

# Design and Technology

## Curriculum grid

Activity	Key Stage 3 curriculum reference
Investigation into the sweetening of soft drinks	DT 3b, 4b
It's in the water (different waters in soft drinks)	DT 4c
Home-made lemonade	DT 1a, b, f, g, 3a, b
Making smoothies	DT 1a, b, c, e, f, 3a, b, c, 4c
How smooth is your smoothie?	DT 1g
Packaging suitability	DT 1e, 3c, 4c
Hazard analysis critical control points	DT 1e

## Activity 1 – Investigation into the sweetening of soft drinks

### Learning objective

Students to test a product and evaluate their results.

### Key vocabulary

sugar, intense sweetener

### Organisation

Group work

### Resources needed

Food preparation area  
Selection of fruits and vegetables  
Liquidiser/blender/juicer  
Sugar  
Weighing scales/measuring spoons  
Intense sweetener

### Introduction

Discuss why drinks are sweetened, and the difference between sugar and intense sweeteners. Link the use of intense sweeteners for people on restricted diets.

### Activity

In groups, students are to prepare a drink by blending pureed fruit or vegetables with water. They should then add small quantities of sugar to a sample until they are satisfied that the drink is

sweet enough. They should record how much sugar they have added. The students should divide the remaining puree into three portions. To one, they should add the calculated quantity of sugar, to the second an equivalent amount of sweetener (by following the manufacturer's recommendations). The third sample should contain half amounts of both sweetening agents. The groups should carry out a 'blind' tasting, to find out which sample is the most popular and the reasons why.

### Plenary

Discuss the findings of each group.

### Extension

Extend the investigation by adding different amounts of sugar and sweetener.

## Activity 2 – It's in the water

### Learning objective

Students to experiment with different ingredients and to evaluate which has the most successful effect.

### Key vocabulary

sweetness, mouthfeel, colour, flavour, carbonation, dilutable

### Organisation

Group work

# Design and Technology

## Resources needed

Food preparation area  
Fresh fruits  
Bottles of natural mineral water, spring water, table water (still and carbonated)  
Tap water  
Filtered water  
'Bottled water' [TEACHER'S LINK](#) [PUPIL'S LINK](#)

## Introduction

Discuss with the class the difference between ready to serve drinks and dilutable drinks. Is there the same amount of water in all drinks? Why might there be a difference? Are all drinks equally thirst quenching? Give them a design brief to produce a fruit drink with fruit, sugar (or sweetener) and water. They should try out different waters to see which makes the best drink.

## Activity

In groups, the students should produce a puree of their chosen fruit, add a sweetener if necessary, then choose two different types of water to dilute their puree. They should make sure that the only different ingredient is the water. They should then compare the samples to see if the water has any effect on:

- colour
- texture
- taste
- mixing ability
- flavour.

## Plenary

Compare the results with other groups. Discuss if there was one particular water that had more effect on the drink.

## Extension

Make up your drink with four different amounts of one type of water and find out which is the most popular dilution.

## Activity 3 – Home-made lemonade

### Learning objective

Students to identify relevant sources of information by researching into different recipes, consider their research, then adapt the recipes, test their product and cost the product.

## Key vocabulary

nutritional content, cost

## Organisation

Group work

## Resources needed

Internet access and use of computers/recipe books  
Food preparation area  
Lemons  
Sugar and intense sweetener  
Lemon squeezers/juice extractors/liquidisers/blenders  
Measuring jugs  
Measuring spoons/scales  
Disposable cups

## Introduction

Challenge the students to find and make the best tasting lemonade.

## Activity

In groups, the students are to research into different recipes – they must find at least three and experiment to find the best tasting drink.

## Plenary

Conduct a tasting session and vote on the most popular drink produced by the class.

## Extension

The groups are to produce a label with all the nutritional information and a realistic cost for the product.

## Activity 4 – Making smoothies

### Learning objective

Students to experiment with different ingredients to make a smoothie and to evaluate which is the most successful. Students also to consider why ingredients may be included.

## Key vocabulary

sweetness, texture, acidity

## Organisation

Group work

# Design and Technology

## Resources needed

Examples of commercially produced smoothies  
Sample smoothie recipes  
Food preparation area  
Selection of fruits and vegetables, juice and yoghurt  
Liquidiser/blender/juicer per group

## Introduction

Show the class the bottles/cartons of smoothies. Invite members of the class to guess the ingredients by taste testing. Read out the ingredients, and discuss which fruits they identified. Discuss why unidentified ingredients may have been added (to add sweetness, acidity, texture, liquid).

## Activity

In groups, the class should design and make a smoothie. They should research smoothie recipes to get an idea of the number of ingredients and how to combine them. They should write out a list of their favourite fruits and agree on their ingredients, then make at least three drinks with differing quantities of their chosen fruits (recipes to be written by weight). The group should decide which is the best based on a taste test and then make the successful drink.

## Plenary

Each group is to carry out a taste test on the other groups' drinks and identify their ingredients.

## Extension

Ask each group to 'hide' a vegetable in their drink.

## Activity 5 – How smooth is your smoothie?

### Learning objective

Students to investigate the best way to make a smoothie and evaluate their end product.

### Key vocabulary

texture, taste, blender, food processor, sieve, juicer

### Organisation

Group work

## Resources needed

Per group:  
100g strawberries (approx 10)  
150g of banana (approx 1 medium sized banana)  
Small can of pineapple in fruit juice

Knives  
Sieves  
Juicer  
Hand blender  
Blender  
Liquidiser  
Food processor

## Introduction

Ask the students whether they prefer smooth orange juice or the one with bits in. Why? Does the texture of what you drink matter? How can you test this?

## Activity

Give each group the ingredients for a smoothie. Each group should try a different way of making their smoothie – sieve, whisk, blender, food processor (at different settings and lengths of time).

## Plenary

The students should compare their results and decide on the optimum method of making their drink. They should also see if their drink separates after a time.

## Extension

Students should also consider ease of use of equipment, time taken to clear up and also yield – how much drink was made using each method before deciding?

## Activity 6 – Packaging suitability

### Learning objective

Students to consider aesthetics and how packaging meets a clear need and fitness for its purpose.

### Key vocabulary

size, suitability, ease of hold/grip, tamper-evident bands, openers

### Organisation

Group work (pairs)

# Design and Technology

## Resources needed

'Wrapping Up' [TEACHER'S LINK](#) [PUPIL'S LINK](#)  
Selection of drinks packaging – different sizes of bottles, cartons, pouches, sports capped bottles, screw caps, crown caps, ring pull cans

## Introduction

Board blast the function of packaging – to contain, protect, identify a product, sell a product. Discuss other points to consider – ease of use, type of closure (cap), ease of opening, 'fun' factor, as well as environmental impact and the cost of production.

## Activity

In pairs, the students are to draw up a table to compare the types of packaging using information from the introductory discussion and information from 'Wrapping Up'. This could include:

- how much drink the packaging contains
- type of material it is made from
- type of closure
- type of drink it contains
- usefulness of information on packaging
- ease of use
- tamper-evident bands.

Based on this research, the groups should devise a questionnaire and undertake market research to find out which features of drinks packaging are most popular. (Allow time for research.)

## Plenary

Collate the class results and discuss the findings.

## Extension

The students are to design packaging for a new drink using their findings to inform their design.

## Activity 7 – Hazard analysis critical control points

### Learning objective

Students to understand the concept of HACCP.

### Key vocabulary

hazard, critical control point

### Organisation

Group work

Individual written work (extension work)

## Resources needed

1 litre glass bottle of carbonated drink  
1 litre plastic bottle of carbonated drink  
1 litre bottle cordial/squash  
1 litre cardboard juice carton  
1 litre glass bottle of juice  
1 litre plastic bottle of juice

Per group:

Large sheet of paper  
Marker pen

## Introduction

Explain what constitutes a hazard, and what a critical control point is. Show the class the different 1 litre containers.

## Activity

Divide the class into groups. Give each group one of the containers to consider. They are to consider the potential hazards that could affect the container and its contents from the moment it is purchased to the time it is consumed at home. (Examples include damage to packaging when in a shopping bag, bottle not being opened properly, bottle not being closed properly after being first opened, bottle not being stored properly.)

The groups should write down their list of hazards on the sheet of paper, then identify the critical control points in the journey from the shop to the time the drink is consumed. The groups should also put forward recommendations to ensure that the product is protected.

## Plenary

Each group to present their findings to the rest of the class.

## Extension

Individually, students should produce a poster showing critical control points, together with their recommendations.