

Everyone in their ordinary daily life is confronted with the products from a highly developed technologically advanced industry, in the food that they eat.

There are many aspects of Food Technology in the National Curriculum related to food retailing. The introduction and acceptance of a new product, from the first stage of conception to the point of consumption, is a good illustration whereby classroom investigations and evaluations can reflect industrial practice.

New products are developed to reflect the needs of today's society. The new products monitoring service at Campden Food and Drink Research Association (CFDRA) recorded 4,815 new food and non-alcoholic drink products for 1994 — a staggering 92 for every week of the year! Sixty percent of those new products recorded were retailer label (see Figure 1).

Product Development is the systematic process for developing and marketing a new food product from the development of an original product idea to the launching of the product on the market (see Figure 2).

The following statements taken from the National Curriculum Orders for Design and Technology relate to food technology and retailing, from new product development to quality control, to marketing and advertising, and can be delivered through food technology coursework:

Figure 1

New Food and Non-alcoholic Drink Products

| Year | No. |
|------|-------|
| 1990 | 2,990 |
| 1991 | 3,233 |
| 1992 | 3,823 |
| 1993 | 4,525 |
| 1994 | 4,815 |

New Food and Non-alcoholic Drink Products

| | 1993 | | 1994 | |
|---------|------|------|------|------|
| Frozen | 662 | 15% | 533 | 11% |
| Chilled | 2055 | 45% | 2405 | 50% |
| Ambient | 1808 | 40% | 1877 | 39% |
| | 4525 | 100% | 4815 | 100% |

Food Technology in the National Curriculum — an Industrial Perspective

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Food Technology has adopted some of the techniques of manufacturers and retailers; Brenda Jamieson outlines the methods used by one of Britain's biggest

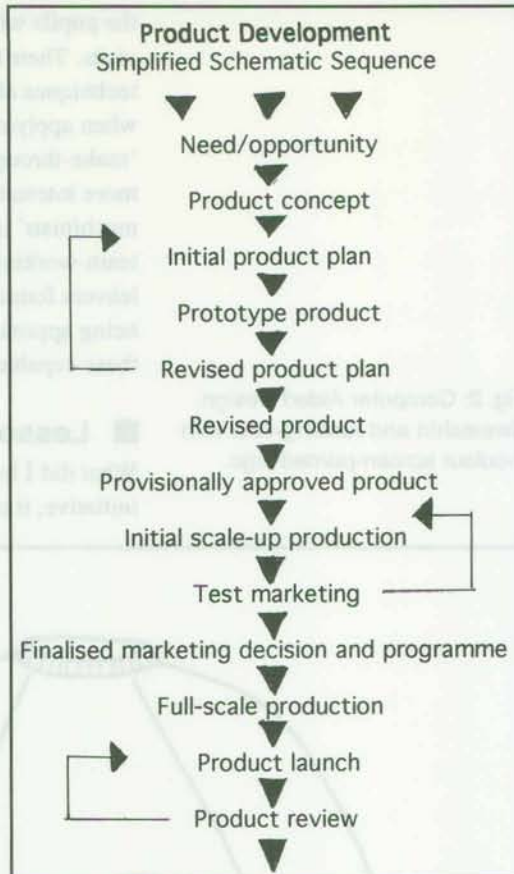


Figure 2

- factors which affect food choices
- organoleptic qualities of food
- comparing and assessing products
- sensory testing (including interpretation of statistical data)
- legal standards
- evaluation of consumer acceptability.

Factors Which Affect Food Choice

Understanding the reason for food choice is a complex field, influenced by many factors (see Figure 3). A knowledge of the factors and how they relate is essential to manufacturers and retailers. A producer must be aware of his potential customers and attitudes to his products as well as the various economic or social factors which influence them when purchasing. Without such information it is impossible to optimise product ranges, successfully create new products or direct advertising to where it will be effective.

Changes in home and society have a major influence on new product developments. Manufacturers have to develop products to appeal to clearly defined market sectors and

Some Factors Affecting Choice

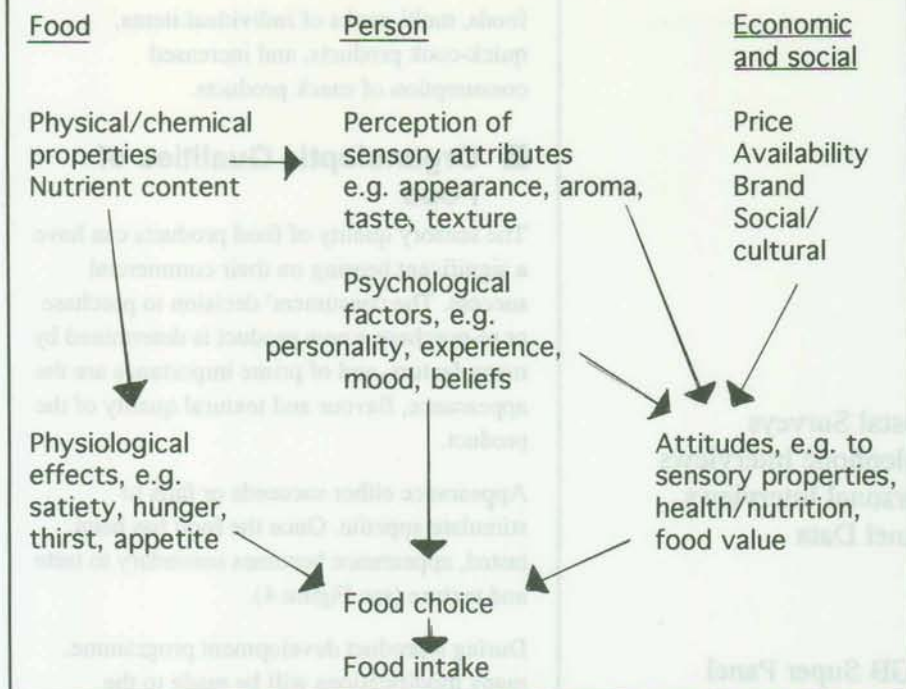
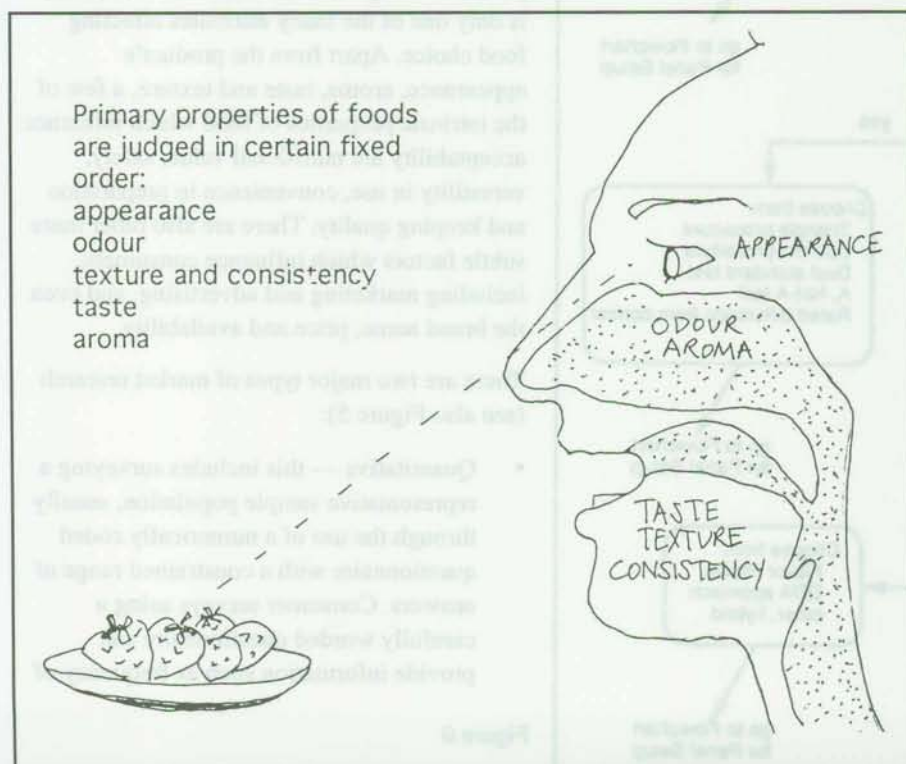


Figure 3

must increasingly think of the circumstances and life styles they are catering for. These are some of the factors to be considered:

- Changing market demographics — falling family size, and changes with household styles of living. Nearly one quarter of all households in Great Britain are one-person households (the increase in the divorce rate has led to more single households and single-parent households). Age ranges

Figure 4



with the most change projection are fewer teenagers and under-20s (therefore fewer purchases of hamburgers, cakes, ice creams etc.) and an increase in the 45+ group in the prime of life and peak earning capacity, with higher disposable incomes who are heavy spenders in high-value products.

- Increased number of women in the workforce — more wives and mothers working means less time for preparation of meals and a greater demand for convenience and quick-cook foods stimulated by raising levels of consumer durables such as microwaves.
- Increased consumer spending — the essence of shopping has moved away from bargain hunting, and in its place has come the search for quality. Customers are prepared to pay for convenience and higher quality (e.g. extra trimmed meat, prepared salads).
- Increased travel — increased interest in foreign foods and a greater choice of wine, coffee, cheeses, exotic fruit and vegetables from around the world. This is also reflected in a wide range of ethnic cookery book titles.
- Heightened consumer awareness — increased education has resulted in reduced consumption of high-fat products and an increased consumption of fresh fruit and vegetables. This has resulted in the development of modified foods (such as reduced sugar, salt and fat, or increased fibre alternatives to standard lines) and with 33% of all adults actively trying to lose weight, 'diet' products (weight-watchers' ready meals, for example). There has also been a decrease in the consumption of white loaves and a compensating increase in the purchase of other types of bread, especially wholemeal and soft grain.

Environmental — there is increased concern about the environmental effects of products, with an increasing number of people who choose to eat vegetarian foods, and wider availability of organic products.

Changing lifestyles and food patterns go hand in hand with technological developments. Overall, the effect on food retailing has been the introduction of smaller unit pack sizes, increased sales in ready meals/convenience

MARKET RESEARCH

QUANTITATIVE RESEARCH

QUALITATIVE RESEARCH

PRIMARY RESEARCH

- Postal Surveys
- Telephone Interviews
- Personal Interviews
- Panel Data

SECONDARY RESEARCH

- AGB Super Panel
- Nielson Homescan
- Family Expenditure Survey

Figure 5

foods, multi-packs of individual items, quick-cook products, and increased consumption of snack products.

■ Organoleptic Qualities of Food

The sensory quality of food products can have a significant bearing on their commercial success. The consumers' decision to purchase or re-purchase a new product is determined by many factors, and of prime importance are the appearance, flavour and textural quality of the product.

Appearance either succeeds or fails to stimulate appetite. Once the food has been tasted, appearance becomes secondary to taste and texture (see Figure 4).

During a product development programme, many modifications will be made to the product, such as use of alternative ingredients and the selection of different processing products. Each of these modifications may affect the sensory qualities of the product. Evaluation of the organoleptic qualities of a product during development stages results in greater chances of success in the market place.

■ Comparing and Assessing Products

Following assessment of need, it is essential to produce the right commodity. Sensory quality is only one of the many attributes affecting food choice. Apart from the product's appearance, aroma, taste and texture, a few of the intrinsic properties of food which influence acceptability are nutritional value, safety, versatility in use, convenience in preparation and keeping quality. There are also other more subtle factors which influence consumers, including marketing and advertising, and even the brand name, price and availability.

There are two major types of market research (see also Figure 5):

- Quantitative — this includes surveying a representative sample population, usually through the use of a numerically coded questionnaire with a constrained range of answers. Consumer surveys using a carefully worded questionnaire can provide information such as frequency of

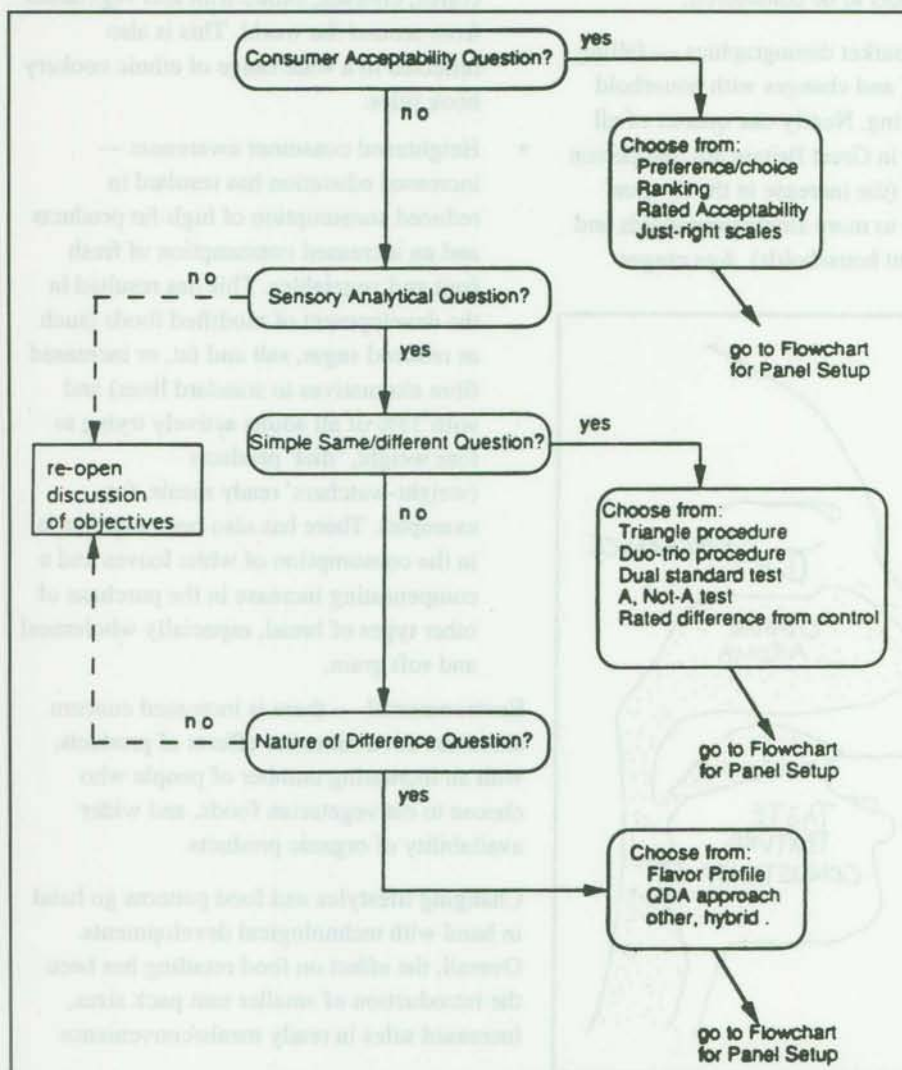


Figure 6

purchase and likely repeat purchase and investigate market variables such as name, packaging and price.

- **Qualitative** — this includes more in-depth and 'open' questioning, particularly useful for exploring feelings and attitudes. In-depth 'focus' discussion groups provide information on how 'real' consumers think about a product in their home and among their friends. They look at the product from a totally impersonal view, their evaluations are dispassionate and their comments honest.

■ Sensory Testing

Modern sensory evaluation techniques require careful experimental design to ensure efficient use of the powerful statistical methods for analysis now available in computer packages (see Figure 6). The ready availability of computer hardware and software for data collection, storage and analysis has led to an interlinked computing system:

- **Difference testing** — this determines whether a product modification such as a substitute of an ingredient produces a

perceptible change in the product (to what degree, for example, can fat levels be reduced before the change is detected?)

- **Product profiling** — for this, panels are extensively trained to score sensory attributes of products. The result is a visual representation of the data in the form of a star diagram or spider's web. Each arm of the star represents a sensory attribute. The mean score for each attribute is plotted with the centre of the star representing the absence of the attribute (see Figure 7).

■ Legal Standards

All packaged food sold in the UK should carry labelling which conforms to the Food Labelling Regulations of 1984. The major aim of labelling is that it should be informative (see Figure 8) and it must contain:

- the food name
- a list of ingredients (in descending order of weight)
- the net quantity
- a date mark ('Use by', on highly perishable foods located in chill cabinets, and 'Best before' on all other products)
- storage conditions
- the business name and address of the manufacturer or seller
- the country of origin
- instructions for use.

Legal standards also encompass advertising.

■ Advertising

The Advertising Standards Authority controls the content of print and cinema advertisements and stipulates that advertisements must be legal, decent, honest and truthful. Advertising may be classified as:

- **informative** — to generate awareness of a new product in the market place
- **competitive** — to protect against competition
- **persuasive** — 'lifestyle' advertising
- **corporate** — to give an image of quality and innovation, and aimed at long-term customer loyalty
- **generic**.

Figure 7

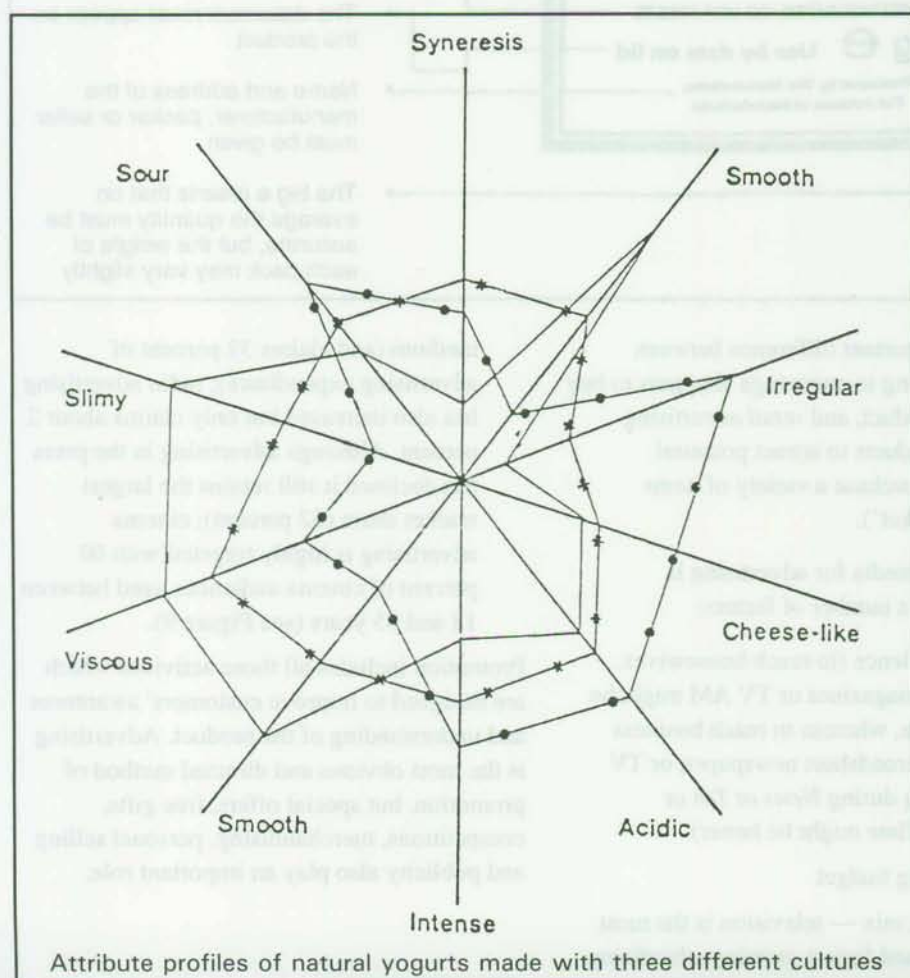


Figure 8

Low Fat RASPBERRY YOGURT
Produced in Scotland

ADDED INGREDIENTS
Sugar, Raspberry, Stabilisers (Pectin, Carob Gum), Flavouring, Citric Acid.

NUTRITIONAL INFORMATION

| TYPICAL VALUES | PER 100g |
|----------------------|-----------------|
| Energy | 379kJ (89 kcal) |
| Protein | 4.8g |
| Carbohydrate | 15.6g |
| (of which sugars) | 15.6g |
| Fat | 1.3g |
| (of which saturates) | 0.8g |
| Sodium | less than 0.1g |
| Fibre | 0.6g |
| Calcium | 160mg |

KEEP REFRIGERATED. DO NOT FREEZE
150g e Use by date on lid

Produced by The Manufacturer,
Full Address of Manufacturer.

Callouts:

- The name can't make false statements: raspberry yogurt must get its flavour mainly or completely from raspberries. Otherwise, it could only be called 'Raspberry flavour yogurt'.
- Food labels often indicate country of origin. UK and other EC countries have very good safety rules.
- Ingredients are in order of weight, so this yogurt contains more sugar than fruit. Most 'low sugar' yogurts list fruit first, because sugar will have been replaced by a much smaller weight of artificial sweetener.
- All additives are listed, including artificial sweetener.
- Nutrition information is optional but will soon need to be given if a claim such as 'low fat' is made. Then the label will need to show the amount per 100ml or 100g of product. Many products show this already.
- Storage and use instructions must be given, if needed.
- The date mark must appear on the product.
- Name and address of the manufacturer, packer or seller must be given.
- The big **e** means that on average the quantity must be accurate, but the weight of each pack may vary slightly.

There is an important difference between *brand* advertising to encourage shoppers to buy a particular product, and *retail* advertising which uses products to attract potential customers to purchase a variety of items ('shopping basket').

The choice of media for advertising is determined by a number of factors:

- Target audience (to reach housewives, women's magazines or TV AM might be appropriate, whereas to reach business people, a broadsheet newspaper, or TV advertising during *News at Ten* or *Question Time* might be better)
- Advertising budget
- Marketing mix — television is the most powerful and fastest growing advertising

medium (and claims 32 percent of advertising expenditure); radio advertising has also increased but only claims about 2 percent. Although advertising in the press has declined it still retains the largest market share (62 percent); cinema advertising is highly targeted with 60 percent of cinema audiences aged between 18 and 35 years (see Figure 9).

Promotion includes all those activities which are designed to improve customers' awareness and understanding of the product. Advertising is the most obvious and directed method of promotion, but special offers, free gifts, competitions, merchandising, personal selling and publicity also play an important role.

Figure 9

| <u>ADVERTISING</u> | | |
|-------------------------------------|---------------------------|-----|
| * | Television | 32% |
| * | Radio | 2% |
| * | Press | 62% |
| * | Cinema | 2% |
| * | Posters | 2% |
| <u>"BELOW THE LINE" ADVERTISING</u> | | |
| * | Direct Mail | |
| * | Competitions | |
| * | Sponsorship | |
| * | In-store tastings | |
| * | Point-of-Sale Advertising | |
| * | Door-to-Door drops | |

Figure 10

Name.....

Date

Product

Please taste this sample and indicate how much you like or dislike the product

..... Like extremely

..... Like very much

..... Like moderately

..... Like slightly

..... Neither like nor dislike

..... Dislike slightly

..... Dislike moderately

..... Dislike very much

..... Dislike extremely

Please comment why you do or do not like the product

.....

.....

.....

Please press the indicator light switch

Thank you for your help

■ Evaluation of Consumer Acceptability

For a producer or retailer it is essential to harness all the efforts of new product development into goods and services which satisfy the needs and desires of the consumer. Consumer tests are essential to assess the potential acceptability of a product. The actual consumer test chosen will depend on the type of product. It is important to select the appropriate consumer test in order to answer the objective:

- Consumer preference measures the appeal of one product when compared against the other. If we wish to know only which product is preferred, paired comparison or a ranking test may be chosen. These involve the consumer selecting the preferred product, or awarding the products in ascending order of preference.
- Consumer acceptance measures the degree of liking of individual products. To evaluate acceptability, hedonic scales are often used. The hedonic test directly measures the degree of liking or acceptability of products. A typical 9-point hedonic scale would consist of descriptive words such as 'Like extremely' (9) to 'Dislike extremely' (1) (see Figure 10). For children, picture scales are often more appropriate.

■ Summary

Consumer needs are constantly changing and the pace has accelerated in recent years. Food manufacturers must constantly review their product ranges to keep pace with sophisticated taste requirements.

The demands made for more variety and higher quality will be met by an array of powerful technologies, related to rising educational standards, to meet the demands of shopping and eating in the twenty-first century.