Sensory assessment of fish is used along all stages of the food chain, from catch to plate. It is used for informal examination, for assessing degrees of freshness and deterioration, for determining the extent of defects, for formal grading schemes, for product development, and for the determination of shelf life.

How is Freshness Measured in Fish and Shellfish?
Most species of fish and shellfish are caught or gathered from the wild. Where they are caught and how they are treated after they are caught affects their quality.

Fisheries Research Services (FRS) sensory assessor measure the freshness of fish using four of the human senses (sight, smell, touch and taste) and allocate ‘freshness scores’ to batches of fish. Different score sheets are used to record information about the different types of fish, (white fish, flat fish and shellfish). This scoring system is based upon pioneering work conducted at Torry Research Station* in Aberdeen in the 1950s.

‘Quality’ means more than how good the fish is to eat, though eating quality is perhaps the most important component of overall quality, and is greatly influenced by the manner in which fish is stored, i.e. whether in ice or frozen storage. Quality assessment also encompasses such aspects as value, suitability for processing, size, and damage or blemish.

<table>
<thead>
<tr>
<th>Sense Used</th>
<th>Aspect of Quality Determined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sight</td>
<td>General appearance and condition, size, shape, physical blemishes, colour, gloss, identity.</td>
</tr>
<tr>
<td>Smell</td>
<td>Freshness, off-odours, taint, oiliness, rancidity, smokiness.</td>
</tr>
<tr>
<td>Taste</td>
<td>Freshness, off-flavours, taints, oiliness, rancidity, smokiness, astringency, the primary tastes of acidity, bitterness, saltiness, sweetness.</td>
</tr>
<tr>
<td>Touch (using fingers and mouth)</td>
<td>General texture, hardness, softness, elasticity, brittleness, roughness, smoothness, grittiness, wetness, dryness, crispness, presence of bones.</td>
</tr>
</tbody>
</table>

*Torry Research Station closed in 1996
Objective and Subjective Sensory Assessment

Objective assessment
In objective sensory assessment, personal preferences are minimised by avoiding, as far as possible, bias and feelings of like and dislike. Objective sensory assessment is essential where standards of quality need to be established, controlled or assured. To assess the degree of freshness or deterioration, objective sensory assessment based on standard descriptions is used. To construct a scale of freshness or deterioration, fish are stored under fixed conditions, i.e. well packed in melting ice. Changes in appearance, smell, taste, and texture that occur in fish after given intervals of time are described as objectively as possible by a small group of sensory assessors. The descriptions given at each stage during the loss of freshness are compared, and a selected set of descriptions at each stage agreed. Each stage is then denoted by a number or score, usually starting at ten for the freshest and decreasing with loss of freshness.

Sets of descriptions are available for a wide range of species, iced and frozen. None of the descriptions includes subjective expressions of liking or disliking, acceptance or rejection.

Subjective assessment
In subjective assessment, a person’s natural feelings, such as liking, pleasure, acceptance and value are freely expressed. Since subjective assessments usually involve expressions of pleasure, or degrees of it, they are often called hedonic.

Subjective or hedonic assessment is used in product development and market research, and is largely confined to finding out what every day consumers think about fish products.

Some aspects of quality measurable by sensory methods can sometimes be estimated by non-sensory methods. Instruments, or chemical or bacteriological analysis can be used in certain circumstances to estimate freshness, for example, in the quality control area of a fish processing factory. However, results based on these non-sensory methods are not exact substitute measures of quality as understood by consumers.

Training Activities
At FRS sensory assessment is an important part of the training in the taint assessment of fish. Panellists must be able to distinguish between the naturally occurring flavours in various species of fish at all stages of deterioration and those flavours produced by taint substances. As well as training its own staff, FRS offers training in the objective sensory assessment of fish to people in the fishing industry. Examples include fishery officers who are trained on the EU grading system operated on the fish markets.