Consumer Product Testing
Suggested Year: 9 or 10

This unit encourages pupils to apply scientific methods when consumer testing common products. They consider the factors that influence what soft drinks they buy and use scientific methods of investigation and experimentation to measure and compare these. They explore the role of the media and marketing in consumer behaviour and, finally, they consider the impact, if any, of drinking soft drinks on their health.

Teachers could consider linking with the College of Agriculture, Food and Rural Enterprise Loughry Campus, which carries out consumer testing of food products. A school visit from Loughry staff or a trip to the campus could supplement this topic, if appropriate. This unit allows pupils to connect science lessons with everyday life.

Statutory topic covered in this unit

» Organisms and Health
» Chemical and Material Behaviour

Unit links to the Big Picture

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Learning Experiences
» Investigating and problem solving
» Relevant and enjoyable
» Linked to other curriculum areas
» Enquiry based

Assessment for Learning
» Clear learning intentions shared with pupils
» Celebrate success against agreed success criteria

Attitudes and Dispositions
» Personal responsibility
» Openness to new ideas

Classroom Activities

Activity 1: What is Our Favourite Soft Drink and Why?

Activity 2: Comparing Characteristics of Soft Drinks

Activity 3: Can Soft Drinks be Part of a Healthy Diet?

Activity 4: Link with Marketing
Activity 1:
What is Our Favourite Soft Drink and Why?

Learning Intentions
Pupils are learning to:
» record data and present it in an appropriate graph;
» develop a questionnaire to gather reliable data; and
» identify the favourite soft drinks in the class.

Suggested Activities
Choose one pupil to be the scribe at the board. Ask each pupil in turn to name their favourite soft drink. The scribe records the names of each different soft drink in a suitable table, using tally marks if any are repeated. They then total the number of pupils who prefer each drink. Draw a bar graph to show the number of pupils who like each drink.

Ask the pupils to consider their reasons for choosing their drink. Carry out a brainstorming session and write all responses on the board. The class groups similar responses and develops four or five similar reasons for their choice. These could include:
» taste;
» colour;
» price;
» sugar content;
» volume;
» advertising; and
» packaging.

The pupils now devise a simple questionnaire (online or on paper) for 3–5 members of their family or friends. This questionnaire aims to find out their favourite drink and why they chose it. This could be free response but it is easier to collate the information if options are presented and 1–2 are ticked if chosen.

The pupils then use all their responses to produce a second graph showing the most popular reasons for choosing a soft drink.
Activity 2:
Comparing Characteristics of Soft Drinks

Learning Intentions
Pupils are learning to:
» work safely in groups to investigate different aspects of soft drinks;
» design reliable and valid ways of gathering data from others; and
» develop conclusions from the evidence gathered.

Suggested Activities
After establishing that people have different reasons for choosing a soft drink, pupils now investigate the properties of these drinks. They also find out if there are differences or similarities in certain characteristics across the drinks.

Pupils could investigate characteristics such as:
» fizziness;
» acidity;
» sugar content; and
» taste.

Fizziness
Pupils could measure the fizziness of a drink or the amount of CO2 it contains in the following ways.
» Qualitative:
  – Pupils can shake a bottle of each soft drink and open them.
  – They can visually compare which one fizzes up the most.
  – But even with the same size bottles and the same number of shakes, this is not a very accurate method.
» Quantitative:
  – Use a gas syringe to collect and measure the amount of gas or measure the amount of water displaced by the gas released.
For the gas syringe method, pupils should:

- fix a gas syringe in place using a retort stand;
- connect rubber tubing to the gas syringe and feed the other end of the tubing through a stopper that fits a volumetric flask;
- add the soft drink to the flask and put the stopper in place; and
- record the gas released.

For the displacement method, pupils should:

- use the same volumetric flask, stopper and tubing;
- place the other end of the tubing into a basin of water;
- fill a measuring cylinder with water and turn it upside down into a basin of water, on top of the tubing (a beehive stand will make this easier); and
- pour the soft drink into the flask and fit the stopper in place (the gas will force the water out of the measuring cylinder and the level will move down).

By subtracting the final level of water from the initial level, pupils can calculate the decrease and, therefore, the amount of gas that entered the cylinder.

The following websites include information and resources that you might find useful for this lesson.

- [How to Measure Carbonation in Soft Drinks for a Science Project](www.sciencing.com)
- [The Fizz Factor – Which Soda has the Most Pop?](engineering.oregonstate.edu)

Ask the pupils:

- Which method provides the most accurate results?
- How can the reliability of the results be improved?
Acidity
This can be tested using universal indicator or solution. However, some strongly coloured drinks might make it difficult to clearly identify a colour change. Therefore, a pH meter might be more suitable.

Sugar Content
Demonstrate that bottles and cans of diet drinks will float, while regular versions will sink due to their sugar content. Ask the pupils to estimate the concentration of sugar in drinks from measurements of their densities.

The following resources outline possible methods using a hydrometer.
» Science Project: Measuring Sugar in Soda available at www.education.com
» Determining the Sugar Content of Soft Drinks available at nchsdduncanchem2.wikispaces.com

Taste
(Pupils must complete taste tests outside the laboratory environment – possibly in collaboration with the Home Economics department or in the canteen. Use non-laboratory equipment, for example disposable plastic cups.)

Pupils could choose to judge taste by any of the following criteria:
» colour;
» smell;
» thickness;
» texture of drink in the mouth;
» flavour;
» watery or bland;
» strength;
» fruitiness; and
» synthetic or natural aftertaste.
Pupils could score the taste using sensory analysis methods to rate the intensity of the selected criteria, for example:

» a descriptive rating test using a 1–5 scale with (for example colour):
  1 = very weak;
  2 = weak;
  3 = neither weak nor strong;
  4 = strong; and
  5 = very strong; or

» a 0–5 scale with (for example sweetness):
  0 = not at all;
  1 = weak;
  2 = fairly;
  3 = moderate;
  4 = quite; and
  5 = very.

Pupils then plot the average scores using a bar chart.

**Extension Activity for Taste**

Can the pupils correctly distinguish between or identify a well-known and a less well-known brand of cola? Pupils could do this as a blind taste test in the canteen. Use two different brands of cola and two different coloured plastic cups. Ask the pupils to taste both and identify the well-known brand.

**Conclusions about Soft Drinks**

Based on the results of their investigations, pupils need to draw their conclusions about which soft drink is the most popular. To help, they could answer these questions:

» Which product was the best value?

» Which product had the best taste?
Ask the pupils to think about:

» Is there any relationship between the ability to taste differences and how strongly a person feels that one brand is better than another?
» Which product had the strongest brand?

The pupils then write up activities 1 and 2 as a report. In groups, they could review some consumer reports to identify the features of a good report. These will be the success criteria for this report.
Activity 3: Link with Marketing

Learning Intentions
Pupils are learning to:
» examine options and weigh up alternatives; and
» evaluate the impact of marketing strategies on consumer choice.

Suggested Activities
Ask the pupils to:
» discuss strategies manufacturers use to get their products noticed among competing products;
» discuss what the manufacturer might want to communicate through its packaging strategy, for example:
  – value; and
  – performance;
» think about the packaging that you might want to use when introducing a new brand within that category, for example:
  – your objectives for your packaging; and
  – any conflicts between these objectives; and
» consider the possible implications of the above issues for the retailer.

Design a New Soft Drink and Packaging
Pupils use the information from the completed activities to design a new soft drink and its bottle or can and label.

Ask them to consider the following criteria:
» target customer;
» bottled or canned;
» colour and flavour;
» diet or regular;
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» caffeine or no caffeine;
» poster advertisements;
» television advertisements; and
» price.

Pupils then write a report about developing the new product and the reasons behind the final design.

Key Stage 4 Link (Business)
Activity 4: Can Soft Drinks be Part of a Healthy Diet?

Learning Intentions

Pupils are learning to:
» assess the impact of diet on their health; and
» ask focused questions.

Suggested Activities

Give the pupils copies of the soft drinks labels. Ask them to make a list of questions about the suspected adverse long-term health effects of the ingredients in the soft drinks, for example:

» Should I be concerned about the amount of sugar or calories in soft drinks?
» Does sugar make children hyperactive?
» Are soft drinks bad for my teeth?
» Do soft drinks have a lot of caffeine?
» Is caffeine safe?
» Is caffeine addictive?
» What is aspartame?
» Is aspartame safe?
» What is phenylketonuria (PKU)?
» What is phenylalanine?
» Is there a connection between soft drinks and bone health?

In groups, the pupils decide on one question to research and try to answer. They then present their findings to the class, either as a poster or orally.