

YEAR

5 - 6

Sink or Float Soda Cans



40 mins

MATERIALS

- 1 can 375ml soda.
- 1 can 375ml diet soda.
- Large clear bucket or tub.
- Water to fill the tub.
- Digital scales.
- 1 empty favourite drink from home.

METHOD:



1. Fill the tub with tap water.



2. Place the two cans into the water.



3. Make your observations.



4. Remove the cans from the water. Dry and weigh each can.



WHY?

5. Weigh out the sugar and determine how many teaspoons are in each can.

The difference between the amount of sugar used in regular soda versus the amount of sweetener used in diet soda causes a difference in the density of the liquids. Artificial sweeteners are much stronger/ sweeter than sugar so only a small amount is needed to sweeten the soda. This creates a difference in the mass of the cans even though they are the same volume and in the same packaging.

Sink or Float Soda Can Experiment

Lesson Outline:

Time allocation: 40 minutes

Format: Class demonstration followed by independent/ group work.

Student outcomes:

- Develop scientific understanding of the principle of density and the density of liquids.
- Utilise and develop science inquiry skills.
- Apply and further develop literacy and numeracy skills.
- Critically evaluate food labels.

Materials:

FOR THE CLASS

- 1 can 375ml soda
- 1 can 375ml diet soda
- Large clear bucket or tub
- Water to fill the tub
- Digital Scales

FOR EACH STUDENT/ GROUP

- 1 empty drink container/ carton from home that they or someone in their family likes to drink.

Optional/ Extra Material:

Refresh.ED 'Reading a Food Label' infographic (pdf) displayed on screen or printed.

Preparation:

A day or two prior to staging the experiment ask the children to bring in an empty drink container/ carton from home that they or someone in their family likes to drink. It may be useful also to collect several extras to ensure there are enough containers for the children to each have a nutrition label to analyse.

Make copies of the student worksheet 'Sink or Float Soda Cans Experiment Worksheet'.

Setup: 2 mins

In an area suitable for a whole class demonstration set up your tub and fill it with water. Ideally the tub is transparent and twice as deep as the height of your chosen cans, e.g. an empty aquarium, clear bucket, or semi-transparent storage tub.

Introduction: 5 mins

We are going to do an experiment about the density of liquids today.

Ask: Does anyone know what that density is?

Density is: Mass per unit of volume. You can think of it like how many particles are in the volume. For example, density is often expressed as grams per 100ml or litre.

Density tends to be higher for solids than for liquids, which are both denser than gases.

Different liquids of course can be made of different particles/ingredients, so different liquids can have different densities. Like when you see a lava lamp and the two liquids inside don't mix but instead one liquid (the less dense one) floats around.

For our experiment today we are going to take two liquids that seem the same and see if they have the same density. We are going to use soft drinks.

They both look the same and are packaged the same, one is the standard recipe, and the other is the diet version.

Ask: What do you think will happen if we put them both into this tub of water?

Hypothesis

Ask the children to fill out their worksheet as to what they think might happen in the experiment.

Investigation: 5 mins

Conduct the class demonstration and ask the students to write down the findings (Choose a student/s to conduct the experiment if desired).

Ask:

Are you surprised that one sank and one floated?

Why do you think that happened?

Do you think that maybe although they look the same in every way there is something different inside making one heavier?

Explain that different liquids have different densities based on their weight. The denser a liquid is the more it will weigh and thus sink to the bottom whilst a less dense liquid will appear to float in comparison.

Shall we weigh them and find out if one is heavier?

Remove the cans from the water, dry and weigh and ask the students to record the findings on their worksheet (students could be chosen to do this task).

Exploration: 20 mins

Address the class and discuss how to read the food label/ nutrition panel on the soda cans (You may choose to show the Refresh.ED infographic on screen).

- A food label must show the ingredients present, listed in descending order of their proportion by weight in the food.
- Food additives must also be included in the ingredients list. These may be listed by a class name, chemical name, or a code number. Food additives include colours, flavours, antioxidants, preservatives, and emulsifiers.
- The nutrition information panel must state a serving size and the servings per pack.
- Serving size is specified by the manufacturer and may not be the same as a serve in the Australian Guide to Healthy Eating or the amount consumed.

As a teacher led activity fill out the data on the worksheet for both of your soda cans, noting the grams of sugar per can.

The density of the drinks is different because 1 can has actual sugar in it whilst the 'diet' can does not. Food scientists use artificial sweeteners in diet products, like Aspartame which is 200 x sweeter than sugar so only a little bit is added to get the same effect and it means the drink is less dense.

Ask: On your worksheet calculate how many teaspoons of sugar are in each of our drinks?

Organise students into small groups of 3-5 and direct them to now have a go reading the label on their drink from home, calculating how many teaspoons of sugar is in it, comparing theirs amongst the group and filling out their worksheet.

Conclusion: 8 mins

Ask the children to pack away or have a group representative report their highest & lowest in sugar drinks to the class.

Ask:

Where there any drinks higher in sugar than you expected or surprised you?

How much sugar do you think is in water?

What do you think would be the best drink to quench your thirst then?

Take away messages:

Different liquids can have different densities.

- What goes into a liquid affects the density of the liquid and can create differences in how those liquids behave under certain conditions.

Reading a food label can help us to make healthy or healthier drink choices.

- To keep your body healthy it is best to avoid manufactured drinks high in sugar - saving them for special occasions only. Water is best when you are thirsty.

Further Topic Inquiry

This experiment can be further explored within the context of the Health and Physical Education Curriculum. Providing an opportunity for students to develop strategies to ensure safety and wellbeing at home and at school, such as identifying and choosing healthier foods and drinks for themselves.

Refresh.ED provides unit resources for specific year groups within their Food & Drink Choice and Food, Drink & Health focus areas. Of particular interest in relation to extending learning within this area are the units.

- Year 5 Limiting Salt, Fat & Sugar (Know your Drinks).
 Influences on Our Choices.
- Year 6 Balanced Eating Plan.
 A Closer Look at Nutrients & Energy.

Sink or Float Soda Cans Experiment Worksheet

| | |
|---|---|
| <p style="text-align: center;">Hypothesis</p> <p>(What do you think will happen?)</p> | |
| <p style="text-align: center;">Observations</p> <p>(Sink or Float)</p> | <p>Full sugar can:</p> <p>Diet can:</p> |
| <p style="text-align: center;">Weight</p> | <p>Full sugar can:</p> <p>Diet can:</p> |
| <p style="text-align: center;">Sugar Content</p> <p>(Read the label on each can to see how many grams of sugar are in each drink)</p> <p>How many teaspoons of sugar are in each drink?</p> <div style="text-align: center; margin: 10px 0;">  </div> <p>1 teaspoon = 4 grams</p> | <p>Full sugar can.</p> <p>Grams:</p> <p>Teaspoons:</p> <p>Diet can.</p> <p>Grams:</p> <p>Teaspoons:</p> <p>Drink from home.</p> <p>Grams:</p> <p>Teaspoons:</p> |

Sink or Float Soda Can Experiment

Overview

In this experiment students are introduced to the scientific principle of density. Cans of full sugar and diet soft drink are utilised to visually explore the concept of density of liquids. This experiment also provides learning centred around nutrition, specifically the amount of sugar in popular drinks.

Some key new vocabulary students will be introduced to include: Hypothesis, density, artificial sweeteners, ingredient list, food labels.

Key Messages

- Density is dependent upon mass as opposed to volume alone.
- Science is involved in the manufacture of what we eat and drink.
- Foods and drinks have variable nutritional and energy value.
- Different people may choose different drinks within their diet aside from water, however water is best.
- We can make healthy drink choices to quench our thirst, be healthy and feel well each day.
- Reading food labels can help us to identify ingredients and therefore make healthy drink choices.

Learning Outcomes:

- Understand the scientific principle of density and the density of liquids.
- Utilise science inquiry skills.
- Apply and enhance literacy and numeracy skills.
- Critically evaluate food labels.

General capabilities:

Literacy, Numeracy, Critical & creative thinking, Personal & social capability.

Year 5 Australian Curriculum Links

| Strand/ Sub- strand | Curriculum content descriptions |
|---|---|
| HEALTH & PHYSICAL EDUCATION | |
| Personal, social & community health. <i>Being healthy, safe & active.</i> <i>Contributing to healthy and active communities.</i> | Plan and practise strategies that promote health, safety and wellbeing, such as: comparing food labels on products. (ACPPS054). Preventative health measures that promote and maintain an individual's health, safety and wellbeing. (ACPPS058). |
| SCIENCE | |
| Science as human endeavour. <i>Use and influence of science.</i> Science inquiry skills. <i>Questioning & predicting.</i> | Scientific knowledge is used to solve problems and inform personal and community decisions. (ACSHE083). With guidance, pose clarifying questions and make predictions about scientific investigations. (AC SIS231). |
| MATHEMATICS | |
| Number and algebra. <i>Number and place value.</i> | Solve problems involving division by a one- digit number, including those that result in a remainder (ACMNA101). |
| ENGLISH | |
| Literacy. <i>Interpreting, analysing, evaluating.</i> | Use comprehension strategies to analyse information, integrating and linking ideas from a variety of print and digital sources (ACELY1703). |
| TECHNOLOGY | |
| Design technologies. <i>Knowledge & understanding: Food & fibre production.</i> | Investigate how and why food and fibre are produced in managed environments and prepared to enable people to grow and be healthy. (ACTDEK021). |

Additional Year 5 WA Curriculum Links

| Strand/ Sub- strand | Curriculum content descriptions |
|---|---|
| TECHNOLOGY | |
| Design technologies. <i>Knowledge & understanding: Food & fibre production.</i> | People in design and technologies occupations aim to increase efficiency of production systems, or consumer satisfaction of food and natural fibre products. (ACTDEK022). |

Year 6 Australian Curriculum Links

| Strand/ Sub- strand | Curriculum content descriptions |
|---|---|
| HEALTH & PHYSICAL EDUCATION | |
| Personal, social & community health. <i>Being healthy, safe & active.</i> <i>Contributing to healthy and active communities.</i> | Plan and practise strategies that promote health, safety and wellbeing, such as: comparing food labels on products. (ACPPS054). Preventative health measures that promote and maintain an individual's health, safety and wellbeing. (ACPPS058). |
| SCIENCE | |
| Science as human endeavour. <i>Use and influence of science.</i> Science inquiry skills. <i>Questioning and predicting.</i> | Scientific knowledge is used to solve problems and inform personal and community decisions. (ACSHE083). With guidance, pose clarifying questions and make predictions about scientific investigations. (ACSIS231). |
| ENGLISH | |
| Literacy. <i>Interpreting, analysing, evaluating.</i> | Use comprehension strategies to analyse information, integrating and linking ideas from a variety of print and digital sources (ACELY1703). |
| TECHNOLOGY | |
| Design technologies. <i>Knowledge & understanding: Food & fibre production.</i> | Investigate how and why food and fibre are produced in managed environments and prepared to enable people to grow and be healthy. (ACTDEK021). |

Additional Year 6 WA Curriculum Links

| Strand/ Sub- strand | Curriculum content descriptions |
|---|---|
| HEALTH & PHYSICAL EDUCATION | |
| Personal, social & community health. <i>Being healthy, safe & active.</i> <i>Contributing to healthy and active communities.</i> | Strategies that promote a healthy lifestyle, such as: improving the nutritional value in meals. (ACPPS054). Preventative health measures that promote and maintain community health, safety and wellbeing. (ACPPS058). |
| TECHNOLOGY | |
| Design technologies. <i>Knowledge & understanding: Food specialisations.</i> | Principles of food preparation for healthy eating. |

External Supporting Resources for Teachers

- Refresh.ED Reading a food label guide.



<https://www.refreshedschools.health.wa.gov.au/wp-content/uploads/2019/03/Reading-a-Food-Label.pdf>

- LiveLighter (advice given directed toward Australian adults only).



<https://livelighter.com.au/The-Facts/About-Sugary-Drinks>



<https://livelighter.com.au/assets/resource/infographic/2020-01-17%20sugary%20drinks%20infographic.pdf>



<https://livelighter.com.au/SugaryDrinks/Calculator>

- Rethink Sugary Drink Organization Australia.



<https://www.rethinksugarydrink.org.au/how-much-sugar>

- Australian Guide to Healthy Eating & The Australian Dietary Guidelines.

<https://www.eatforhealth.gov.au>