <table><tr><td>Fish</td><td>225%</td></tr><tr><td>Eggs</td><td>100%</td></tr><tr><td>Beef</td><td>161%</td></tr><tr><td>Lamb</td><td>173%</td></tr><tr><td>Pork</td><td>156%</td></tr><tr><td>Chicken</td><td>142%</td></tr></table> <p>Ask trainees: <i>Where could a member of the public buy fish?</i></p> <p>Try to obtain the possible answers.</p>	Fish	225%	Eggs	100%	Beef	161%	Lamb	173%	Pork	156%	Chicken	142%
Fish	225%													
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Chicken	142%													

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Quality and shopping habits	<p>There are three main types of outlet selling fish to the public. These are:</p> <ol style="list-style-type: none"> 1. The fishmonger's shop. 2. The market stall/mobile trader. 3. The supermarket. <p>Although there are other types of retail outlet these three account for over 90% of all fish sold (<i>excluding fish friers and other catering establishments</i>)</p> <p>Over the years, more supermarkets have started to sell fish and the market stalls, mobiles and independent fishmongers have tended to reduce in number.</p> <p>All fish retailers should demand high quality fish from their suppliers and look after it properly in order to sell high quality fish to customers.</p> <p>Quality fish attracts sales and is demanded by the customer.</p> <p>Remember - Lost quality can never be recovered.</p>	
Control of fish quality	<p>From the moment the fish enters the premises until it leaves, the quality must be checked and monitored continually to ensure that no fish of unacceptable quality is sold or passed on.</p>	<p>Ask trainees: <i>What can be done to ensure that fish quality remains satisfactory?</i></p> <p>Try to obtain possible answers.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Control of fish quality/cont'd.	<p>There are three methods that can be used for controlling fish quality.</p> <ol style="list-style-type: none"> 1. Monitoring the physical appearance of the fish to check its freshness. 2. Measuring the temperature of fish during storage. 3. Accurate stock control - ensuring first in, first out. <p>In other words:</p> <ul style="list-style-type: none"> — Keep it clean and fresh. — Keep it cool. — Keep it moving. 	
RECOGNISING GOOD QUALITY FISH	<p>Although it is difficult to define the term 'quality', it is usually considered that quality does not depend upon any single property, but a combination of all the different features that contribute towards the product's acceptability to the consumer.</p>	
Quality and freshness	<p>When chilled fish is described outside the industry it is usually referred to as 'fresh' fish. Therefore, when assessing quality, freshness must be taken into account.</p> <p>When assessing freshness there are three factors that must be considered:</p>	<p>Ask trainees: <i>What three factors must be considered when assessing freshness?</i></p> <p>Try to obtain possible answers.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Quality and freshness/cont'd.	<ol style="list-style-type: none"> 1. Visual appearance (<i>assessing with the eyes</i>) 2. Smell (<i>assessing with the nose</i>) 3. Texture (<i>assessing with the fingers</i>) <p>Freshness can be graded into three classes:</p> <ul style="list-style-type: none"> — Good (<i>desirable</i>) — Medium (<i>acceptable</i>) — Poor (<i>unacceptable</i>) <p>Good quality wet fish should have eyes which are bright and clear, skin that is bright with a good sheen. The gills should be a bright blood red.</p> <p>It should have a fresh, pleasant smell and the flesh should be smooth, firm and springy to the touch.</p> <p>Good quality frozen fish should not have dull white patches or ice crystals on its surface.</p> <p>There should be little 'drip' loss on thawing.</p> <p>The requirement to grade fish prior to first sale using EC standards of size and</p>	<p>Hand out Information Sheet No. 2 <i>Simple Freshness Assessment System For Finfish</i></p> <p>Good quality wet fish fillets should have even, firm and springy flesh. There should not be any discoloration, dents or slime. They should smell fresh and seaweedy.</p> <p>White patches are usually caused by 'freezer burn'. The crystals are often formed when fish is allowed to thaw and is then refrozen.</p>
Grading	<p>The requirement to grade fish prior to first sale using EC standards of size and</p>	

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Grading/cont'd.	<p>freshness was introduced in order to allow easier trading across all Common Market countries.</p> <p>It also made possible the introduction of a price support system under the Common Fisheries Policy.</p> <p>The freshness grades adopted are:</p> <p>E - Extra (<i>comparable to good quality</i>)</p> <p>A - Good (<i>comparable to medium quality</i>)</p> <p>B - Poor (<i>comparable to poor quality</i>)</p> <p>By using this grading system the buyer is assured, in theory, that all the fish contained in the box will be of a similar size and have the same grade of freshness.</p> <p>Although the fish must be graded by the owner of the fish (<i>or his agent</i>), in practice, employees of the local Producer's Organisation usually carry out the grading operation.</p>	<p>This guarantees a minimum price to be paid to fishermen for fish landed which are of saleable quality but which fail to attract a buyer.</p> <p>The grading scheme is monitored by MAFF Fisheries Inspectors.</p> <p>Hand out Information Sheet No. 3 <i>Practical Guide To Community Freshness Grades.</i></p> <p>For further information contact your local office of the Ministry of Agriculture, Fisheries and Food.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Shellfish	<p>Although shellfish do not have to be graded for freshness under EC law, there are various features that allow you to assess their freshness and quality.</p> <p>Molluscs to be sold live should either remain closed or shut rapidly when tapped and have a fresh seaweedy smell.</p> <p>Crustaceans to be sold live should also smell fresh and seaweedy and be quite active or respond rapidly when touched.</p> <p>The shells of cooked shellfish should be intact and should have natural bright colours.</p> <p>Frozen shellfish should not show 'freezer burn' or ice crystals on the surface.</p> <p>There should be little 'drip' loss on thawing.</p>	<p>Ice crystals caused by the shellfish thawing and then being refrozen.</p> <p>Hand out Information Sheet No. 4 <i>Simple Freshness Assessment System For Shellfish.</i></p>
FISH SPOILAGE	<p>Spoilage begins as soon as a fish dies and is caused mainly by the action of enzymes and bacteria.</p> <p>Fresh fish looks different to spoilt fish because a lot of obvious changes have taken place.</p>	<p>Hand out Example Sheet No. 1 <i>Appearance Changes In Fish From Fresh To Spoilt State.</i></p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Enzymic spoilage	<p>Enzymes are present in the gut and tissues of living fish to help process food into energy and further tissue. Unfortunately, once the fish dies, these enzymes keep working and also help the bacteria to start breaking down the flesh.</p> <p>If the fish is gutted immediately after catching, the rate of spoilage slows down because a major source of enzymes is removed.</p> <p>This is natural spoilage.</p>	<p>The process of enzymes breaking down the flesh is called 'autolysis' or 'self-digestion'.</p> <p>If careless gutting takes place, the enzymes may be released into the belly cavity causing spoilage of the belly lining and the flesh.</p>
Bacterial spoilage	<p>Bacteria are the smallest free-living organisms known. It has been calculated that over one million bacteria could fit on to a pin head.</p> <p>Bacteria exist everywhere even in healthy fish. They exist on the skin and in the fish intestine.</p> <p>Whilst a fish is alive its normal body defences prevent the bacteria from invading the internal tissues but, once the fish dies, the natural defensive mechanisms cease and bacteria invade the flesh and start to break it down.</p> <p>Reduction in the rate of this breakdown can be achieved by using temperature control - the lower the temperature the slower the fish spoils and vice versa.</p>	<p>Bacteria grow by dividing into two new bacteria when they reach a certain size. Under ideal growth conditions they can divide and multiply in numbers every 20 minutes.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES																								
Bacterial spoilage /cont'd.	<p>For example, a fish caught, killed and gutted will remain enjoyable to eat for up to about 10 days if stored at 0°C. The same fish will remain edible for only three days if stored at 5°C and for less than 24 hours at 16°C.</p>	<p>For example:</p> <p><i>After</i></p> <table><tr><td></td><td>1 bacterium becomes:</td></tr><tr><td>20 mins</td><td>2 bacteria</td></tr><tr><td>40 mins</td><td>4</td></tr><tr><td>1 hour</td><td>8</td></tr><tr><td>1 hr 20 mins</td><td>16</td></tr><tr><td>1 hr 40 mins</td><td>32</td></tr><tr><td>2 hours</td><td>64</td></tr><tr><td>2 hr 20 mins</td><td>128</td></tr><tr><td>2 hr 40 mins</td><td>256</td></tr><tr><td>3 hours</td><td>512</td></tr><tr><td>4 hours</td><td>4096</td></tr><tr><td>etc.</td><td>etc.</td></tr></table>		1 bacterium becomes:	20 mins	2 bacteria	40 mins	4	1 hour	8	1 hr 20 mins	16	1 hr 40 mins	32	2 hours	64	2 hr 20 mins	128	2 hr 40 mins	256	3 hours	512	4 hours	4096	etc.	etc.
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etc.	etc.																									
Human-induced spoilage	<p>Although fish can become spoilt by enzymes and bacteria, bad or careless handling can speed up the rate of spoilage dramatically, either by introducing further bacteria or by allowing those present to grow and spread.</p> <p>Some of the activities associated with handling and processing in which human negligence can assist the process of fish spoilage are:</p> <ul style="list-style-type: none">— Gutting (Careless techniques thereby introducing bacteria into the flesh)— Utensils (Using dirty, bacteria-laden knives for filleting)— Water (Using dirty water thereby adding further spoilage bacteria to the flesh)— Work areas (Not washing or cleaning work surfaces thoroughly)																									

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Human-induced spoilage/cont'd. Oxidation	<p>— Storage <i>(Maintaining incorrect temperatures or using unclean facilities)</i></p> <p>Spoilage can also occur in oily fish, e.g. <i>herring, mackerel etc.</i>, when the fat/oil present in the flesh is attacked by oxygen in the air and becomes rancid <i>(very smelly and strong tasting)</i></p>	
CONSOLIDATION	<p>Ask trainees questions on knowledge aspects of the session.</p> <p>Allow time for further discussion on areas which give particular difficulty to the trainees.</p>	Use of multiple-choice questionnaire.

Information Sheet No's. 1-4

Information Sheet No. 1

THE IMPORTANCE OF FISH QUALITY

The customer, be it a member of the general public, a fish merchant or a fish retailer has many choices of where to buy fish. One of the deciding factor when buying fish is the quality and presentation of the product.

It takes only **one** bad fish to deter a customer.

Fish quality is dependent on **intrinsic** factors, such as species, size, season, feeding behaviour etc. which are outside of direct human control and **extrinsic** factors *i.e. the effects of time, temperature and handling of the fish after capture*, which determine the 'freshness' factor.

Although fish start to lose quality as soon as they are captured it is up to everyone involved in the industry to ensure that the ultimate customer or consumer can obtain good quality fish.

If the public do not buy fish, then the fish retailer does not buy fish, then the fish merchant does not buy fish . . . and so it goes on!

The entire industry is dependent upon the final consumer of the fish and the consumer will pay for quality.

Therefore, at all stages throughout the distribution chain from catcher to consumer, great care must be exercised in order to maintain fish quality and to ensure satisfied customers.

Your job may depend upon it!

Information Sheet No. 2

SIMPLE FRESHNESS ASSESSMENT SYSTEM FOR FINFISH

FRESHNESS	CHILLED FISH		CHARACTERISTICS OF FROZEN FISH	EQUIVALENT EATING QUALITIES
	CHARACTERISTICS OF WHOLE FISH	CHARACTERISTICS OF FILLETS		
Good (desirable)	<p>Appearance: eyes bright and bulging, gills dark red or pink, skin colours distinct with 'fresh' bloom, blood bright red.</p> <p>Texture: flesh firm and elastic to the touch.</p> <p>Gill odour: 'fresh' and seaweedy.</p>	<p>Appearance: flesh translucent, skin colours distinct with 'fresh' bloom, no gaping or discoloration.</p> <p>Odour: 'fresh' and seaweedy.</p>	<p>Frozen appearance: no freezer burn or ice crystals on surface.</p> <p>Thawed appearance: similar to chilled fish but blood darker, eye pupils white, flesh not translucent.</p> <p>Thawed texture and odour: similar to chilled fish.</p> <p>Drip: negligible release of drip on thawing.</p>	<p>Sweet flavours characteristic of species.</p>
Medium (acceptable)	<p>Appearance: eyes starting to sink, gills losing colour, skin colours fading and lost bloom, blood lost brightness and losing redness.</p> <p>Texture: flesh feels softer and less elastic.</p> <p>Gill odour: neutral or even slightly stale, fatty fish may have slightly 'off-oil' odours.</p>	<p>Appearance: flesh dull, skin colours fading and lost bloom.</p> <p>Odour: neutral or slightly stale, fatty fish may have slightly 'off-oil' odours.</p>	<p>Frozen appearance: could have slight freezer burn and a few ice crystals on surface.</p> <p>Thawed appearance: similar to chilled fish but eye pupils white.</p> <p>Thawed texture and odour: similar to chilled fish.</p> <p>Drip: could have noticeable drip on thawing.</p>	<p>Neutral flavours.</p> <p>Cold storage flavour just detectable.</p>
Poor (unacceptable)	<p>Appearance: eyes sunken, gills discoloured, skin lost colour and looks bleached, discoloured slime, blood brown.</p> <p>Texture: scales easily rubbed off, flesh soft and inelastic (finger indentations remain).</p> <p>Gill odour: sour, putrid, 'off' e.g. like rotting vegetables, fatty fish smell rancid.</p>	<p>Appearance: flesh discoloured especially around belly flaps, skin lost colour and looks bleached.</p> <p>Odour: sour, putrid, 'off', fatty fish smell rancid.</p>	<p>Frozen appearance: obvious freezer burn with large quantities of ice crystals on surface.</p> <p>Thawed appearance: similar to chilled fish but may have yellow discoloration, eye pupils white.</p> <p>Thawed texture and odour: similar to chilled fish.</p> <p>Drip: copious quantities of drip on thawing.</p>	<p>Sour, bitter, rancid flavours.</p> <p>Well developed cold storage flavour, texture tough and dry from cold storage.</p>

Information Sheet No. 3

PRACTICAL GUIDE TO COMMUNITY FRESHNESS GRADES

To qualify for grading as grade E, A or B, the fish of the following species should meet the descriptions under the relevant heading:
Cod, Saithe, Haddock, Whiting, Plaice, Mackerel, Spanish Mackerel, Atlantic Sardines (*Pilchards*), Ling, Dogfish, Megrim,
Ray's Bream and Monkfish.

	E	A	B
Skin	Bright, shining, iridescent (not redfish) or opalescent, no bleaching.	Waxy, slight loss of bloom very slight bleaching.	Dull, some bleaching.
Outer Slime	Transparent or water white.	Milky.	Yellowish-grey, some clotting.
Eyes pupil	Convex, black pupil, translucent cornea.	Plane, slightly opaque, slightly opalescent.	Slightly concave, grey pupil, opaque cornea.
Gills all except saithe opaque	Bright red, mucus translucent.	Pink, mucus slightly opaque.	Grey and bleached, mucus opaque.
Saithe	Dark red, mucus translucent.	Dark red, mucus slightly opaque.	Brown, mucus opaque and thick.
Peritoneum	Glossy, brilliant, difficult to tear from flesh.	Slightly dull, difficult to tear from flesh.	Gritty, fairly easy to tear from flesh.
Gill and internal odours all except plaice	Fresh, strong seaweedy.	No odour, neutral odour, trace musty, mousey, milky, caprylic, garlic or peppery.	Definite musty, mousey, milky, caprylic, garlic or peppery, bready, malty, beery, lactic or slightly sour.
Plaice	Fresh oil, metallic, fresh cut grass, earthy, peppery.	Oily, seaweedy, aromatic trace musty, citric.	Oily, definite musty, mousey, citric, bready, malty, beery, slightly rancid, painty.

The descriptive terms are meant to be guides and not all the characteristics described will necessarily occur in every fish.
Where necessary, particular note is taken of gill odours because this characteristic is particularly discriminatory.

Information Sheet No. 4

SIMPLE FRESHNESS ASSESSMENT SYSTEM FOR SHELLFISH

FRESHNESS	CHARACTERISTICS OF LIVE SHELLFISH	CHILLED		CHARACTERISTICS OF FROZEN SHELLFISH	EQUIVALENT EATING QUALITIES
		CHARACTERISTICS OF RAW SHELLFISH	CHARACTERISTICS OF COOKED SHELLFISH		
Good (desirable)	Behaviour: Crustacea active or respond rapidly when touched. Bivalve molluscs tightly shut when out of water.	Appearance: natural, 'fresh' colours, flesh translucent	Appearance: natural, 'fresh' colours.	Frozen appearance: no freezer burn or ice crystals on surface. Thawed appearance: similar to chilled fish but flesh not translucent.	Sweet flavours characteristic of species.
	Odour: 'fresh' and seaweedy.	Texture: flesh firm and elastic. Odour: 'fresh' and seaweedy.	Odour: 'fresh' and seaweedy.	Thawed texture and odour: similar to chilled fish. Drip: negligible release of drip on thawing.	
Medium (acceptable)	Behaviour: Crustacea have low level of activity, respond slowly when touched. Bivalve molluscs tightly shut when out of water.	Appearance: some loss of colour, flesh dull. Texture: flesh less firm and elastic.	Appearance: some loss of colour.	Frozen appearance: could have some freezer burn and a few ice crystals on surface. Thawed appearance: similar to chilled fish.	Neutral flavours, cold storage flavour just detectable.
	Odour: stale seaweed.	Odour: stale seaweed.	Odour: stale seaweed.	Thawed texture and odour: similar to chilled fish. Drip: could have noticeable drip on thawing.	
Poor (unacceptable)	Behaviour: Crustacea inactive, apparently undamaged dead fish in batch. Bivalve molluscs gaping when out of water.	Appearance: blackening of shell-on products, flesh discoloured. Texture: flesh soft and inelastic.	Appearance: blackening of shell-on products, flesh discoloured.	Frozen appearance: obvious freezer burn with large quantities of ice crystals on surface. Thawed appearance: similar to chilled fish but may have yellow discoloration.	Sour, bitter rancid or rancid flavours. Well developed cold storage flavour, texture tough and dry from cold storage.
	Odour: sour, putrid, 'off'.	Odour: sour, putrid, 'off'.	Odour: sour, putrid, 'off'.	Thawed texture and odour: similar to chilled fish but may smell rancid. Drip: copious quantities of drip on thawing.	

Example Sheet No. 1

Example Sheet No. 1

APPEARANCE CHANGES IN FISH FROM FRESH TO SPOILT STATE

Fresh fish looks visibly different to spoilt fish because a lot of physical changes have taken place.

Complete the tables below by filling in how you think the appearance of fish changes after it has become spoilt.

WHOLE FISH

FRESH	SPOILT
Eyes are bright, clear and non-sunken. Gills are bright red. Skin is bright, shiny, smooth and covered with clear slime.	

FILLETS

FRESH	SPOILT
Translucent (<i>lets light through</i>) Raw-looking. Clean and fresh smell. No discoloration. Skin-side firm and springy. Firm and compact flesh.	

Example Sheet No. 1

Answers

APPEARANCE CHANGES IN FISH FROM FRESH TO SPOILT STATE

WHOLE FISH

FRESH	SPOILT
Eyes are bright, clear and non-sunken.	Eyes are cloudy, sunken, with a grey pupil.
Gills are bright red.	Gills are brown/yellow and covered with slime or a similar colour.
Skin is bright, shiny, smooth and covered with clear slime.	Skin is dull, bleached, feels gritty and is covered with brown/yellow slime.

FILLETS

FRESH	SPOILT
Translucent (<i>lets light through</i>)	Waxy-looking, some yellowing.
Raw-looking.	Cooked-looking.
Clean and fresh smell.	Smells of ammonia (<i>fishy</i>)
No discoloration.	Visible reddening near bone.
Skin-side firm and springy.	Finger pressure leaves marks.
Firm and compact flesh.	Soft, gaping and breaking-up.

The points listed above are not necessarily identical for every species, however, the general points still apply.

Questionnaire

Questionnaire

WHAT IS QUALITY

Please tick the box you feel best answers each question.

1. *Under ideal conditions how long does it take for one bacterium to grow and divide?*

- a) 10 minutes ☐
 - b) 20 minutes ☐
 - c) 30 minutes ☐
-

2. *Fish quality is important because:*

- a) It may take only one bad fish to deter a customer. ☐
 - b) Your job depends upon it. ☐
 - c) You can charge more for good quality fish. ☐
-

3. *One of the factors to be considered when assessing the freshness of fish is:*

- a) How much it costs. ☐
 - b) Its appearance. ☐
 - c) Who sold it to you. ☐
-

4. *A good quality fish fillet should smell:*

- a) Sour and putrid. ☐
 - b) Fresh and seaweedy. ☐
 - c) Neutral (i.e. hardly any smell) ☐
-

Questionnaire/cont'd.

WHAT IS QUALITY

5. *The EC freshness grades used for fish are:*

- a) A B C
- b) E B C
- c) E A B

☐
☐
☐

6. *When a fish dies, the enzymes:*

- a) Continue working.
- b) Move on to another living fish.
- c) Stop working.

☐
☐
☐

7. *If a fish is caught, killed and correctly gutted, for how long will it remain edible if stored at 0°C?*

- a) 20 days
- b) 15 days
- c) 10 days

☐
☐
☐

8. *Bacteria are associated with:*

- a) Dead matter.
- b) Living matter.
- c) Dead and living matter.

☐
☐
☐

Questionnaire Answers

WHAT IS QUALITY

1. b). *(Applies to the fish spoilage bacteria covered in this session)*
2. a). Definitely, b) to a certain extent and c) might also apply.
3. b). Although c) could have a bearing on your overall assessment.
4. b). It is often said that fresh fish does not smell, but good quality fish has a seaweedy odour.
5. c).
6. a).
7. c). But in exceptional circumstances b).
8. c). Bacteria exist everywhere but different types of bacteria exist in different environments.

Fish quality standards

Total Time Indicator - 120 mins

Objectives - On completion of this session trainees will be able to:

- State the major factors which affect the rate of fish spoilage.
- Identify the effects on fish quality caused by parasites and contamination.
- Identify the stages during the handling of fish where contamination can occur.
- Describe what actions need to be taken in order to prevent contamination of fish.

Summary of Topics to Cover	Time Indicator
Introduction	5 mins
Factors which affect the rate of spoilage	20 mins
Some causes of quality loss	30 mins
Contamination of fish	20 mins
Preventing contamination of fish	35 mins
Consolidation	10 mins
	120 mins

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
I.N.T.R.O.	See: Guide to the Manual	
DEVELOPMENT		
FACTORS WHICH AFFECT THE RATE OF SPOILAGE	There are three factors that speed up the rate of spoilage and three others which help to slow down the rate of quality loss.	Hand out Information Sheet No. 5 <i>External Factors Which Affect Quality.</i>
Time	A vital factor that affects fish spoilage is the length of time that has elapsed since capture. When handling fish, it is important to move it through the distribution chain as quickly as possible.	Storage temperatures have a large influence on the shelf-life of fish.
Temperature	<p>At higher temperatures the rate of spoilage increases because:</p> <ol style="list-style-type: none"> 1. The growth rate of bacteria increases. 2. Enzyme activity increases. 3. Chemical reactions e.g. <i>enzyme activity</i>, speed up. <p>For every 10°C rise in temperature, bacterial growth doubles.</p> <p>For every 10°C rise in temperature, chemical reactions proceed twice as quickly.</p> <p>As a result, for every 10°C rise in temperature the rate of fish spoilage approximately doubles.</p>	<p>Ask trainees: <i>Why does the rate of fish spoilage increase as the temperature rises?</i></p> <p>Try to obtain possible answers.</p> <p>Hand out Example Sheet No. 2 <i>Interesting Figures.</i></p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Temperature/ cont'd.	It is essential to remember that if the temperature is high , quality is lost quickly , but if the temperature is low , quality is lost slowly .	Storing fish at temperatures below 0°C is not recommended unless the fish has previously been quick frozen.
Trauma	<p>This word is used to describe physical damage which can speed up the rate of spoilage.</p> <p>There are two main causes of trauma which result in the reduction of fish quality:</p> <ul style="list-style-type: none"> — Rough handling which causes bruising. <p>and:</p> <ul style="list-style-type: none"> — Careless handling of ungutted fish which can rupture the gut and allow the gut contents to spill on to the flesh. <p>Damage through crushing can also be caused by stacking boxes which have been over-filled with fish.</p>	<p>Trauma actually means injury caused by mental or physical shock.</p> <p>The same effect can be caused by careless gutting.</p>
The 3 'C's'	<p>Factors which can slow down the rate of fish spoilage are:</p> <ul style="list-style-type: none"> — Cleanliness of equipment and utensils that come into contact with the fish. — Care in handling fish before, during and after gutting. — Cooling the fish, using ice to slow down the process that causes quality loss. 	<p>Although there may be other factors which affect the rate of spoilage the most common ones have been described.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
SOME CAUSES OF QUALITY LOSS	Time, temperature and trauma are all causes of quality loss, but careless or thoughtless handling of fish can result in much worse.	
Parasites	<p>Parasites are a form of life that live in or on other forms of life (<i>the 'host'</i>) and from which they obtain their food.</p> <p>If a fish is heavily infested with parasites then it is:</p> <ul style="list-style-type: none"> — Possibly harmful to eat. — Of poor appearance and eating quality. — More difficult to process. <p>Fish parasites do not usually cause any harm to people if they are eaten accidentally because they are easily killed, either by cooking for one minute at a temperature of 60°C or more, or by freezing.</p> <p>If a customer sees a parasite on their fish, this can be off-putting and could deter that person from ever eating fish again.</p>	<p>Ask trainees: <i>What problems could arise if a fish is heavily infested with parasites?</i></p> <p>Try to obtain possible conclusions.</p> <p>The hot smoking process also kills them.</p> <p>Parasites are more common at certain times of the year. For further information contact your local Environmental Health Department.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Parasites/cont'd.	<p>Most parasites can be removed by careful gutting and washing but, in cases of heavy infestation, some worms may burrow into the flesh itself.</p> <p>The most common parasites of fish are roundworms, tapeworms and flatworms.</p> <p>Roundworms, when embedded in the flesh, look like coiled watch springs and are found especially in the region of the gut.</p> <p>Most roundworms can be removed by:</p> <ul style="list-style-type: none"> — Gutting. — Cleaning the belly cavity. — Trimming and discarding the belly flaps. — Cutting out worms that are visible near the surface of the flesh. <p>Roundworms are not killed during the process of brining or cold smoking.</p> <p>Tapeworms can occasionally be found in halibut and some shellfish.</p> <p>They are found in the gut and appear creamy-white in colour. An adult tapeworm may measure up to one metre in length.</p> <p>Adult flatworms are found in the gut of many commercial fish species. Their harmless larvae are found just under the skin and look like peppery spots.</p>	<p>Roundworms are also known as nematode worms.</p> <p>Hand out Information Sheet No. 6 <i>Information On Roundworms.</i></p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Parasites/cont'd.	Both tapeworms and flatworms can be killed by cooking, but are unattractive to the customer buying the fish. It is important that heavily infested fish should not be processed or sold.	
Contamination	<p>As well as marine contamination, e.g. <i>chemical spills, pollution etc.</i>, this can also occur during the handling and processing of fish via harmful substances or organisms which may come into contact with the fish.</p> <p>Two ways in which fish can become contaminated are from:</p> <ol style="list-style-type: none"> 1. Foreign matter <i>i.e. physical contamination.</i> 2. Spoilage and food poisoning bacteria <i>i.e. bacterial contamination.</i> <p>Both types of contamination can be prevented.</p> <p>Some contamination, especially bacterial contamination, may not necessarily affect the physical appearance but may affect the eating quality of the fish and may even prove harmful to the health of the consumer.</p>	<p>Ask trainees: <i>In what two ways can fish become contaminated?</i></p> <p>Try to obtain possible conclusions.</p>
CONTAMINATION OF FISH	During the period between capture and ultimate sale to the customer, fish is handled many times. It can be handled individually during the	

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
CONTAMINATION OF FISH/CONT'D.	<p>gutting or filleting process or handled in bulk during boxing/packing operation. There are numerous opportunities for contamination to take place throughout the transport and distribution cycle.</p> <p>All types of contamination are caused through negligence or bad handling practices.</p>	<p>Hand out Information Sheet No. 7 <i>Some Causes Of Fish Contamination.</i></p> <p>Discuss each example with trainees.</p>
PREVENTING CONTAMINATION OF FISH	<p>Since all contamination of fish arises through bad handling techniques it makes sense to look at some of the practices which can be used to prevent contamination.</p>	<p>Hand out Information Sheet No. 8 <i>Prevention Of Fish Contamination.</i></p> <p>Discuss each point with the trainees.</p>
Clean working practices	<p>Careful attention to hygienic practices in the workplace will prevent both bacterial and physical contamination.</p> <p>Unclean working conditions may cause food poisoning.</p> <p>Food poisoning bacteria do not occur naturally on fish; they have to be introduced from an external source.</p>	

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Clean working practices/cont'd.	<p>Food poisoning bacteria can be introduced from:</p> <ul style="list-style-type: none"> — Contaminated food. — Dirty equipment/machinery. — Clothing. — Animals. — People. <p>Food poisoning is always caused by human negligence and, as well as possibly harming people and losing customers (<i>in both senses of the word</i>), it usually causes legal and financial problems for the establishment concerned.</p> <p>All food handlers are required by law to handle food cleanly.</p>	<p>Ask trainees: <i>What are the possible sources of food poisoning bacteria?</i></p> <p>Try to obtain possible conclusions.</p> <p>By law, all food handling premises must be clean.</p>
CONSOLIDATION	<p>Ask trainees questions on knowledge aspects of the session.</p> <p>Allow time for further discussion on areas which give particular difficulty to the trainees.</p>	<p>Use of multiple-choice questionnaire.</p>

Information Sheet No's. 5-8

Information Sheet No. 5

EXTERNAL FACTORS WHICH AFFECT QUALITY

There are three factors which affect the quality of the fish after capture: **Time**, **Temperature** and **Trauma**.

They are sometimes referred to as the 3 'T's'.

Time is vital because fish quality decreases rapidly with the passage of time. Keeping the fish in ice and storing it at a temperature of from 0°C to 2°C will slow down the rate of quality loss. If you are handling fish, move it on as quickly as possible.

Temperature is important because for every 10°C rise in temperature, bacteria double their growth rate, enzymes work faster and chemical reactions proceed twice as quickly. For example fish stored at 20°C will spoil four times more quickly than fish stored at 0°C. Another way of looking at it is to say that four days shelf-life would be used up in one day!

Remember - High temperature increases the rate of spoilage; low temperature reduces the rate of spoilage.

Trauma is a condition caused by mental or physical shock, but it is used to describe the physical damage that fish can suffer after capture. For example:

Rough handling — This can cause bruising which allows blood to escape into the flesh.

Careless handling of ungutted fish — This can burst the gut and allow the contents to spill on to the flesh. Careless gutting can also cause this.

The 3 'T's' - **Time**, **Temperature** and **Trauma** can dramatically reduce fish quality but by using the 3 'C's' - **Care**, **Cooling** and **Cleanliness**, the spoilage rate of fresh fish can be slowed down.

Information Sheet No. 6

INFORMATION ON ROUNDWORMS

The two most common types of roundworm which are found in fish are the '**cod worm**' and the '**herring worm**'. The information below describes some of their features.

	COD WORM	HERRING WORM
Types of fish infected	Mainly cod, but also haddock.	Herring, mackerel, whiting and blue whiting.
Length	4cm (1½ in)	2cm (¾ in)
Colour	Creamy-white (<i>but can be dark brown</i>)	Colourless
Where found	Flesh and belly flaps.	Gut, belly flap and flesh.

Roundworms are killed by:

- Freezing.
- Hot Smoking.
- Cooking at temperatures above 60°C.

Information Sheet No. 7

SOME CAUSES OF FISH CONTAMINATION

SOURCE	EXAMPLE	BACTERIAL CONTAMINATION	POSSIBLE PHYSICAL CONTAMINATION
Food handlers	Standing on boxes. Dirty hands and overalls. Coughing/sneezing. Uncovered cuts and sores. Uncovered hair. Cigarettes. Overall pockets.	Yes Yes Yes Yes Yes Yes Yes	Dirt. Dirt, buttons. Hair. Cigarette ash and stubs. Sweet papers, pen tops, paperclips.
Equipment	Transport vehicles. Processing equipment. Old premises. Maintenance and repair. Packaging/wooden boxes.	Yes Yes Yes Yes Yes	Dirt and dust. Grease, oil and pieces of metal. Flaking paint or rust. Bolts, nuts, wire and staples. Cardboard, string, glass, wood.
Chemical spills	Detergents. Disinfectants.	No No	Poisoning and tainting. Poisoning and tainting.
Refuse	Decaying fish, offal.	Yes	Mould, dirt, dust.
Animals	Cats and dogs. Birds. Flies and cockroaches. Rats and mice.	Yes Yes Yes Yes	Hairs and dirt. Feathers, dirt and droppings. Droppings. Urine and hairs.

Information Sheet No. 8

PREVENTION OF FISH CONTAMINATION

The following guidelines should be followed in order to prevent contamination of fish. Expand the points listed below as necessary and add any further examples of 'good practice' which are relevant to your establishment.

1. Never walk on the top of fish boxes.
2. Always use clean and plastic or stainless steel fish containers wherever possible.
3. Always cover any fish boxes stored outside premises and keep seagulls away.
4. Never smoke whilst loading or unloading fish boxes.
5. Keep birds, dogs and cats out of any storage areas.
6. Check the workplace continually for vermin and use vermin-proof containers for the storage of fish.
7. Never store fish next to chemicals.
8. Maintain high standards of hygiene and cleanliness continuously.
9. Always wear clean overalls.
10. Remove any waste or unfit food immediately from the premises and store separately from fish destined for sale.
11. Always follow correct cleaning procedures.
12. Never use dirty or defective equipment.
13. Whenever possible - try to keep fish covered at all times.
- 14.
- 15.
- 16.
- 17.
- 18.
- 19.
- 20.

Example Sheet No. 2

Example Sheet No. 2

INTERESTING FIGURES

Under ideal natural conditions fish spoilage bacteria will grow and divide every 20 minutes. If the temperature is raised by 10°C the growth rate of these bacteria will double.

Fill in the missing blanks in the Table below by calculating the total number of bacteria that would be present after the time intervals and temperature conditions indicated.

TIME	NORMAL CONDITIONS	TEMP. RAISED BY 10°C
After 0 mins	1	1
After 20 mins	2	4
After 40 mins	4	16
After 60 mins	8	64
After 80 mins	16	
After 100 mins	32	
After 120 mins		

For every 10°C rise in temperature fish spoilage doubles. How many times more quickly would a box of fish spoil if stored at 30°C instead of 0°C ?

Example Sheet No. 2

Answers

INTERESTING FIGURES

TIME	NORMAL CONDITIONS	TEMP. RAISED BY 10°C
After 0 mins	1	1
After 20 mins	2	4
After 40 mins	4	16
After 60 mins	8	64
After 80 mins	16	256
After 100 mins	32	1024
After 120 mins	64	4096

A box of fish stored at 30°C would spoil 8 times faster than the same box of fish stored at 0°C.

Questionnaire

Questionnaire

FISH QUALITY STANDARDS

Please tick the box you feel best answers each question.

1. *Which one of the following activities might result in bacterial contamination of fish?*

- a) Using disinfectants. ☐
- b) Using detergents. ☐
- c) Using wooden boxes. ☐

2. *A 10°C rise in temperature causes bacteria to:*

- a) Triple their rate of growth. ☐
- b) Double their rate of growth. ☐
- c) Stop growing altogether. ☐

3. *The 3 factors which slow down the rate of fish spoilage are known as:*

- a) 3 'T's' - Time, Temperature and Trauma. ☐
- b) 3 'W's' - Warm, Wet and Windy. ☐
- c) 3 'C's' - Cleanliness, Care and Cooling. ☐

4. *Parasites present in fish can be killed by:*

- a) Cooking at temperatures above 60°C. ☐
 - b) Freezing. ☐
 - c) Brining. ☐
-

Questionnaire/cont'd.

FISH QUALITY STANDARDS

5. Food poisoning bacteria in fish:

- a) Occur naturally. ☐
 - b) Lie dormant until the fish are caught. ☐
 - c) Have to be introduced from an external source. ☐
-

6. Fish contamination can be prevented by:

- a) Wearing clean gloves. ☐
 - b) Wearing clean overalls. ☐
 - c) Wearing clean shoes. ☐
-

7. Roundworms (nematode worms) in fish are usually found:

- a) In the surface skin. ☐
 - b) In the gills. ☐
 - c) In the flesh and belly flaps. ☐
-

8. Physical contamination of fish can be caused by:

- a) Standing on boxes. ☐
 - b) Coughing. ☐
 - c) Sneezing. ☐
-

Questionnaire Answers

FISH QUALITY STANDARDS

1. c). a) and b) cause physical contamination by tainting the fish.
2. b). For some types of bacteria a) could be correct, but increasing the temperature will always speed up bacterial growth.
3. c). a) are factors which affect fish spoilage and b) is a weather forecast for North East England.
4. a). or b). c) does not kill fish parasites.
5. c). Although, on occasions, mackerel and related species can cause food poisoning (*scombroid poisoning*). Toxins are produced in the flesh of these fish during the spoilage process.
6. b) is the best answer; a) could help, but the gloves would have to be changed frequently and c) clean shoes are better than dirty shoes.
7. c). Occasionally, other types of parasite e.g. *lice*, can be found on the skin and gills.
8. a). b) and c) cause bacterial contamination.

Recommended practices

Total Time Indicator - 120 mins

Objectives - On completion of this session trainees will be able to:

- State routine procedures to follow in the workplace which help to maintain product quality.
- Describe the uses of, and handling methods for ice.
- Describe recommended practices for storing fish under chilled and frozen conditions.
- Describe recommended practices for maintaining the quality of fish whilst on display.
- Identify sales practices which can influence fish quality.

Summary of Topics to Cover	Time Indicator
Introduction	5 mins
Quality maintenance	30 mins
Ice	10 mins
Fish storage	30 mins
Fish display	15 mins
Sales practices	20 mins
Consolidation	10 mins
	120 mins

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
<i>I.N.T.R.O.</i>	See: Guide to the Manual	
<i>DEVELOPMENT</i>		
QUALITY MAINTENANCE	<p>High standards of product quality start with the adoption and continued use of good working practices.</p> <p>Although quality cannot be improved, the use of quality maintenance procedures will reduce dramatically any further losses in quality.</p>	<p>Hand out: Information Sheet No. 9 <i>Some Problems Associated With Fish.</i></p> <p>Discuss each point with trainees.</p>
Stock rotation	<p>Fresh fish is a highly perishable food item and one way to reduce loss in product quality is to turn the stock over <i>i.e. sell it</i>, as quickly as possible.</p> <p>Labelling boxes of fish on taking delivery is a good method of distinguishing old from new stock.</p> <p>A recommended practice is to label fish boxes/containers with the date of their delivery to the premises.</p>	<p>Hand out Example Sheet No. 3 <i>Stock Rotation</i></p> <p>Solvent-based (<i>waterproof</i>) marker pens should be used.</p>
Temperature monitoring	<p>Temperature is the most important factor which affects the rate of fish spoilage. The higher the temperature the faster the rate of spoilage.</p>	

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Temperature monitoring/ cont'd.	<p>Causes of high fish temperatures include:</p> <ul style="list-style-type: none"> — Inadequate icing. — Hot weather conditions. — Leaving chill store doors open. — Exposing fish to warm draughts. — Faulty refrigeration equipment. — Exposing fish to direct sunlight or heaters. <p>All chilled fish should be maintained within a temperature range of from 0°C to 4°C. Live shellfish are best maintained within the range 2°C to 8°C. Frozen fish should be maintained at a temperature of -18°C or below.</p> <p>Fish and equipment temperatures should be checked daily so that any irregularities can be identified and corrected immediately.</p> <p>If the fish is seen to be surrounded by ice then this is an indication that the fish itself is being maintained at the correct temperature for chilled storage.</p>	<p>Ask trainees: <i>What are some common causes of high fish temperatures?</i></p> <p>Try to obtain possible answers.</p> <p>See: ICE</p> <p>Hand out Information Sheet No. 10 <i>The Fresh Fish Thermometer.</i></p>

MAINTAINING FISH QUALITY

SESSION TITLE: RECOMMENDED PRACTICES

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KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
<p>Temperature monitoring/ cont'd.</p>	<p>However, a probe thermometer inserted into the flesh should be used to check the actual temperature of the fish.</p>	
<p>Fish inspection</p>	<p>This should be carried out on a daily basis.</p> <p>Fish inspections should examine:</p> <ul style="list-style-type: none"> — Freshness quality (<i>appearance, smell and texture</i>) — Freedom from bruising, burst bellies or other blemishes. — Freedom from worms and other parasites. <p>At the start of the day, all fish deliveries should be inspected prior to display or storage.</p> <p>During the day, fish being prepared or processed and fish on display should be continually inspected.</p> <p>At the end of the day, all fish unsold and to be held over for future sale must be inspected and rejected or retained, as appropriate.</p>	<p>Ask trainees: <i>What should fish inspections look for?</i></p> <p>Try to obtain the possible answers.</p> <p>For further information See: SESSION OUTLINE 2- Fish quality standards.</p>

MAINTAINING FISH QUALITY

SESSION TITLE: RECOMMENDED PRACTICES

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KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Equipment maintenance	<p>Although equipment is <i>(or should be)</i> serviced regularly by expert engineers, it is important that refrigeration units are kept free of dirt and other materials which might prevent the unit from working efficiently.</p> <p>Simple daily checks such as monitoring the temperature and listening for unusual noises are all part of equipment maintenance and help towards the maintenance of high quality products.</p>	
ICE	<p>Icing and fish quality are closely linked. Since temperature increase is the biggest enemy of fish quality, the use of ice will reduce the temperature of fish quickly.</p> <p>Remember - Proper icing is the single most effective way of maintaining fish quality.</p> <p>It is important to allow ice to melt continually, otherwise it may cause partial freezing of the fish which affects its appearance and eating quality.</p> <p>Refrigerated chilled storage equipment, <i>e.g. display cabinets, chill stores</i>, should be adjusted so that the minimum temperature never falls below 0°C, in order to avoid partial freezing of fish.</p>	<p>The installation and use of '<i>in-house</i>' ice-making plant is recommended but, where ice is required to be delivered from external sources, it must be handled and transported hygienically.</p> <p>Hand out Information Sheet No. 11 <i>How Much Ice.</i></p>

MAINTAINING FISH QUALITY

SESSION TITLE: RECOMMENDED PRACTICES

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KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Handling and storage	<p>Ice must be transported and stored in clean containers provided with lids and drainholes.</p> <p>When storing large quantities of ice, it should be used in strict rotation, first-in first-out.</p> <p>When handling ice always use plastic or stainless steel scoops and shovels.</p> <p>Never use your hands.</p>	<p>Some types of bacteria are able to grow in ice and could contaminate the fish.</p>
Methods of icing	<p>Before placing any wet fish into a container, a layer of ice must first be laid in the bottom.</p> <p>The fish are then laid in rows followed by further ice to completely cover the fish.</p> <p>When packing fillets for storage it is important that ice does not come into direct contact with the flesh. Fillets should be laid flesh-sides together and covered by a sheet of wet-strength paper or polythene film before covering them top and bottom with ice.</p> <p>Smoked and cooked fish should not be directly iced. For display, they should first be placed in containers which are then laid in a bed of ice.</p>	<p>Although it is recommended that large whole fish are stored in a single layer, smaller fish can be stored in several layers provided that ice is placed between each layer of fish.</p> <p>The sheets are necessary to prevent the fillets from becoming soft by the absorption of meltwater, or marked by contact with hard pieces of ice.</p> <p>Possible leaching of dye and tainting of unsmoked fish, cross-contamination between raw and cooked products etc.</p>

MAINTAINING FISH QUALITY

SESSION TITLE: RECOMMENDED PRACTICES

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KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
FISH STORAGE	In order to reduce quality loss, avoid cross-contamination and allow effective stock rotation, care must be given to the design and layout of storage areas.	
Chill storage	<p>Chillers are designed for fish storage only; warm fish placed in a chill store will cool, but only very slowly.</p> <p>All batches of fish should be identified in some way to assist stock rotation.</p> <p>Depending on the type of chiller installed, fish can be stored in drawers, plastic boxes or trays. All containers used, however, should have drainholes and, preferably, be lidded.</p> <p>Under no circumstances should wet fish be stored directly above other products, e.g. <i>smoked fish, cooked fish or clean unused ice.</i></p> <p>Ideally, separate areas within the chill store should be allocated for storing newly-delivered fish, for fish ready for display and for fish held over from the previous day.</p> <p>When adding or removing fish, the main doors should only be kept open for as long as is necessary, in order to minimise the entry of warm air into the chiller.</p> <p>Boxes of fish should never be stored or stacked hard against the store walls because:</p>	<p>Ice will cool fish effectively.</p> <p>Strong possibility of cross-contamination occurring.</p> <p>Ask trainees: <i>Why should boxes of fish never be stacked or stored hard against a wall?</i></p> <p>Try to obtain possible answers.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Chill storage/ cont'd.	<ul style="list-style-type: none"> — The normal pattern of cold air circulation will be interrupted and the effectiveness of the cooling will be impaired. — Condensation or surface water may drip into the boxes. — The low temperature of the refrigerant contained in the cooling coils may cause the temperature of the fish to drop below 0°C and cause partial freezing. <p>Where manual defrosting of chill stores is necessary this is best carried out when stocks of stored products are low.</p>	<p>Fish should never be placed directly in front of an air blast refrigeration unit because as well as restricting the flow of cold air, fierce draughts of even cold air tend to dry out the fish.</p>
Frozen storage	<p>Typically, frozen fish stores are not designed to freeze fish, only to store previously frozen fish and to maintain recommended storage temperatures.</p> <p>The storage life of frozen fish depends upon the temperature at which it has been stored.</p> <p>In practice, the recommended storage temperature for all fish products in the UK is from -20°C to -30°C.</p>	<p>Prime quality cod, frozen soon after capture and stored at -30°C, will remain in good condition for at least two years.</p>

MAINTAINING FISH QUALITY

SESSION TITLE: RECOMMENDED PRACTICES

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KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Frozen storage/ cont'd.	<p>The cold store temperature should be monitored frequently. The thermometer probe itself should be located inside the cold store and be linked to a temperature gauge placed outside the cold store.</p> <p>Although there will always be some temperature fluctuation due to the nature of the refrigeration cycle, excessive temperature rises must be avoided. These can be caused by:</p> <ul style="list-style-type: none"> — Doors being left open. — The introduction of a quantity of partially frozen or unfrozen fish. — Breakdown of refrigeration equipment. <p>As with chilled storage, never stack fish tight against the walls or too closely together because the air will not be able to circulate freely and the effectiveness of cooling will be reduced.</p>	<p>A similarly frozen fish stored at -10°C will only remain in good condition for about one month.</p> <p>Ask trainees: <i>What could cause excessive temperature fluctuations within a cold store?</i></p> <p>Try to obtain possible answers.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Frozen storage/ cont'd.	Important - Frozen fish must always be handled with insulated gloves.	People working inside cold stores should wear protective clothing and be able to open the door from the inside. An alarm system should also be fitted.
FISH DISPLAY	<p>Although you will be able to keep the display full and well-stocked, it is also important that the quality of the products on display is maintained.</p> <p>The quality of fish on display is very important because, if care is not taken, the fish can soon spoil making the display unattractive and adversely affecting sales.</p> <p>Fish on display is subject to both temperature rises and contamination. It is vital that the following practices are followed:</p> <ol style="list-style-type: none"> 1. Each batch of fish must be inspected before placing on display; any poor quality fish should be rejected. 2. A bed of ice should be prepared initially, before adding fish products to the display. 3. The display should be arranged so that raw fish does not come into direct contact with any cooked or smoked fish. 4. The display should be re-iced as often as necessary during the day so that a sprinkling of top ice is always present. 	<p>See: FISHMONGER PRACTICE - Display and merchandising Training Manual.</p> <p>Adapt this section to suit your own working practices.</p>

MAINTAINING FISH QUALITY

SESSION TITLE: RECOMMENDED PRACTICES

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KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
FISH DISPLAY/ CONT'D.	<p>5. Smoked fish should not be placed in direct contact with ice.</p> <p>Although a fish display can appear to be well-iced and the refrigeration unit appear to be working correctly, temperature rises can still occur.</p> <p>Possible causes of temperature increases are:</p> <ul style="list-style-type: none"> — Display lighting of improper design and incorrectly positioned. — Exposure to direct sunlight. — Warm air draughts. — Inadequate insulation. <p>Every product that is sold is likely to be eaten by a customer.</p> <p>It is your duty to ensure that all the products offered for sale are of the highest possible quality.</p> <p>A display of high quality products not only sells the products, but also helps to ensure that customers will come back for more!</p>	<p>Ask trainees: <i>What could cause the temperature of fish on display to rise?</i></p> <p>Try to obtain possible answers.</p> <p>Hand out Example Sheet No. 4 <i>Quality On Display.</i></p>

MAINTAINING FISH QUALITY

SESSION TITLE: RECOMMENDED PRACTICES

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KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
SALES PRACTICES	<p>It cannot be stressed highly enough that fish is a food which is destined to be eaten by someone, sometime.</p> <p>You must make sure that all fish leaves the establishment safe to eat and of the highest possible quality. The premises, therefore, must be kept clean, tidy and in good order. This will help to build customer confidence in both the products and your abilities.</p>	<p>This section is only applicable to those establishments which sell fish direct to the public.</p> <p>It is recommended that unless fish preparation and processing are designed to be a deliberate visual feature of the sales area, only minor processing activities such as trimming, skinning and portioning are carried out within view of customers.</p>
Handling fish	<p>All knives, cutting boards and other associated equipment must be kept spotlessly clean.</p> <p>Never wipe knives on overalls.</p> <p>When cleaning tools and surfaces use disposable cloths and detergent. Try not to use the same cloth too often, otherwise you will only succeed in spreading germs.</p> <p>Each time you finish using the cutting board, clean the surface and the knife, especially when you are preparing a variety of fish in sequence.</p>	<p>It is recommended that fish is removed from display using a sheet of clean, wet-strength paper or similar impervious material.</p>

MAINTAINING FISH QUALITY

SESSION TITLE: RECOMMENDED PRACTICES

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KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Weighing fish	The scale pan must be kept clean at all times and each fish product should be weighed on a fresh sheet of wrapping paper. These practices will help to prevent the possibility of cross-contamination occurring.	
Wrapping fish	<p>Poor or careless wrapping techniques not only spoil the fish, but may also allow fish 'drip' or odour to contaminate other foods in the customer's shopping bag.</p> <p>When wrapping fish you should first wrap in wet-strength paper, then over-wrap and seal inside polythene bags.</p>	Polythene film of food-grade quality can also be used.
Handling money	<p>Notes and coins are a potential source of both physical and bacterial contamination which can be passed on to fish by hand.</p> <p>Try not to handle fish and cash at the same time.</p> <p>If two or more staff are serving, try to arrange for one person to be responsible solely for payment transactions.</p>	<p>Electronic price calculating and label printing scales are now available and used in many food shops. This type of equipment allows a fish handler to price and wrap the fish before passing the parcel on to the cash handler for payment.</p> <p>Hand out Information Sheet No. 12 <i>Good Sales Practices.</i></p>

MAINTAINING FISH QUALITY

SESSION TITLE: RECOMMENDED PRACTICES

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KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
<i>CONSOLIDATION</i>	<p>Ask trainees questions on knowledge aspects of the session.</p> <p>Allow time for further discussion on areas which give particular difficulty to the trainees.</p>	<p>Use of multiple — choice questionnaire.</p>

Information Sheet No's. 9-12

Information Sheet No. 9

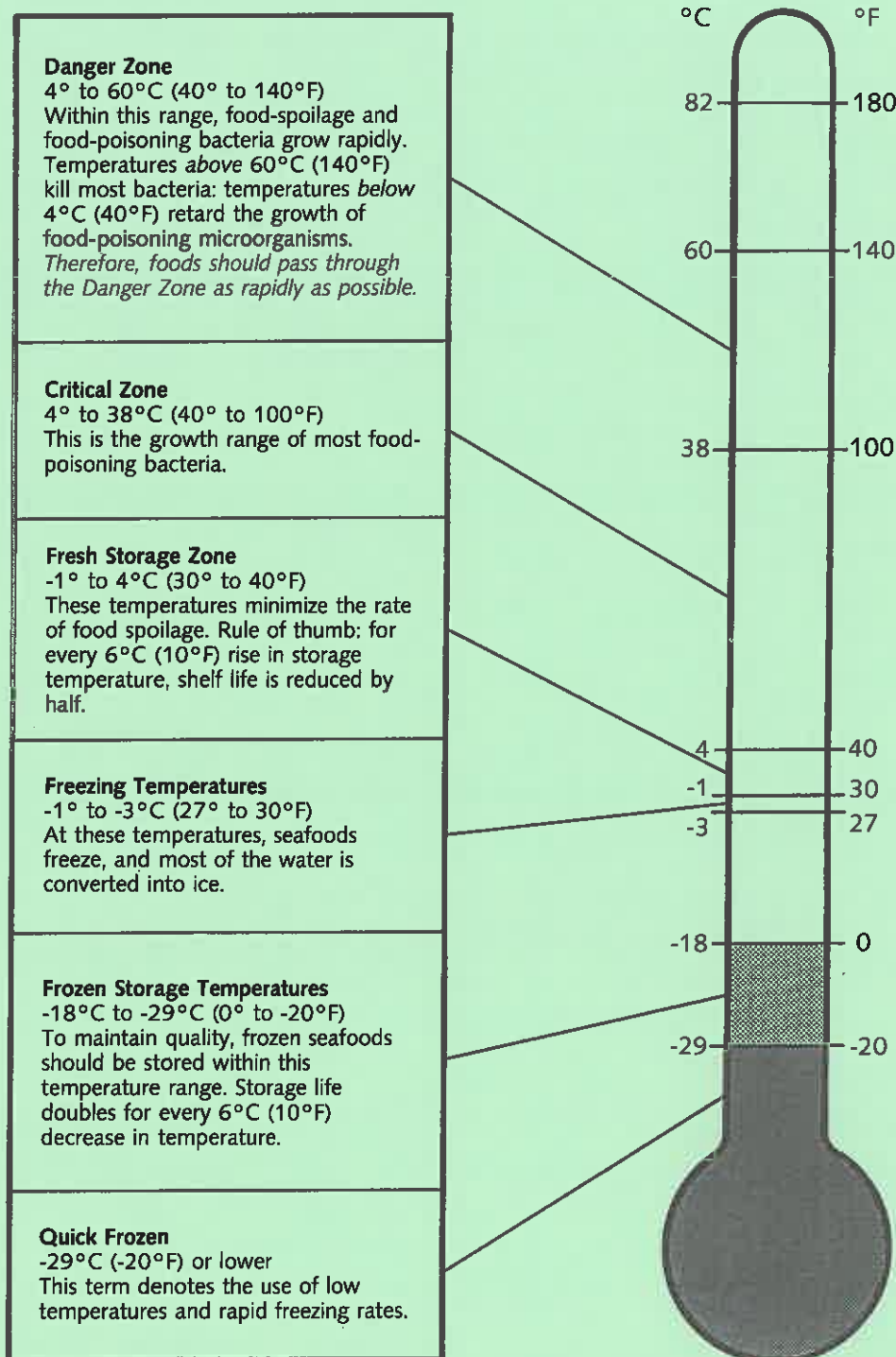
SOME PROBLEMS ASSOCIATED WITH FISH

Good quality assurance methods are vital if fish quality is to be maintained. As a food item, fish is faced with a number of inherent difficulties but, if you have knowledge of these, it will help you in your task of maintaining product quality. Some factors to note are:

1. The quantity, variety and quality of fresh fish available to the buyer on any given day is often variable or restricted because of quotas, prices, demand, weather etc.
2. Some fish are subject to seasonal availability *i.e. certain species may only be available at certain times of the year.*
3. Fish quality can vary with season *i.e. spawning times and the type of food eaten by the fish may affect the texture and flavour of the flesh.*
4. Fish is a highly perishable product *i.e. loses eating quality quickly.*
5. Fish can be difficult to handle *e.g. slippery, spiny, delicate, brittle, cold etc. (depending on the product)*
6. Bones can be a problem for some customers, particularly in fillets.
7. Fish is subject to handling by many people during all stages of distribution from catcher to consumer *i.e. it can become easily contaminated, tainted, spoilt or damaged in transit unless care is continually exercised by all persons involved.*

Information Sheet No. 10

THE FRESH FISH THERMOMETER



KEEP IT COLD!

KEEP IT CLEAN!

KEEP IT MOVING!

SEA FISH

Information Sheet No. 11

HOW MUCH ICE

Ice melts by absorbing heat energy from its surroundings. Therefore, whatever supplies heat to the ice, e.g. *fish*, itself becomes cooler.

Based on the theory that a given quantity of ice requires a fixed amount of heat energy for it to melt, the Table below shows how much ice is needed to lower the temperature of 1kg (2.2 *lb*) of fish to 0°C, from various starting temperatures.

INITIAL TEMPERATURE OF FISH (°C)	WEIGHT OF ICE NEEDED TO COOL FISH TO 0°C (Kg)
20	0.25
15	0.19
10	0.13
5	0.06
2	0.03

For practical purposes, it can generally be assumed that flake ice will occupy about 4/3 the volume of the same weight of fish.

In practice, the quantity of ice used should exceed the minimum determined by calculation alone because there will always be some heat gain from the surrounding environment e.g. *warm air draughts etc.*

Information Sheet No. 12

GOOD SALES PRACTICES

It is up to you to make sure that any fish leaving the premises is safe to eat and of the highest possible quality.

Fish spoilage can occur at any time, but one common area where this happens is in the sales area.

In order to avoid, or at least minimise the risk of fish spoilage, you should adopt the following good sales practices:

1. **Always** maintain knives and cutting boards in spotless condition and clean them immediately after use.
2. **Always** keep scale pans clean and weigh each fish order on a fresh sheet of wet-strength paper or similar material.
3. **Always** wrap fish first in wet-strength paper (*or food-grade polythene film*), then over-wrap and seal inside a polythene bag.
4. **Always** keep money separate from fish. If possible, avoid handling fish and cash together at the same time.

Example Sheet No's. 3-4

Example Sheet No. 3

STOCK ROTATION

Your boss is concerned that some of the older fish are not being sold because new fish deliveries are normally placed in front of existing fish held in the store.

He asks you for some ideas on how to improve stock rotation, what methods would you suggest?

Example Sheet No. 3

Answers

STOCK ROTATION

Proper stock rotation requires all stock held in storage to be identified or marked in some way to indicate its age or how long it has been there.

Simple effective methods for labelling stock include marking boxes with the date of packing, the date of freezing or the date of delivery to the premises.

Once the stock has been '**date**' or '**age**' coded, it becomes easy to ensure proper stock rotation by following the '**first-in, first-out**' principle.

Example Sheet No. 4

QUALITY ON DISPLAY

You have been asked to set up a fish display. What practices should you adopt in order to maintain the quality of all the fish on display, as far as possible.

1.

2.

3.

4.

5.

6.

7.

Example Sheet No. 4

Answers

QUALITY ON DISPLAY

To help maintain the quality of fish on display, the following practices should be followed:

1. A bed of ice should be prepared prior to creating a display of wet fish.
2. Each batch of fish delivered or taken from storage must be inspected for freshness and quality - Poor quality fish should be rejected.
3. Smoked fish should not be laid directly on to ice.
4. Raw fish must not come into contact with any cooked or smoked products.
5. The display lighting used should be of a suitable design and correctly positioned.
6. Where possible, the display should not be exposed to direct sunlight. Adequate shading should be used, where necessary.
7. The fish must be iced adequately and re-icing procedures should be carried out as often as necessary.

Questionnaire

Questionnaire

RECOMMENDED PRACTICES

Please tick the box you feel best answers each question.

1. *A box of fish at a temperature of -10°C is put into a cold store containing fish and operating at a temperature of -18°C. What will happen?*

- a) The temperature of the new fish will fall to -18°C
- b) The thermostat setting will need to be altered.
- c) The temperature of the existing fish will rise.

☐
☐
☐

2. *Which of the following fish products is considered to be perishable?*

- a) Tinned/canned fish.
- b) Wet fish.
- c) Frozen fish.

☐
☐
☐

3. *Why should cooked fish products always be stored above, never below, raw fish?*

- a) To avoid cross-contamination.
- b) To make them easier to reach.
- c) To keep the store tidy.

☐
☐
☐

4. *Proper stock rotation relies on a procedure called:*

- a) Last-in, first-out.
- b) First-in, first-out.
- c) First-in, last-out.

☐
☐
☐

Questionnaire/_{cont'd.}

RECOMMENDED PRACTICES

5. *Temperature rises in fish on display can be caused by:*

- a) Direct sunlight. ☐
 - b) Displaying smoked fish next to raw fish. ☐
 - c) Meltwater. ☐
-

6. *What is the optimum temperature range for frozen fish storage?*

- a) 0°C to -10°C. ☐
 - b) -10°C to -18°C. ☐
 - c) -18°C to -30°C. ☐
-

7. *Icing fish on display is important because:*

- a) It looks nice for the customers. ☐
 - b) It keeps the quality loss to a minimum. ☐
 - c) It stops the fish drying out. ☐
-

8. *Trays designed for storing wet fish on display must have:*

- a) Drainholes. ☐
 - b) Lipped edges. ☐
 - c) Sloping sides. ☐
-

Questionnaire Answers

RECOMMENDED PRACTICES

1. a) eventually, if the quantity of warmer fish added is relatively small but
c) if the quantity of fish introduced is proportionately large.
2. b). c) would become perishable once it had been allowed to thaw.
3. a).
4. b). a) is a sign of improper stock rotation and c) describes a drinking friend of mine.
5. a). b) might cause tainting unless adequate segregation measures are employed and c) does not cause the temperature of fish to rise but can soften the flesh.
6. c).
7. b) is the most important reason but a) and c) are also correct.
8. a) is very important. b) and c) are design features which are more cosmetic than functional.

Hygiene and cleaning

Total Time Indicator - 120 mins

Objectives - On completion of this session trainees will be able to:

- Outline the legislation which relates to food hygiene and state how these laws apply to the workplace.
- Demonstrate correct methods of cleaning and disinfection and state the appropriate equipment and materials to be used.
- Describe the correct procedures to follow when cleaning and disinfecting work areas and shop premises.
- State the necessity for, and the actions required to maintain a high level of personal hygiene.
- Describe methods for dealing with pests.

Summary of Topics to Cover	Time Indicator
Introduction	5 mins
Basic food hygiene legislation	10 mins
Methods of cleaning and disinfection	35 mins
Equipment and materials	25 mins
Cleaning procedures for work areas and shop premises	10 mins
Personal hygiene	15 mins
Dealing with pests	10 mins
Consolidation	10 mins
	120 mins

MAINTAINING FISH QUALITY

SESSION TITLE: HYGIENE AND CLEANING

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KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
I.N.T.R.O.	See: Guide to the Manual	Hand out Information Sheet No. 13 <i>The Importance Of Hygiene</i>
DEVELOPMENT		
BASIC FOOD HYGIENE LEGISLATION	<p>One of the most important items of legislation affecting all fish preparation and processing businesses is the Food Hygiene (<i>General</i>) Regulations 1970.</p> <p>The requirements are quite simple and are designed to protect both you and the ultimate consumers of the fish products. Although the rules of hygiene are basically common-sense, there are severe penalties, including fines, if you ignore the regulations.</p> <p>You must:</p> <ol style="list-style-type: none"> 1. Protect food from all risk of contamination. 2. Maintain personal cleanliness. 3. Wear clean overalls and other necessary garments when working in areas where food is handled. 4. Store foodstuffs in clean containers and use only materials of food-grade quality. 	<p>Expand this section as necessary to include any impending or recently-introduced UK/EC legislation which is applicable.</p> <p>Ask trainees: <i>What are the five most important requirements of the Food Hygiene Regulations that affect you?</i></p> <p>Try to obtain possible conclusions.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
BASIC FOOD HYGIENE LEGISLATION/ CONT'D.	<p>5. Notify your supervisor of any infectious disease from which you believe you may be suffering. You should also notify him/her of all cuts, grazes and other ailments, immediately you become aware of them.</p> <p>It is important to realise that the Food Hygiene Regulations and more recent legislation are intended to protect the consumer, which means all of us. Equally, they are the responsibility of everyone who works in a fish processing or preparation environment and not just the owner/management.</p> <p>Remember - If you disobey the rules you can be fined or even jailed.</p>	
METHODS OF CLEANING AND DISINFECTION	<p>Cleaning procedures are important for a number of reasons:</p> <ul style="list-style-type: none"> — To avoid food poisoning, <i>e.g. avoid contamination.</i> — To maintain product quality, <i>e.g. keep products in good condition.</i> — To satisfy the requirements of legislation, <i>e.g. Food Hygiene Regulations.</i> — To maintain a safe and tidy working environment, <i>e.g. good housekeeping practices.</i> 	<p>Ask trainees: <i>Why do we need to carry out cleaning procedures?</i></p> <p>Try to obtain possible conclusions.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
METHODS OF CLEANING AND DISINFECTION/ CONT'D.	<ul style="list-style-type: none"> — To project a suitable 'image', e.g. <i>a dirty shop gives little confidence to the customer.</i> — To maximise product shelf-life e.g. <i>reducing spoilage prolongs product shelf-life.</i> — To remove pests and their waste products e.g. <i>rats and mice, insects, birds etc.</i> — To maintain equipment and machinery in proper working order. <p>Different surfaces require different cleaning methods and equipment.</p> <p>There are many types of surface to be cleaned in a fish processing/preparation area with each surface ('substrate') presenting its own cleaning problems. The most common method of cleaning used is manual, i.e. <i>by hand</i>.</p>	<p>The surface to be cleaned is sometimes referred to as the 'substrate'.</p> <p>Hand out Example Sheet No. 5 <i>What To Clean</i></p>
Manual cleaning	<p>The basic steps to follow for effective cleaning and disinfection of facilities and equipment are:</p> <ol style="list-style-type: none"> 1. Removal of gross soil. This may be achieved by brushing or scraping, or for wet fish slime and residues by swilling with cold water. 2. Loosen clinging soil. As not all soil can be removed with water, it is sometimes necessary to select an appropriate 	<p>Hand out Information Sheet No. 14 <i>The Importance Of Cleaning</i></p> <p>The use of water is recommended as the simplest, safest and cheapest method for removing dirt.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Manual cleaning/ cont'd.	<p>detergent in order to first soften and loosen it before brushing it loose.</p> <p>3. Disinfection.</p> <p>After cleaning, many surfaces and especially those liable to come into contact with fish need to be disinfected in order to kill bacteria.</p> <p>Manual cleaning includes three types of activity:</p> <p>1. The cleaning of small items.</p> <p>2. Soak tank cleaning.</p> <p>3. Manual cleaning of large surfaces, e.g. floors, walls, ceilings, etc.</p> <p>The first two activities involve taking the items to the cleaning solution. In this case, the detergent is taken to the surface to be cleaned.</p>	<p>It is essential that a suitable disinfectant is chosen and allowed sufficient contact time before thorough rinsing.</p> <p>Hand out Information Sheet No. 15 <i>Basic Methods Of Manual Cleaning.</i> Similar to washing dirty crockery in the home but on a slightly larger scale.</p> <p>Useful for cleaning a number of small items simultaneously, or where stubborn soil is present.</p> <p>Problems associated with cleaning large surfaces include very stubborn dirt, the large amount of time involved and the cost of the detergent required.</p>
Mechanical cleaning	<p>This involves the use of hand-held pressurised water sprays to achieve a cleaning result. The two most common are:</p> <p>— Direct pressure cleaning.</p> <p>This method relies upon a high-energy water jet to remove the surface dirt in a single operation.</p>	

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Mechanical cleaning/cont'd.	<ul style="list-style-type: none"> — Jet cleaning with detergent pre-soak involves a two-stage process. <p>Stage 1 is to apply the detergent either as a mist, a foam or a gel.</p> <p>Stage 2 is to rinse off the detergent using a high pressure water jet.</p>	<p>Hand out Information Sheet No. 16 <i>Mechanical Cleaning Techniques.</i></p>
Detergents	<p>As disinfectants only work effectively on clean surfaces, all dirt has to be removed before they can be used.</p> <p>Although water may remove some of the surface dirt, it will not remove oil, grease, fats and dried proteins on its own. This is due to the difficulty water has in wetting the surface because of surface tension effects.</p> <p>Different types of detergents are available and the selection of a particular type is dependent on:</p> <ul style="list-style-type: none"> — The type of soil to be removed. — The type of surface to be cleaned. — The period of time available. <p>In all cases, it is essential that the manufacturers' instructions are followed accurately and that appropriate handling precautions are undertaken.</p>	<p>By way of example, ask trainees to recall any attempts to remove grease from their hands using plain water.</p> <p>Hand out Information Sheet No. 17 <i>Types Of Detergent And Their Application.</i></p> <p>Cost may also be a relevant factor.</p> <p>Demonstrate the preparation of a mild-alkaline detergent solution.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Detergents/ cont'd.	<p>There are three main types of detergents:</p> <ol style="list-style-type: none"> 1. Acidic - These are used in special circumstances and typically for removing heavy deposits of hard water scale. 2. Neutral - Mainly used for light cleaning. Relatively safe on skin and will not corrode machinery. Excess suds can be a problem as they tend to foam very easily. Typically used for removing oil and grease. 3. Alkaline - This is the most useful group of detergents for commercial use. Although they are unaffected by soaps or bleach, hard water can reduce their effectiveness. Typically used for removing fat and dissolving protein. Strong alkaline detergents are used to remove stubborn fats, dried proteins and tar. 	<p>Stress the importance of safety and correct handling procedures.</p> <p>Examples in household use include Fairy liquid, Teepol, shampoos, etc.</p>
Disinfection	<p>The purpose of disinfecting a surface is to kill bacteria.</p> <p>Disinfection can be achieved by using chemicals, heat or irradiation, e.g. <i>UV light</i>.</p>	<p>Ideal food-grade disinfectants are:</p> <ul style="list-style-type: none"> — Non-perfumed. — Non-tasting. — Quick-acting. — Non-corrosive. — Non-toxic. — Cheap.

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Disinfection/ cont'd.	<p>The three most common types of chemical disinfectants used are:</p> <ol style="list-style-type: none"> 1. Chlorine-based. 2. Iodine-based. 3. Phenol-based. <p>Remember - The key to proper disinfection is effective prior cleaning.</p>	
Chlorine-based disinfectants	<p>Chlorine-based disinfectants kill bacteria and are a useful general-purpose disinfectant for fish premises.</p> <p>Chlorine solutions are:</p> <ul style="list-style-type: none"> — Relatively safe. — Cheap to use. — Effective over a short period of time. <p>They are ideal for disinfecting washed surfaces, cloths, knives, nail brushes, etc.</p> <p>It is important to remember that cloths should never be soaked for too long or immersed in too strong a solution.</p>	<p>Hand out Information Sheet No. 18 <i>Using Chlorine-based Disinfectants.</i></p> <p>The chlorine will eventually rot cloth.</p> <p>It is advisable to use disposable cloths wherever possible.</p>
Iodine-based disinfectants	<p>Iodine-based disinfectants are sometimes called 'iodophors'. They are very toxic, hazardous to use and can affect the flavour of food.</p> <p>Iodophors have a limited use for industrial cleaning, but can be used on painted surfaces but not near food.</p>	<p>Iodophors can also cause staining of some types of equipment and surfaces.</p> <p>They are often found in skin lotions or combined with detergents for hand-washing.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Phenol-based disinfectants	<p>Phenol-based disinfectants are used extensively in toilet areas and have a long lasting residual effect. They must not be used near food.</p> <p>They are very strong-smelling and splashes can cause damage to the eyes or skin.</p>	<p>Some branded products based on phenol include: Dettol, Izal and Jeyes fluid.</p>
Quaternary ammonium compounds	<p>This is a group of detergents that also have disinfection properties. They are sometimes called 'Quats' or 'Qacs'.</p> <p>Very useful because both cleaning and disinfection are completed in one operation.</p>	<p>Hand out Example Sheet No. 6 Using Disinfectants.</p> <p>More expensive to use than standard disinfectants and inactivated by contact with plastics.</p>
EQUIPMENT AND MATERIALS Manual cleaning	<p>Most cleaning operations carried out by fish preparation and processing businesses consist of manual cleaning.</p> <p>Typical cleaning equipment required for manual cleaning includes:</p> <ul style="list-style-type: none"> — A supply of cloths and sponges for wiping down. — Brushes and mops for cleaning floors. 	<p>Ask trainees: <i>What cleaning equipment is required for manual cleaning?</i></p> <p>Try to obtain possible answers.</p> <p>Disposable cloths are recommended.</p> <p>Sponges and mops should be made of plastic materials and must be capable of withstanding high temperatures and the chemical effects of strong detergents and disinfectants.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Manual cleaning/ cont'd.	<ul style="list-style-type: none"> — Hand-brushes for removing stubborn dirt. — Buckets for holding water or cleaning solutions. 	<p>Soft-cotton strand mops are not hygienic.</p> <p>Buckets should be made of stainless steel or non-coloured food-grade plastic.</p> <p>Hand out Information Sheet No. 19 <i>Cleaning Equipment.</i></p>
Mechanical cleaning	<p>Typical equipment required for mechanical cleaning includes:</p> <ul style="list-style-type: none"> — High pressure water hose system. — Venturi valves which introduce chemicals into the water sprays. 	
Water	<p>For rinsing off fish slime and other food residues which have not dried and hardened, cold water is ideal.</p> <p>Water under pressure is recommended for cleaning large areas e.g. <i>floors, walls etc.</i></p> <p>For hand-washing, warm water at a temperature of about 40°C should be used.</p> <p>For washing equipment and utensils a weak solution of disinfectant at a temperature of 60°C or above should be used. This should be changed regularly. Rinsing water should ideally be of a similar temperature.</p>	<p>Some processing businesses use purpose-built box washing machinery.</p> <p>High pressure washers are extremely useful for loosening and removing dirt from inaccessible areas beneath equipment and inside machinery.</p> <p>Rinsing with water at a temperature of 60°C will assist air drying and the killing of surface bacteria.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
CLEANING PROCEDURES FOR WORK AREAS AND SHOP PREMISES	Different parts of the premises will require different cleaning procedures and cleaning routines.	It is recommended that appropriate daily, weekly and monthly cleaning routines are established. For busy areas a 'clean as you go' policy is recommended.
Yards and reception areas	These must be kept free from litter, brushed clean and hosed down during the day. At the end of trading a final rinse with a residual disinfectant solution should be made to reduce the risk of bacterial contamination and prevent fishy odours which might attract flies and vermin. Waste bins should also be emptied, cleaned and then rinsed out with residual disinfectant solution.	Type of disinfectant will vary according to use. Consult your chemical supplier for appropriate advice and make sure that the manufacturer's instructions are carefully followed.
Floors	In processing, preparation and reception areas, floors should be brushed clean frequently to remove any debris before hosing down with cold water. At the end of the working day, a detergent solution should be used to remove stubborn stains. All traces of detergent should be removed by rinsing with water and a residual disinfectant solution should be applied and left to remain overnight.	This procedure should be carried out during the working day as often as necessary.

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Floors/cont'd.	In retail areas, floors should be brushed clean during normal trading hours. Once trading has finished, the floors should be brushed clean and treated as previously detailed.	It is advised that these floors are not mopped during trading as this action may produce a slippery surface. Do not use sheets of cardboard to cover a damp floor as these can harbour dirt.
Drains	A strong bleach solution (50:50) should be poured down all drains at least once a week. On a daily basis, at the end of operations all drains should be thoroughly sluiced with cold water. Grids should be removed and cleaned by brushing or high pressure spraying. Waste traps should be cleaned out every day.	Detergent will be required to remove any grease or protein residues.
Walls and ceilings	It is important that surfaces next to fish processing and handling operations are cleaned frequently during the day by swilling with cold water, whilst fish slime and food residues are still wet. When cleaning pipework, around light switches, electrical sockets and other dirt-traps ensure that extra effort is made to remove dirt. Upper wall surfaces and ceilings should be cleaned monthly using an alkaline detergent.	If the residues have hardened, use a hand-brush and a solution of detergent in hot water or use a high pressure hose and detergent. Remember - Electrical safety procedures.

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Windows	All windows must be kept clean by washing and polishing with a wash leather.	Special attention should be made to windows next to a fish display. These windows must be kept clean and disinfected.
Chill facilities	<p>All chillers should have their floors and internal walls hosed down daily to remove fish slime and food residues.</p> <p>Chillers should also be washed out once a week using a hand-brush and bucket before sponge drying. All surfaces, both inside and out, should be washed down with a non-odorous mild-alkaline detergent.</p> <p>Shelving and storage trays should be taken out once a week and washed with a detergent, rinsed, disinfected and rinsed again.</p>	Ensure that the chiller is empty before cleaning commences.
Processing equipment	<p>Knives, cutting boards, filleting troughs and sinks should be cleaned frequently during the day by rinsing with cold water.</p> <p>At the end of trading they should be scrubbed down with a mild-alkaline detergent, disinfected and rinsed in hot water.</p>	It is advised that these items are allowed to air dry.
Display surfaces	At the end of the trading period all remaining fish and ice should be removed and the display surface rinsed with warm water. The surface should then be scrubbed down with a mild-alkaline detergent, disinfected and rinsed in hot water.	

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Retail sales equipment	<p>Any spillages, e.g. <i>fish slime etc.</i> on the counter, scales or other retail sales equipment should be wiped up immediately.</p> <p>At the end of trading all sales equipment should be wiped down with a mild-alkaline detergent, disinfected and rinsed in hot water.</p>	The use of disposable cloths is recommended.
Toilet areas	<p>These should be cleaned daily and should include thorough disinfection of taps, sinks, door handles and lavatories.</p> <p>Regular inspections must be made to ensure that they are kept clean and that clean towels, nailbrushes, soap etc. are always available.</p> <p>A cloth soaked in a residual disinfectant should be used to wipe down.</p>	<p>Impending EC Hygiene Regulations require foot/knee operated taps to be provided.</p> <p>Hand out Information Sheet No. 20 <i>Suggested Cleaning Routines.</i></p>
PERSONAL HYGIENE	<p>One of the biggest hygiene problems in the fish preparation and processing industry is people. Remember that people who handle food have other people's health in their hands and nothing is more dangerous to people than other people.</p>	<p>Hand out Information Sheet No. 21 <i>Personal Hygiene.</i></p>
Protective clothing	<p>Hygienic dress for food handlers should start every morning with clean under-clothes. Whilst at work all staff must wear clean and washable protective over-clothing, including coats, aprons and hats or head scarves.</p>	<p>When processing fish, a full length apron and plastic (<i>preferably white</i>) boots should be worn.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Protective clothing/cont'd.	Protective overalls should be changed as often as necessary and plastic boots should be scrubbed daily with hot water and disinfectant.	It is a legal requirement that clean clothing must cover any part of the body that may contact food. <i>Ask trainees: When should they wash their hands?</i> Try to obtain at least four examples.
Personal habits	<p>Hand washing should be a matter of routine, but extra hand washing is also needed in the following cases:</p> <ol style="list-style-type: none"> 1. Before handling any food. 2. Between different food handling operations in order to prevent cross-contamination. 3. After using the toilet and before leaving the washroom. 4. After smoking, coughing and sneezing or using a handkerchief. <p>Washing means using soap, hot water and a nail brush</p> <p>Cuts, grazes and boils must be completely covered by clean waterproof dressings.</p> <p>Coughing, sneezing, nose-blowing and spitting must be avoided in areas where food is being handled. The use of a handkerchief or a clean paper tissue is essential.</p>	<p>Hand drying should be carried out using disposable paper towels or a hot air dispenser.</p> <p>Boils contain many thousands of bacteria.</p>

MAINTAINING FISH QUALITY

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KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
<p>Personal habits/ cont'd.</p> <p>General health</p>	<p>Smoking in areas where food is handled is illegal.</p> <p>Jewellery, watches, nail varnish and rings (<i>other than plain banded types</i>) should not be worn.</p> <p>If you have diarrhoea or are suffering from typhoid and related disorders, vomiting, septic cuts, boils, discharge from eyes, ears and nose; or have a bad cold you must not handle food.</p> <p>By law - You must notify your employer if you are suffering from ill-health.</p>	
<p>DEALING WITH PESTS</p>	<p>Pests are a danger to health in the food industry because they often carry diseases or disease-causing organisms, may contaminate food and food containers and may damage the fabric of the building.</p> <p>There are four main types of pests:</p> <ul style="list-style-type: none"> — Rodents, <i>e.g. mice and rats.</i> — Insects, <i>e.g. wasps, flies, and cockroaches.</i> — Birds, <i>e.g. sparrows, pigeons and seagulls.</i> — Cats and dogs. <p>All these pests can carry diseases and may contaminate any food or surface with which they come into contact.</p>	<p>Hand out Example Sheet No. 7 Pests.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
DEALING WITH PESTS/CONT'D.	<p>Remember - Pests are always dirty so remove them, keep them out or prevent them from living in your premises.</p>	
Rodents	<p>Rats are intelligent and can breed quickly. They operate mostly in the dark, can burrow a distance of more than six feet through soil and can bite their way through non-metal containers.</p> <p>There are three ways of detecting rats:</p> <ol style="list-style-type: none"> 1. Bags and other food containers will be gnawed open. 2. Droppings (<i>like small black rice</i>) will be left in dark places. 3. Scratch marks will be left on walls and beams in dark places where they have their regular runs. <p>If rats are detected then, by law, the Environmental Health Dept. must be informed immediately and their help sought.</p> <p>In order to prevent rat infestations:</p> <ol style="list-style-type: none"> 1. Keep the area around the premises clear and clean. Fit any openings with fine mesh wire grilles. 	<p>All local Authorities employ Environmental Health Officers (<i>EHO's</i>) to check that hygiene regulations are being followed in their area. Their advice is free and professional in nature.</p> <p>The EHO will advise on appropriate rodent-proofing measures to adopt.</p>

MAINTAINING FISH QUALITY

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KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Rodents/cont'd.	<ol style="list-style-type: none"> Keep food in sealed metal containers and keep the premises clean. Never leave any scraps of food lying around. Do not allow waste paper or boxes to pile up as this attracts rats which use it for nesting material. 	Also check canteen and locker areas.
Mice	Mice are very similar to rats but are much easier to trap.	The best trap bait is a fatty food, e.g. <i>bacon rind</i> .
Birds	<p>They are not usually thought of as pests, but their feet and droppings can infect foodstuffs.</p> <p>Methods of prevention include:</p> <ol style="list-style-type: none"> Do not encourage their presence and do not feed them waste food. Remove any waste food and keep all food, including waste food, covered. Prevent their gaining entrance to the premises through windows or other openings. 	<p>A recent survey showed that 1 in 5 gulls carried food-poisoning bacteria.</p> <p>Reduce perching points - bird repellent strips can also be fitted.</p>
Cats and dogs	<p>Dogs carry many bacteria than can cause ill-health. Dog excreta is especially dangerous. It can be transported on people's shoes, dogs' feet or insects' bodies. It is essential that shoes are preferably changed or else covered before entering food rooms.</p> <p>Keep dogs out and display a prominent notice outside any retail area prohibiting customers from bringing dogs on to the premises.</p>	Shoes for the food room should never be worn outside.

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Cats and dogs/ cont'd.	<p>Cats are not the solution to a rodent problem.</p> <p>Cats are more dangerous than dogs because they can climb and are less noticeable than dogs. Keep cats out by not encouraging them and do not allow others to encourage their presence.</p>	<p>It is illegal to keep a cat on the premises.</p>
Insects	<p>Fortunately, fish is not attractive to many insect pests. The most common is the fly whose feet and body are usually contaminated with bacteria from whatever substrate they have recently been in contact with.</p> <p>They are attracted to rotten food and excreta. They eat by vomiting on to food which becomes softened and allows it to be sucked up through the mouth (<i>proboscis</i>)</p> <p>Try to keep flies out by adopting indirect ventilation. Open doors and windows allow flies easy access to the workplace.</p> <p>Cockroaches prefer cereals to fish but infestations may occur.</p>	<p>Flies breed rapidly and the removal of all waste from both inside and outside premises is the most effective method of control.</p> <p>Within premises, electric fly traps are very effective. They should be left on continuously (<i>including overnight</i>) and trays and grids should be cleaned weekly. It is advised that the ultra-violet tubes are replaced at yearly intervals.</p> <p>If you have an infestation contact your local EHO.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Insects/cont'd.	<p>Wasps are treated in the same way as flies.</p> <p>Ants can be a nuisance in areas where offal or waste food is stored because they are attracted to rotting food.</p> <p>Keep all waste food well covered and keep the area tidy.</p>	<p>If you have an infestation contact your local EHO.</p> <p>Hand out Information Sheet No. 22 <i>Dealing With Pests.</i></p>
CONSOLIDATION	<p>Ask trainees questions on knowledge aspects of the session.</p> <p>Allow time for further discussion on areas which give particular difficulty to the trainees.</p>	<p>Use of multiple-choice questionnaire.</p>

Information Sheet No's. 13-22

Information Sheet No. 13

THE IMPORTANCE OF HYGIENE

It is essential that you always maintain high standards of hygiene in order to:

- Satisfy the legal requirements of food hygiene legislation.
- Ensure that all products offered for sale are free from any danger of contamination or food poisoning.
- Project a clean, bright and fresh establishment image to the customer.
- Create pleasant working conditions for yourself and colleagues.

Good hygiene applies to:

- The design and layout of premises, facilities and equipment.
- Careful fish handling practices including temperature control and the prevention of contamination and cross-contamination.
- Maintaining high standards of personal cleanliness and behaving responsibly with regard to infectious diseases.
- The control of animal and insect pests.
- The thorough cleaning and disinfection of premises, facilities and equipment.

It is important to remember that in all cases, it is **you** who are responsible for the standard of hygiene in the workplace. Failure to maintain high standards could result in a fine, or even jail! Therefore, it is vital to either report, or take personal action, on any aspects which might lower the high standards of hygiene required.

Information Sheet No. 14

THE IMPORTANCE OF CLEANING

The cleaning operation is a vital part of everyday work. To minimise the risk of food poisoning and maximise the shelf-life of fish, it is essential to prevent contamination by bacteria, fungi, viruses etc.

To achieve this, equipment and premises must be kept clean. In many areas, cleaning of surfaces will be sufficient, but there will always be a number of critical hygiene points where chemical cleaning is also necessary in order to minimise the dangers of contamination.

Two important definitions are:

- Sterilization** — A process designed to destroy or remove all living organisms, including viruses and spores.
- Disinfection** — A process which reduces the number of micro-organisms to a level which is neither harmful to health nor causes significant food spoilage.

It is very hard to sterilize equipment and this process is often inappropriate because it is difficult to keep equipment sterile for long periods of time. The most common cleaning operation usually involves removing visible soil from a dirty surface. Although this process also removes a lot of bacteria, it will not leave the surface sterile or hygienic (*disinfected*)

There are four important points to remember about bacteria:

1. They occur everywhere, in many different environments.
2. Since they cannot be destroyed totally, we must learn to cope with their presence.
3. Bacterial numbers must be kept down, otherwise they cause food spoilage and food poisoning.
4. Bacteria cost a business money by increasing wastage and the danger of legal actions arising from cases of food poisoning.

Information Sheet No. 15

BASIC METHODS OF MANUAL CLEANING

The cleaning of small items.

Similar to washing dirty crockery in the home, but on a slightly larger scale.



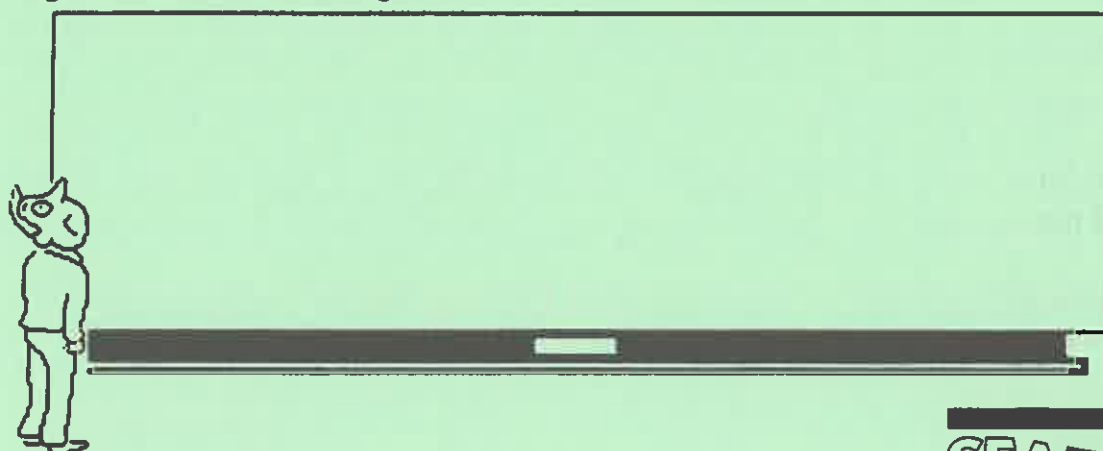
Soak tank cleaning.

Useful for cleaning a number of small items simultaneously, or where stubborn soil is present.



Manual cleaning of large surfaces.

e.g. floors, walls and ceilings.



Information Sheet No. 16

MECHANICAL CLEANING TECHNIQUES

Jet cleaning

This method relies upon a high-energy water jet to remove surface dirt and soil in a single operation.

Mist cleaning

This method uses a fine spray of chemically-active detergent solution applied as a low energy jet to a dirty surface. A few minutes are allowed for the detergent to soften the dirt before both the dirt and detergent are removed using a high energy water jet.

One problem in using this method is that the fine spray tends to produce a detergent vapour which, if inhaled, could prove harmful to health. It is, however, a cheap method of cleaning.

Foam cleaning

This method is similar to mist cleaning but, in this case, the detergent is applied as a foam. The softened dirt and detergent are removed together using a high energy water jet.

One problem in using this method is that it is often difficult to remove all the foam totally. An advantage of this method is that the foam has a long contact time with the dirt and new detergent is exposed to the dirty surface as the foam collapses.

Gel cleaning

This method is also similar to mist cleaning, except that the gel, which is a fluid in concentrated form, thickens and becomes viscous (*sticky*) when diluted with water. The softened dirt and detergent are removed together using a high energy water jet.

A problem with this method is that unlike foam, a gel will not flow into all the cracks and crevices; it has to be applied directly to every area to be cleaned. When applied properly, gel cleaning is very effective because of the long contact time and the powerful chemicals used.

Information Sheet No. 17

TYPES OF DETERGENT AND THEIR APPLICATION

DETERGENT TYPE	TYPICAL INGREDIENTS	TYPICAL APPLICATIONS	LIMITATIONS AS TO USE
Acidic	Acid, corrosion inhibitor, wetting agent*.	Removing heavy deposits of scale or dirt.	Extremely corrosive, must only be used whilst wearing protective clothing, including goggles and gloves.
Neutral	Synthetic surface-active agent.	Removing oil and grease.	May foam in high pressure equipment.
Mild-alkaline	Synthetic surface-active agent, polyphosphate, silicate.	Removing fats and dissolving proteins.	Prolonged contact with skin should be avoided.
Caustic⁺	Sodium or potassium hydroxide, sodium orthosilicate.	Removing stubborn fats, dried proteins and tar.	Extremely corrosive, must only be used whilst wearing protective clothing, including goggles and gloves.
Abrasive	Abrasive powder (4% on 150 mesh sieve) wetting agent, alkali.	Scouring hardened residues.	Should not be used on soft surfaces such as plastics.

*Detergents for use with mechanical applications should have low foaming properties.

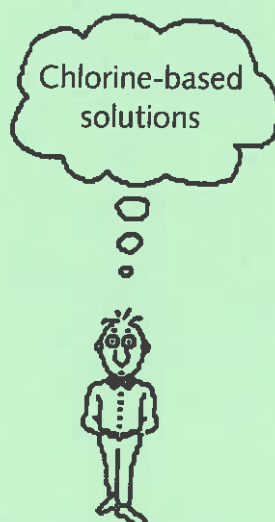
⁺ This product is usually applied neat.

Information Sheet No. 18

USING CHLORINE-BASED DISINFECTANTS

Instructions for use must be followed carefully.

1. They must always be used at the manufacturers' recommended strengths. A more concentrated solution is not necessarily more effective.
2. They must never be mixed with other chemicals *e.g. soaps, detergents etc.*
3. They should be allowed to remain in contact with the surfaces to be disinfected for as long as possible.
4. They kill bacteria, therefore they can be harmful to you. Always protect your eyes and skin from splashes and rinse any splashes on yourself, immediately, with plenty of cold water.
5. They are ineffective if any soap, grease or organic matter is present.
6. Rinse all disinfected surfaces well with clean water.



Information Sheet No. 19

CLEANING EQUIPMENT

You may find this list of basic cleaning equipment to be a useful guide.

- A supply of disposable cleaning cloths.
- Sponges and mops made of plastic.
- Brushes with stiff plastic fibres.
- Buckets made from stainless steel or non-coloured food-grade plastic.
- A plastic hosepipe or high pressure washer.
- Appropriate types of detergent.
- Appropriate types of disinfectant.
- Venturi system.
- Plenty of '*elbow grease*'!

Information Sheet No. 20

SUGGESTED CLEANING ROUTINES

AREA	HOW OFTEN	METHOD
Yard, waste storage and reception	During the day	Brush clean and hose down.
	End of the day	Rinse with a residual disinfectant and leave overnight.
Floors (<i>processing and preparation</i>)	During the day	Brush clean and hose down.
	End of the day	Wash with a detergent solution; rinse with a residual disinfectant and leave overnight.
(retail)	During the day	Brush clean.
	End of the day	Wash with a detergent solution; rinse with a residual disinfectant and leave overnight.
Drains	End of the day	Wash with a detergent solution and sluice thoroughly with cold water. Remove grids and clean by brushing or high pressure spraying.
	Once a week	Pour a strong bleach solution (50:50) down the drains.
Walls, ceiling and woodwork	During the day	Swill or wash with cold water. Use a hot detergent solution to remove hardened fish slime.
	Once a month	Wash with a mild-alkaline detergent.
Windows	During the day	Wash and polish with a wash leather.
	End of the day	Wipe with a non-residual disinfectant and rinse with cold water.

Information Sheet No. 20/cont'd.

SUGGESTED CLEANING ROUTINES

AREA	HOW OFTEN	METHOD
Chill facilities	Once a day	Hose down floors and walls.
	Once a week	Wash out using hand brush and bucket before sponge drying. Wash down all surfaces with a non-odorous, mild-alkaline detergent. Wash shelving and storage trays with a non-odorous, mild-alkaline detergent; rinse, disinfect with a non-residual disinfectant and rinse again.
Processing equipment	During the day	Rinse with cold water.
	End of the day	Scrub down with mild-alkaline detergent solution; rinse then disinfect. Finally rinse in hot water.
Display surfaces	During the day	Wipe up any spills immediately.
	End of the day	Scrub down with mild-alkaline detergent solution; rinse then disinfect. Finally rinse in warm water.
Toilet	During the day	Wipe down taps, sinks, door handles, chains, etc. with a cloth soaked in a residual disinfectant solution. Make sure that soap, nailbrushes and clean towels are provided.

Information Sheet No. 21

PERSONAL HYGIENE

Posture

Proper stance is important for visual appearance, comfort and efficiency.

Hands

Must be washed frequently, and always after using the toilet. Keep nails in good condition because your hands are constantly on view. Use of nail varnish is not recommended. Nail biting and nicotine stains also spoil the appearance of well-groomed hands.

Bathing

Must occur frequently - at least once weekly. Body odour may offend customers and colleagues.

Hair

Must be clean. Should not be combed or handled whilst handling foodstuffs and must be kept under a cap or hat.

Nose/Mouth/Forehead

Should not be touched with the hands. Coughing and sneezing should be accompanied by the appropriate use of a handkerchief.

Teeth

Clean teeth and healthy mouths are essential for pleasant breath.

Jewellery

Remove before commencing work, or wear it underneath your outer clothes.

Rings

Only plain bands, e.g. *wedding rings*, should be worn.

Watches

Remove before commencing work.

Cosmetics

Wear the minimum amount of cosmetics.

Information Sheet No. 21/cont'd.

PERSONAL HYGIENE

Smoking

'No smoking' notices should be displayed and the rules enforced.

Spitting

Completely unhygienic and illegal in food preparation areas.

Cuts

Should be covered with a brightly-coloured waterproof dressings.

Burns

Should be examined and attended to immediately.

Sores

Should be covered with a waterproof dressing.

Illness

Staff should report any illness to the owner/manager without fail or delay.

Clothing

Correct uniform must be worn whilst on duty. Should always be clean, well-pressed and worn correctly. Shoes should be well-fitting, comfortable and afford adequate protection for the feet. Feet should be well cared for. Socks should be changed daily.

Information Sheet No. 22

DEALING WITH PESTS

PEST	SUGGESTED ACTION	PREVENTION MEASURES
Rats	Environmental Health Department informed and help sought.	Fit openings with fine mesh wire grilles. Keep area clean and tidy and remove any waste paper or empty boxes immediately. Keep food in sealed metal containers and avoid leaving scraps of food lying around.
Mice	Set traps with a bait of bacon rind.	Use same methods as for rats.
Birds	Scare them away from the premises.	Do not feed birds with waste food and keep all food covered. Stop them gaining access through windows or openings.
Dogs	Eject immediately.	Display a prominent notice prohibiting dogs. Keep dogs out.
Cats	Eject immediately.	Do not encourage cats or allow others to feed them. Keep cats out.
Flies and wasps	Fit electric fly traps (<i>if not already fitted</i>)	Adopt indirect ventilation. Try to screen off open doors and windows. Keep waste foodstuffs covered.
Ants	If the infestation is severe contact the Environmental Health Department.	Keep waste food well-covered and the outside area tidy.

Example Sheet No's. 5-7

Example Sheet No. 5

Answers

WHAT TO CLEAN

Some common answers are as follows:

TYPE OF SURFACE	LOCATION
Stainless steel	Work-surfaces, knives, sinks, machine casing, food handling equipment, display trays.
Aluminium	Machine parts and machinery.
Galvanised metal (zinc or steel)	Should never be found in food areas.
Mild Steel	Should never be found in food areas.
Paint	Floors, walls and doors.
Concrete	Mainly floors.
Plastic	Walls, chopping boards, food-handling equipment, display trays.
Tiling	Walls and floors.
Wood	Should never be found in food areas.

Note: Surfaces constructed of wood, mild steel or galvanised metal should be replaced with more suitable food-grade materials.

Example Sheet No. 6

USING DISINFECTANTS

You have been asked to show a member of staff some of the cleaning procedures in the preparation area. List below five important points about the use of disinfectants which you would stress.

- 1.
- 2.
- 3.
- 4.
- 5.

Example Sheet No. 6

Answers

USING DISINFECTANTS

There may be others, but the five most important points to be stressed are:

1. Always protect skin and eyes from spills and splashes.
2. Never mix cleaning chemicals together.
3. Use only at the manufacturer's recommended strength.
4. Leave disinfectant solutions in contact with the surface to be disinfected for as long as possible.
5. Always rinse disinfected surfaces with clean water, especially those that are likely to come into contact with food.

Example Sheet No. 7

PESTS

Pests are a danger to health in the food industry because they:

- Carry diseases or disease-causing organisms.
- Contaminate food and containers.
- May damage the fabric of buildings.

List below any pests which you think might be of concern to food handlers.

Example Sheet No. 7

Answers

PESTS

Although there may be others, the most common pests which cause concern are:

- Cats and dogs.
- Insects, e.g. *flies, wasps and cockroaches*.
- Rodents, e.g. *rats and mice*.
- Birds, e.g. *pigeons, sparrows, seagulls etc.*

Questionnaire

Questionnaire

HYGIENE AND CLEANING

Please tick the box you feel best answers each question.

1. ***Before applying a disinfectant solution to a surface you should:***

- a) Ensure that the surface is clean. ☐
 - b) Ensure that the surface is dry. ☐
 - c) Ensure that the surface has been polished. ☐
-

2. ***What should you do after going to the toilet?***

- a) Stop smoking. ☐
 - b) Change your overalls. ☐
 - c) Wash your hands. ☐
-

3. ***What is the most suitable cleaning method for removing grease?***

- a) Hot water and detergent. ☐
 - b) Hot water and disinfectant. ☐
 - c) Hot water and a scrubbing brush. ☐
-

4. ***Why is smoking forbidden in food areas by the Food Hygiene Regulations?***

- a) Because the ash could contaminate the fish. ☐
 - b) Because cigarette ends are a hygiene hazard. ☐
 - c) Because hand to mouth contact contaminates the hand. ☐
-

Questionnaire/cont'd.

HYGIENE AND CLEANING

5. *Which of the following comes in acidic, neutral and alkaline forms?*

a) Detergents.

☐

b) Disinfectants.

☐

c) Solvents.

☐

6. *Which of the following disinfectants is the most suitable to use on plastic preparation surfaces?*

a) Quaternary ammonium compounds.

☐

b) Iodine-based.

☐

c) Chlorine-based.

☐

7. *What special precautions should be taken when handling acidic and caustic detergents?*

a) Always use very dilute solutions.

☐

b) Always rinse surfaces with hot water.

☐

c) Always wear protective clothing.

☐

8. *Stainless steel is a 'good' surface because:*

a) After cleaning it looks shiny.

☐

b) It does not corrode.

☐

c) It is very strong.

☐

Questionnaire Answers

HYGIENE AND CLEANING

1. a).
2. c). a) is advisable since smoking in food-handling establishments is illegal, b) will not prevent contamination occurring to the hands.
3. a). c) is very hard work.
4. c) although a) and b) also apply.
5. a).
6. c). b) would taint the surface and a) would be ineffective.
7. c). This is very important.
8. b). a) and c) also apply but the hygienic properties of stainless steel are vital.

Premises and equipment

Total Time Indicator - 120 mins

Objectives - On completion of this session trainees will be able to:

- Describe the major factors to consider when designing premises in order to minimise the risk of cross-contamination and fish spoilage.
- Outline the principal areas of their premises and the relevant practices which should be adopted in each in order to maintain high standards of hygiene.
- Explain the principal requirements of chilled and frozen fish storage equipment.
- Describe the major features of fish handling/processing equipment and utensils which contribute to the maintenance of hygiene and product quality.

Summary of Topics to Cover	Time Indicator
Introduction	5 mins
Design of premises	25 mins
Details of premises	35 mins
Fish storage facilities	25 mins
Equipment and utensils	20 mins
Consolidation	10 mins
	120 mins

MAINTAINING FISH QUALITY

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KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
I.N.T.R.O.	See: Guide to the Manual	
DEVELOPMENT		
DESIGN OF PREMISES	<p>The layout of the premises should be designed so that each separate operation can be carried out with optimum efficiency, with no risk of cross-contamination and with minimal loss in product quality.</p> <p>Facilities should be able to maintain the quality of fish whilst in storage. All surfaces and equipment should be capable of being easily cleaned in order to allow a high level of hygiene to be maintained.</p>	<p>Adapt this section to suit your own premises.</p> <p>Hand out Information Sheet No. 23 <i>A Typical Layout Of A Fish Retailer's Premises.</i></p> <p>Refer to this diagram as appropriate.</p>
Storage facilities	<p>These should be sited next to the reception area at the rear of the premises. It is important that clear access to storage facilities is always maintained.</p> <p>Outside normal working hours a separate lockable reception area should be provided to receive deliveries. Chilled storage facilities are designed to maintain products at a temperature of between 0°C and 4°C. Frozen storage facilities should maintain the temperature of products at -18°C or below.</p>	<p>The reception area must be equipped with a chilled storage facility. An unchilled security cage is not suitable for fish reception.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Processing and preparation	<p>The main reasons why most fish processing and preparation operations are carried out close to the chilled storage facilities are:</p> <ul style="list-style-type: none"> — Easy access to fish supplies. — Fish remains out of the chiller for the minimum time necessary. — The risk of contamination is reduced. <p>The route taken by fish from storage to processing area to display unit should always remain free of obstructions.</p>	<p>Ask trainees: <i>Why should most fish processing and preparation activities take place close to the chilled storage facilities?</i></p> <p>Try to obtain possible answers.</p>
Display	<p>Although fish should be displayed prominently to attract customers, it must be protected from all risks of contamination and direct sunlight.</p> <p>The display areas must be easily accessible to staff and sited strategically so as to be prominently on view to customers.</p>	<p>South-facing windows should be avoided if at all possible. Where this is unavoidable a canopy should be used to provide shade from direct sunlight.</p>
Staff facilities	<p>A staff room with lockers, cloakroom and, where appropriate, canteen facilities should be located at the rear of the premises, together with separate toilet facilities and washbasins.</p>	

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Hygiene and cleaning	<p>Ideally, items of wooden construction should not be found in any area where food is handled or stored. Unprotected wood provides a highly absorptive surface which is difficult to clean and harbours bacteria.</p> <p>In those areas where frequent cleaning is carried out all surfaces should be composed of impervious and hard-wearing materials.</p> <p>Utensils and equipment used for handling or processing fish must be constructed of food-grade materials.</p> <p>All equipment should be capable of being easily cleaned and positioned so as not to leave crevices or corners that could act as dirt traps.</p> <p>Drainage should be sloped so that waste water is directed away from walkways and should remain unobstructed at all times.</p>	Discussed further in SESSION OUTLINE 4
DETAILS OF PREMISES	<p>Everything within the premises must be capable of being cleaned so that the risk of product contamination and spoilage is minimised. This applies to floors, walls, ceilings and all fixtures and fittings.</p>	
Floors	<p>All floors must be made from material that is hard-wearing and which provides a non-slip surface.</p> <p>The surface must be capable of withstanding frequent and regular washing without danger of rotting or breaking up.</p>	<p>Granolithic concrete, tiles, or terrazzo (<i>which is more expensive</i>) is recommended for processing areas.</p> <p>Retail areas can be covered with PVC or rubber composition floor tiles. Care must</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Floors/cont'd.	Wooden floors are not suitable.	be taken to ensure that all joins are sealed with a waterproof compound.
Walls	<p>All walls must be smooth, impervious and easy to clean. Where walls are sited next to sinks or processing tables, extra protection in the form of splashback tiling or sheeting is required.</p> <p>Heavy duty plastic sheeting is available and can be fixed directly on to the wall. All joins must be sealed to render them waterproof.</p>	<p>Walls need only to be tiled or similarly protected up to a height of 1.5m (<i>about 5 ft</i>) from the ground. Above that height, the wall can be covered with a paint that is flake and damp resistant.</p> <p>In retail areas, a light-coloured emulsion paint over a plaster surface is adequate.</p>
Ceilings	<p>Ceilings should be smooth, clean and in good repair.</p> <p>A high ceiling can be difficult to reach and therefore clean effectively.</p>	<p>On ceilings, a gloss-painted surface causes glare and encourages condensation.</p> <p>Hand out Example Sheet No. 8 <i>Walls, Floors And Ceilings.</i></p>
Lighting	Effective lighting is essential for working premises because it provides a safer working environment and enables more efficient cleaning to be carried out.	<p>Ask trainees: <i>Why is fluorescent lighting ideal for food premises?</i></p> <p>Try to obtain possible conclusions.</p>

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Lighting/cont'd.	<p>Fluorescent lighting is ideal for use in food premises because:</p> <ul style="list-style-type: none"> — It produces less heat. <i>(helps to conserve product quality)</i> — It produces less glare. <i>(more comfortable lighting conditions)</i> — It saves electricity. <i>(offers financial savings/reduces running costs)</i> <p>All light fittings should be designed to prevent broken glass from falling on to the fish.</p> <p>Except where specific 'cool' display lighting is fitted, care should be taken with general lighting sited near fish displays as excessive heating can cause the temperature of the fish to rise with a subsequent loss of quality.</p>	
Drainage	<p>Drains should be provided with drain traps to prevent:</p> <ul style="list-style-type: none"> — The entry of vermin. — The back-up of foul water. — The entry of foul odours. 	<p>Ask trainees: <i>Why should drains be fitted with drain traps?</i></p> <p>Try to obtain possible conclusions.</p>
Ventilation	<p>All areas must be adequately ventilated to prevent the build-up of smells and provide comfortable working conditions.</p> <p>Ventilation should always aim to direct any smells away from customers.</p>	

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KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Ventilation/ cont'd.	All windows or similar openings should be fitted with mesh grilles to prevent the entrance of birds or other pests.	
Waste storage	All waste should be stored outside the premises but remain easily accessible for disposal purposes. Waste must be stored in leakproof, rustproof metal or plastic bins equipped with close-fitting lids.	
Dry storage	Dry goods include cans, packets, packaging material, cleaning material, etc. Cleaning materials should be stored well away from food or packaging material. Dry storage areas should be well-ventilated and protected from vermin.	Hand out Example Sheet No. 9 <i>Easy To Clean.</i>
FISH STORAGE FACILITIES	Chill stores and frozen stores (<i>deep freezes</i>) are used typically to store wet fish and frozen fish respectively. In both cases it is essential that: <ul style="list-style-type: none"> — The store maintains the temperature of the appropriate product at the correct temperature. — There is no risk of product contamination or cross-contamination. — They are capable of being easily cleaned. 	

KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Chill stores	<p>Chill stores must maintain fish as close to 0°C as possible within the temperature range of 0°C to 4°C.</p> <p>They must be of sufficient capacity to contain all the stock.</p> <p>There are three types of chill store practice:</p> <ol style="list-style-type: none"> 1. The use of insulated-only stores. 2. The use of ice assisted by refrigeration. 3. The sole use of refrigeration to maintain fish temperatures between 0°C and 4°C. <p>Irrespective of the type of chill store used all walls, ceilings and doors should have a smooth, impervious finish and be easy to clean.</p> <p>The floors of walk-in chills should be non-slip and doors must be capable of being opened from the inside.</p> <p>All drawers or shelving fitted must be of stainless steel, or plastic-coated metal.</p> <p>External temperature dials should be sited in locations which are easily visible in order to allow the temperature of the chill store to be monitored.</p>	<p>Live shellfish is best maintained at a temperature of from 2°C to 8°C.</p> <p>Not recommended.</p> <p>Ice must be used to chill wet fish products initially and keep them moist.</p> <p>Suitable for smoked and cooked products but not suitable for wet fish unless the fish is first iced.</p> <p>Automatic defrost systems are a useful design feature.</p> <p>Corrosion-resistant metal or durable plastic are recommended.</p> <p>The use of air curtains, plastic doors or strips will reduce the risk of any temperature rises when the door is opened.</p>

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KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Frozen stores	<p>Frozen stores (<i>deep freezes</i>) must maintain the fish at a temperature of -18°C or below.</p> <p>The basic construction is similar to a chill store.</p> <p>An alarm switch should be fitted inside walk-in stores.</p>	<p>Hand out Example Sheet No. 10 <i>Fish Storage.</i></p>
EQUIPMENT AND UTENSILS	<p>Equipment and utensils require careful use and maintenance if the risk of fish spoilage or contamination is to be reduced.</p>	<p>Adapt this section to suit your own premises.</p>
Preparation and processing equipment	<p>All equipment and materials which come into contact with fish must be of food-grade standard e.g. <i>non-toxic and non-corrodable material</i>.</p> <p>All surfaces should be smooth and without cracks or open seams. The surface should be constructed from a non-absorbent material.</p> <p>Separate surfaces must be used for handling or processing poultry products to avoid any cross-contamination of fish. Simply washing the equipment will not prevent contamination.</p> <p>Work surfaces and benches should be made of stainless steel. Cutting boards should be constructed from a laminated or high density plastic.</p>	<p>Wood is not a suitable material because it absorbs water and cannot be cleaned properly. It is also liable to crack and splinter.</p>

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KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
Preparation and processing equipment/ cont'd.	<p>Knives, buckets and brushes should be of stainless steel or hard-wearing food-grade plastic, as appropriate.</p> <p>Ensure that all knives have brightly-coloured plastic handles and always store knives in racks when not in use.</p> <p>Trays and containers should be made from stainless steel or food-grade plastics and have drainholes provided to allow meltwater to run away.</p>	<p>Wooden-handled knives offer a possible source of contamination. Bright colours ensure that knives remain clearly visible.</p>
Sales and display equipment	<p>Display trays and containers should also be made from stainless steel or food-grade plastics and have drainholes to allow the drainage of meltwater.</p> <p>Any garnish, decorative material or tickets used must not cause contamination of the fish products on display.</p> <p>All scoops, tongs or trimming knives used should be made from food-grade plastics or stainless steel. Separate utensils (<i>preferably colour-coded</i>) must be used for serving different fish products, e.g. <i>wet fish, smoked fish, cooked fish and each type of shellfish</i>.</p> <p>All scales used must be kept clean. The weighing pan should be made from stainless steel.</p> <p>A first aid kit must be provided and should contain the appropriate items.</p>	<p>Cleaning equipment and materials are covered in SESSION OUTLINE 4.</p> <p>Hand out Information Sheet No. 24 <i>Statutory Contents Of First Aid Kits</i>.</p>

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KEY WORDS	POINTS TO COVER	ADDITIONAL NOTES
CONSOLIDATION	<p>Ask trainees questions on knowledge aspects of the session.</p> <p>Allow time for further discussion on areas which give particular difficulty to the trainees.</p>	<p>Use of multiple-choice questionnaire.</p>

Information Sheet No's. 23-24

Information Sheet No. 23

A TYPICAL LAYOUT OF A FISH RETAILER'S PREMISES



(Areas are not drawn to scale)

Information Sheet No. 24

STATUTORY CONTENTS OF FIRST AID BOXES

	NUMBER OF EMPLOYEES				
	1-5	6-10	11-50	51-100	101-150
Guidance card	1	1	1	1	1
Individually-wrapped sterile adhesive dressings	10	20	40	40	40
Sterile eye pads with attachment	1	2	4	6	8
Triangular bandages	1	2	4	6	8
Sterile coverings for serious wounds	1	2	4	6	8
Safety pins	6	6	12	12	12
Medium-sized sterile unmedicated dressings	3	6	8	10	12
Large sterile unmedicated dressings	1	2	4	6	10
Extra-large sterile unmedicated dressings	1	2	4	6	10

Example Sheet No's. 8-10

Example Sheet No. 8

WALLS, FLOORS AND CEILINGS

What are the major points to consider regarding walls, floors and ceilings in relation to the possible contamination of fish?

Walls:

Floors:

Ceilings:

Example Sheet No. 8

Answers

WALLS, FLOORS AND CEILINGS

These answers correspond with the need to reduce the risk of contamination. The surfaces of all materials must be capable of being easily cleaned and must not trap or absorb dirt.

Walls:

1. Smooth, impervious, easy to clean.
2. Splashback tiling or sheeting is required where the wall is next to sinks or processing tables.

Floors:

1. Hard-wearing and non-slip surfaces.
2. Capable of being washed regularly without breaking up.

Ceilings:

1. Smooth, clean and in good repair.
2. High ceilings can be difficult to reach and clean properly.

There may be other points. Use these answers to start a general discussion on the cleaning requirements for walls, floors and ceilings.

Example Sheet No. 9

EASY TO CLEAN

In order to reduce the risk of fish spoilage, all fixtures and fittings on your premises must be capable of being easily cleaned.

List six different items to which this statement might apply:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

Example Sheet No. 9

Answers

EASY TO CLEAN

All of the following items must be capable of being easily cleaned.

1. Floors.
2. Walls.
3. Ceilings.
4. Work surfaces.
5. Equipment.
6. Lighting.

There may be others. Try to stress that by keeping these items clean, the risk of contamination is greatly reduced.

Example Sheet No. 10

FISH STORAGE

You wish to buy a new walk-in chill store from an equipment supplier, list twelve questions which you might ask before making a purchase decision.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.

Example Sheet No. 10

Answers

FISH STORAGE

Some typical questions which you might ask the supplier are:

1. What is the designed operating temperature range of the store?
2. How easy is it to clean?
3. Of what material is the store constructed?
4. What is the storage capacity?
5. How do you defrost the store?
6. What are the floors made of and are they of non-slip material?
7. Can the doors be opened from the inside?
8. Of what material are the drawers or shelving constructed?
9. Where are the temperature dials located?
10. What alarms or warning systems are provided?
11. Is a maintenance contract available?
12. How much does it cost to lease or buy?

Questionnaire

Questionnaire

PREMISES AND EQUIPMENT

Please tick the box you feel best answers each question.

1. *The layout of the premises is important because:*

- a) It should look attractive to the customer. ☐
 - b) It should allow free access to all areas. ☐
 - c) It should reduce the risk of fish spoilage. ☐
-

2. *Good fish storage facilities should:*

- a) Maintain the fish at the correct temperature. ☐
 - b) Be of a walk-in design. ☐
 - c) Present a clean appearance. ☐
-

3. *Unprotected wood should never be found anywhere where food is being handled or stored because:*

- a) It is not considered to be a hard-wearing surface. ☐
 - b) It is not environmentally friendly to chop down trees. ☐
 - c) It is illegal. ☐
-

4. *Why should floors possess a non-slip surface?*

- a) For safety purposes. ☐
 - b) For hygiene purposes. ☐
 - c) For ease of painting. ☐
-

Questionnaire/_{cont'd.}

PREMISES AND EQUIPMENT

5. *Why should gloss paint not be used on ceilings?*

- a) It encourages condensation; ☐
 - b) It shows up the dirt too easily. ☐
 - c) It is difficult to clean. ☐
-

6. *Effective lighting is essential because:*

- a) You cannot read the newspaper in poor light conditions. ☐
 - b) You can see unclean areas more easily. ☐
 - c) It attracts customers. ☐
-

7. *The recommended type of chill store is one that maintains the temperature of fish between:*

- a) -10°C to 0°C ☐
 - b) -4°C to 4°C ☐
 - c) 0°C to 4°C ☐
-

8. *All equipment and utensils which come into contact with fish must be constructed from materials which conform to:*

- a) Food-grade standard. ☐
 - b) Grade A standard. ☐
 - c) Grade 1 standard. ☐
-

Questionnaire Answers

PREMISES AND EQUIPMENT

1. c) is the best answer, but a) and b) are also important features.
2. a). b) need not apply and c) goes without saying.
3. c). It is illegal. a) is only part of the reason.
4. a) but b) is also a factor to consider.
5. a). b) and c) are not relevant.
6. b). Effective lighting does attract customers, but good hygiene is more important.
7. c). a) and b) will both cause partial freezing of fish.
8. a). b) describes an honours student and c) describes a type of egg.

Open Learning

The Sea Fish Industry Authority has produced a series of Open Learning modules which cover various subjects associated with the sea fish industry.

Open Learning consists of a programme of study which enables individuals to work at a pace, place and time to suit themselves, without the need for formal course attendance. Each module typically contains a combined learning text and work book which also includes self-assessment questions and model answers. Some modules also include additional visual aids.

The titles of those modules which are most relevant to the needs of the onshore fish industry are:

Fish and shellfish identification.

Hygiene and cleaning in the fish industry.

Maintenance of fish quality.

The chilled fish chain.

The frozen fish chain.

Fish smoking.

Primary processing of white fish.

Handling, transport and storage of live crabs and lobsters.

Introduction to fishmonger practice.

Introduction to fish frier practice.

Details of these modules and further information on the Open Learning Scheme are available in a booklet from the *Seafish* Training Division.

Training manuals

These have been written primarily for use by instructors, or others concerned with training programme design or the delivery of direct training.

Training manual for fish friers, Training programme for fish filleters and Fishmonger Practice - Display and merchandising are currently available. A further title (*in preparation*) is ***Fishmonger Practice - Customer care and salesmanship***. Further details of these manuals are described in separate leaflets available from *Seafish* Training Division.

Training videos

These are designed to support training programmes. Five titles which are relevant are:

An introduction to fish processing skills - 31 mins - VHS or BETA

This video shows the essential tools and the basic techniques required for hand-processing round and flatfish. Using cod, haddock, herring, mackerel, plaice, turbot and lemon sole as selected examples, the demonstrator covers each technique in turn in a clear and logical manner.

The video covers:

- *Single filleting.*
- *'V' boning.*
- *Block filleting.*
- *Cross filleting.*
- *Quarter filleting.*
- *Skinning fillets.*
- *Skinning 'on-the-bone'.*
- *Cleaning whole fish.*
- *Steaking.*

It is recommended that this video is used as a visual aid to support the training manual ***Training programme for fish filleters.***

An introduction to shellfish processing skills - 28 mins - VHS or BETA

This video follows the style of the previous title and shows the tools and basic techniques required for dressing various crustacean and molluscan shellfish.

The video covers the preparation of:

- *Crab.*
- *Lobster.*
- *Prawn.*
- *Squid.*
- *Scallop.*
- *Oyster.*

A day in the life of a fishmonger - 18 mins - VHS or BETA

This documentary-style video shows the sequence of typical daily activities carried out by a fish retailer. The video features the practices of a specific independent fishmonger's shop in London but the tasks which are shown, and the keypoints which emerge, are applicable to any type of fish retail outlet.

The video is supported by a video guide which provides further useful information on the keypoints associated with fish retailing and, by reference to the video, identifies and explains many of the factors which are important for business success.

The accompanying video guide contains the following sections:

- *How to use the video.*
- *About the video.*
- *Buying fish.*
- *Display.*
- *Customer relations.*
- *Preparation and processing.*
- *Product handling.*
- *Hygiene and cleaning.*
- *Business aspects.*

'Up front' - Selling skills for fish retailers - 20 mins - VHS only

This is a drama-style video which is aimed at retail assistants who have little or no personal experience of dealing with customers at the sales counter.

The keypoints associated with customer expectations of service and also the sequence of stages of the counter sale, are illustrated by actors cast in the various roles. The chief characters are Tom who portrays an experienced fishmonger and Peter, his young nephew, who has recently started work as a fish retail assistant.

NOTE: This video will also form a visual aid support for the training manual ***Fishmonger Practice - Customer care and salesmanship.***

A day in the life of a fish frier - 10 mins - VHS or BETA.

Like its fishmonger companion title, this video is designed to show the range of tasks and activities associated with the daily operation of a typical fish frying establishment. It is also intended to highlight those practices which particularly contribute to the successful operation of a fish frying business.

The accompanying video guide booklet contains the following sections:

- *How to use the video.*
- *About the video.*
- *Typical sequence of daily tasks for a fish frier.*
- *Buying fish.*
- *Batter.*
- *Potatoes.*
- *Frying media.*
- *Customer relations.*
- *Product handling.*
- *Hygiene and cleaning.*
- *Business aspects.*
- *Additional information.*

'Strike Back' - Hygiene and cleaning for the fish industry - 16 mins - VHS only.

The video explains the importance of maintaining high standards of hygiene in the workplace and covers personal hygiene and recommended practices to adopt in various parts of the workplace. The second part of the video covers cleaning materials, housekeeping and cleaning procedures which need to be followed in order to create a hygienic environment.

Frying Tonight - 40 mins - VHS only.

The video is intended to cover important preparation activities such as chip and batter production and the techniques used for frying fish and potatoes. This video will provide visual aid support for the training manual ***Training manual for fish friers.***

Other Seafish publications

Guidelines for the handling of chilled fish by retailers - 1987.

The Guidelines cover the technical aspects of fish purchase, handling and selling, and of premises, vehicles and equipment, and apply to the trades of the traditional fishmonger, the supermarket, the mobile van operator and the market stall operator. Necessary background information is given and detailed recommendations are made.

The Guidelines cover chilled fish which has not been pre-packed for retail sale, including wet fish, smoked fish, cooked fish and shellfish.

Guidelines for the handling of fish packed in a controlled atmosphere - 1985.

These Guidelines are written for processors, distributors and retailers to cover the technical aspects of handling chilled fish packed in a controlled atmosphere. The significance of the major handling and processing variables is described, and recommended procedures based on current knowledge are given.

Guidelines for the handling of chilled finfish by primary processors - 1989.

These Guidelines are written for primary processors who purchase, cut and pack wet finfish for the wholesale trade. The Guidelines cover the technical aspects of fish handling and of premises and equipment. Detailed recommendations are made and necessary background information is given.

Further information

Further information on the above subjects and advice on any other aspects of training can be obtained from:

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