Soap Making

Hamish Johnston

Sarah Washbrooke

TENZ TECHNOLOGY EDUCATION NEW ZEALAND

He Karakia Tīmatanga

Mauri ora ki a mātou	*Wellbeing to us all*
Arahina mātou i a mātou mahi	*Help us with our responsibilities*
Kimihia he huarahi mō te kaupapa o te mātauranga hangarau	*Seek a pathway for the understanding of technology*
Awhina atu, awhina mai	*To give help and receive help*
Te pou e here nei i a mātou	*The virtue that binds us as one*
Hui e, tāiki e	*Bind us together*

TENZ

Hamish Johnston

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Heamana | Chair

Ko Aoraki te maunga
Ko Rakia te awa
Ko Johnston te iwi whānau
Nō Waitaha ahau
Ko Hamish tōku ingoa

PPTA Waitaha Canterbury Regional Secretary
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Tēnā koutou, tēnā koutou, tēnā koutou katoa.

Ko Ingarangi te whakapaparanga mai,
Ko Lincolnshire te whenua tapu,
Nō Scunthorpe au,
Ko Aotearoa te kāinga,
Kei Tahuna au e noho ana,
Ko Sarah Washbrooke tōku ingoa.

Nō reira, tēnā koutou, tēnā koutou, tēnā Tātou katoa.

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Today's Workshop

A focus on BioTechnology using a STEM based approach.

The Hook!

Science Experiments & Activities

The process

How?

Contexts

Why?
Designing & Developing

Future

Experimentation
What next?

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https://go.tenz.org.nz/TESAC24SoapMakingSlides

The hook

Contexts

The process

Future

The Hook

Hands on activities & Science Experiments

- What are germs?
- How do germs spread?
- Where do we find germs?
- Why do we need to use soap?

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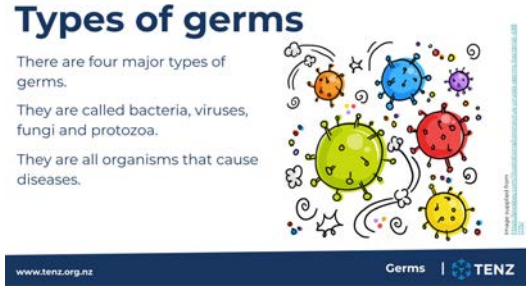
GERMS

What are germs?



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Introduction Slides

https://go.tenz.org.nz/SoapTeachingSlidesGerms

Activity:

Introduce types of germs:

- Bacteria
- Viruses
- Fungi
- Protozoa

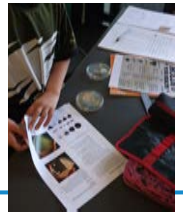
GERMS

Where can we find germs?

Equipment:

- Ziplock bag
- Gloves
- vivid/marker
- Plain white bread

Petri dishes can be used too!



Activity:

- Set up the control - with clean gloves place one slice of bread in a bag. Label this as the control.
- With dirty hands, rub hands over surface of a slice of bread. Place bread in a bag and label accordingly.
- Wash hands well with soap. Then rub hands over surface of another bread slice. Place in another bag & label.
- Activity - Prediction: what do they think is going to happen over time? Why?
- Wait - watch the experiment over a few weeks.
- *Observations? What is happening? Why? DISCUSS*

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Extension:
Add more experiments by gathering germs from different locations, e.g. door handles, rubbish bins, computer keyboards, shoe laces, school bags, etc.

GERMS

How can germs spread?

Equipment:

- Bottle of hand sanitiser
- Glitter
- Sink & soap to wash hands

Activity:

- Mix glitter and hand sanitiser together.
- Shake well
- Ask students to stand in a circle *(this could be the whole class or in smaller groups)*
- Pour a generous amount of glitter sanitiser onto one student's hand.
- Ask them to high five the person next to them with the glitter hand.
- Repeat around the circle.
- Compare hands - observe. *What do they notice? DISCUSS.*

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GERMS

How can germs spread?

Equipment:

- Bottle of hand sanitiser
- Glitter, *or,*
- Bag of flour
- Paper towels
- Sink & soap to wash hands

Activity:

- Place hand sanitiser & glitter or flour in a bowl.
- Ask students to place their hands in the bowl & cover their skin with the mixture.
- Give each student a paper towel - ask them to wipe their hands superficially with the towel.
- *Look at their hands what do they see?*
- Next, place hands under running water & pat dry with a paper towel.
- *Look at their hands what do they see?*
- Finally, ask students top wash hands with soap & water.
- *Look at their hands what do they see? DISCUSS*

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GERMS

Why do we need soap?

Equipment:

- Flat plate with an edge
- Water
- Ground black pepper
- Dishwashing liquid

Activity:

- Pour water onto plate making sure bottom is covered.
- Sprinkle black pepper onto water - the pepper represents germs.
- Place one finger tip in the water.
- *What happens? Observations?*
- Squirt some dishwash liquid onto an index finger tip. Smooth the liquid all around the tip to cover the skin.
- Now, place this finger tip in the water.
- *What happens now? Observations? DISCUSS*

Why does this happen?
When soap is added to the water it lowers the surface tension of the water causing the water molecules on the surface to scatter or pull away from the point where you added the soap.

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The hook

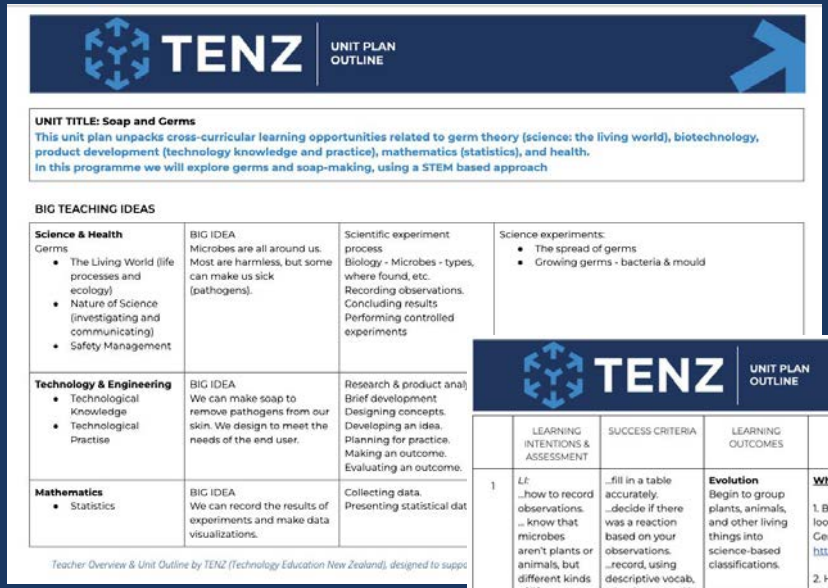
Contexts

The process

Future

Context

Unit plan exemplar



TENZ UNIT PLAN OUTLINE

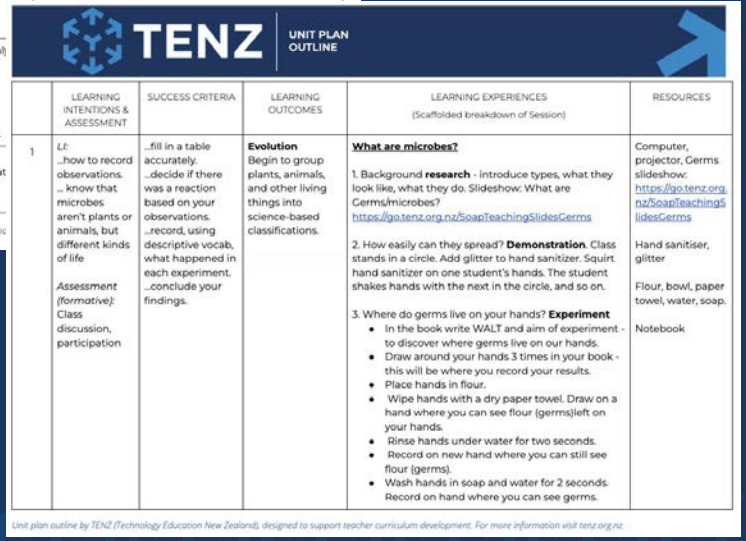
UNIT TITLE: Soap and Germs

This unit plan unpacks cross-curricular learning opportunities related to germ theory (science: the living world), biotechnology, product development (technology knowledge and practice), mathematics (statistics), and health.
In this programme we will explore germs and soap-making, using a STEM based approach

BIG TEACHING IDEAS

Science & Health Germs • The Living World (life processes and ecology) • Nature of Science (investigating and communicating) • Safety Management	BIG IDEA Microbes are all around us. Most are harmless, but some can make us sick (pathogens).	Scientific experiment process Biology - Microbes - types, where found, etc. Recording observations. Concluding results Performing controlled experiments	Science experiments: • The spread of germs • Growing germs - bacteria & mould
Technology & Engineering • Technological Knowledge • Technological Practise	BIG IDEA We can make soap to remove pathogens from our skin. We design to meet the needs of the end user.	Research & product anal Brief development Designing concepts. Developing an idea. Planning for practice. Making an outcome. Evaluating an outcome.	
Mathematics • Statistics	BIG IDEA We can record the results of experiments and make data visualizations.	Collecting data. Presenting statistical dat	

Teacher Overview & Unit Outline by TENZ (Technology Education New Zealand), designed to suppo



TENZ UNIT PLAN OUTLINE

	LEARNING INTENTIONS & ASSESSMENT	SUCCESS CRITERIA	LEARNING OUTCOMES	LEARNING EXPERIENCES (Scaffolded breakdown of Session)	RESOURCES
1	*LI:* ...how to record observations. ... know that microbes aren't plants or animals, but different kinds of life *Assessment (formative):* Class discussion, participation	...fill in a table accurately. ...decide if there was a reaction based on your observations. ...record, using descriptive vocab, what happened in each experiment. ...conclude your findings.	**Evolution** Begin to group plants, animals, and other living things into science-based classifications.	**What are microbes?** 1. Background **research** - introduce types, what they look like, what they do. Slideshow: What are Germs/microbes? https://go.tenz.org.nz/SoapTeachingSlidesGerms 2. How easily can they spread? **Demonstration**. Class stands in a circle. Add glitter to hand sanitizer. Squirt hand sanitizer on one student's hands. The student shakes hands with the next in the circle, and so on. 3. Where do germs live on your hands? **Experiment** • In the book write WALT and aim of experiment - to discover where germs live on our hands. • Draw around your hands 3 times in your book - this will be where you record your results. • Place hands in flour. • Wipe hands with a dry paper towel. Draw on a hand where you can see flour (germs)left on your hands. • Rinse hands under water for two seconds. • Record on new hand where you can still see flour (germs). • Wash hands in soap and water for 2 seconds. Record on hand where you can see germs.	Computer, projector, Germs slideshow: https://go.tenz.org.nz/SoapTeachingSlidesGerms Hand sanitiser, glitter Flour, bowl, paper towel, water, soap. Notebook

Unit plan outline by TENZ (Technology Education New Zealand), designed to support teacher curriculum development. For more information visit tenz.org.nz.

https://docs.google.com/document/d/1L9XKNeSY9cy4OrIOiJX0bS3r7Hc5_xxYa2ocsBi9Aes/edit?usp=sharing

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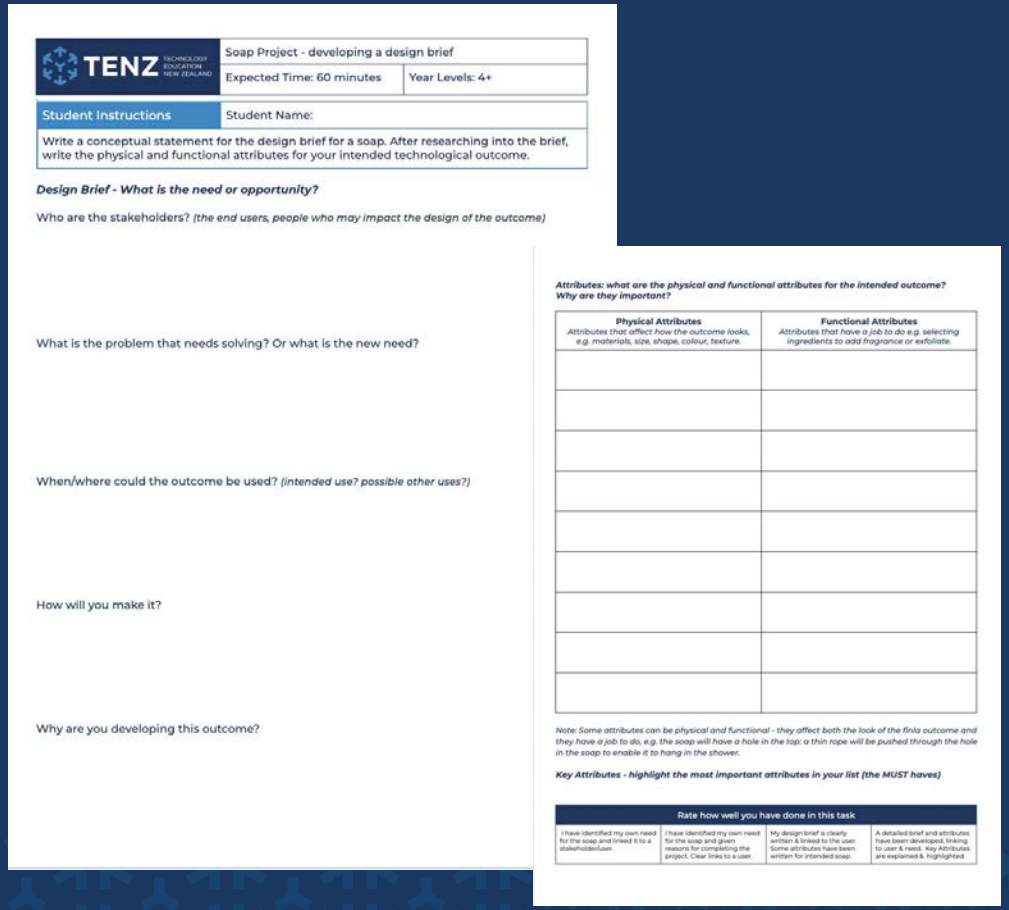
The brief

Example of Brief Development worksheet

https://go.tenz.org.nz/SoapBriefDevelopment
(year 8)



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Soap Project - developing a design brief

Expected Time: 60 minutes | Year Levels: 4+

Student Instructions | Student Name:

Write a conceptual statement for the design brief for a soap. After researching into the brief, write the physical and functional attributes for your intended technological outcome.

Design Brief - What is the need or opportunity?

Who are the stakeholders? *(the end users, people who may impact the design of the outcome)*

What is the problem that needs solving? Or what is the new need?

When/where could the outcome be used? *(intended use? possible other uses?)*

How will you make it?

Why are you developing this outcome?

Attributes: what are the physical and functional attributes for the intended outcome? Why are they important?

Physical Attributes *Attributes that affect how the outcome looks, e.g. materials, size, shape, colour, texture.*	**Functional Attributes** *Attributes that have a job to do e.g. selecting ingredients to add fragrance or exfoliate.*

Note: Some attributes can be physical and functional - they affect both the look of the finla outcome and they have a job to do, e.g. the soap will have a hole in the top: a thin rope will be pushed through the hole in the soap to enable it to hang in the shower.

Key Attributes - highlight the most important attributes in your list (the MUST haves)

Rate how well you have done in this task			
I have identified my own need for the soap and linked it to a stakeholder/user.	I have identified my own need for the soap and given reasons for completing the project. Clear links to a user.	My design brief is clearly written & linked to the user. Some attributes have been written for intended soap.	A detailed brief and attributes have been developed, linking to user & need. Key Attributes are explained & highlighted.

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Product Analysis

Research: Sensory Testing & Science Experiments

https://go.tenz.org.nz/SoapProductAnalysisandTesting

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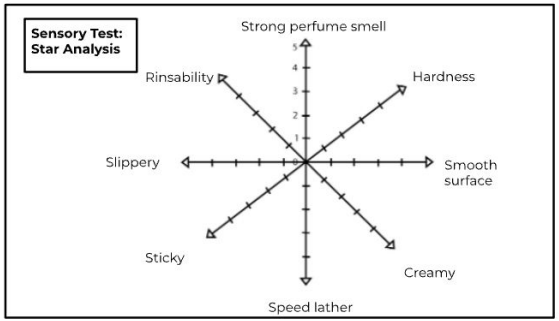
Soap Project - Product Analysis & Soap Testing	
Expected Time: 60 minutes	Year Levels: 4+

Student Instructions	Student Name:
Research into different types of soaps available on the market. Complete sensory testing with star analysis & conduct experiments into the properties of materials.	

Research: Sensory Testing ***Name of Soap Product:***

Use the star chart to record your thoughts about the soap product. (0 = minimum, 5 = maximum, for example hardness: 0 = very soft & squishy, 5 = Very hard to the touch)



Material properties - experimentation

Will it float or sink in water? Why?	What will happen when heated up? (in a microwave)
Prediction:	*Prediction:*
Observation:	*Observation:*

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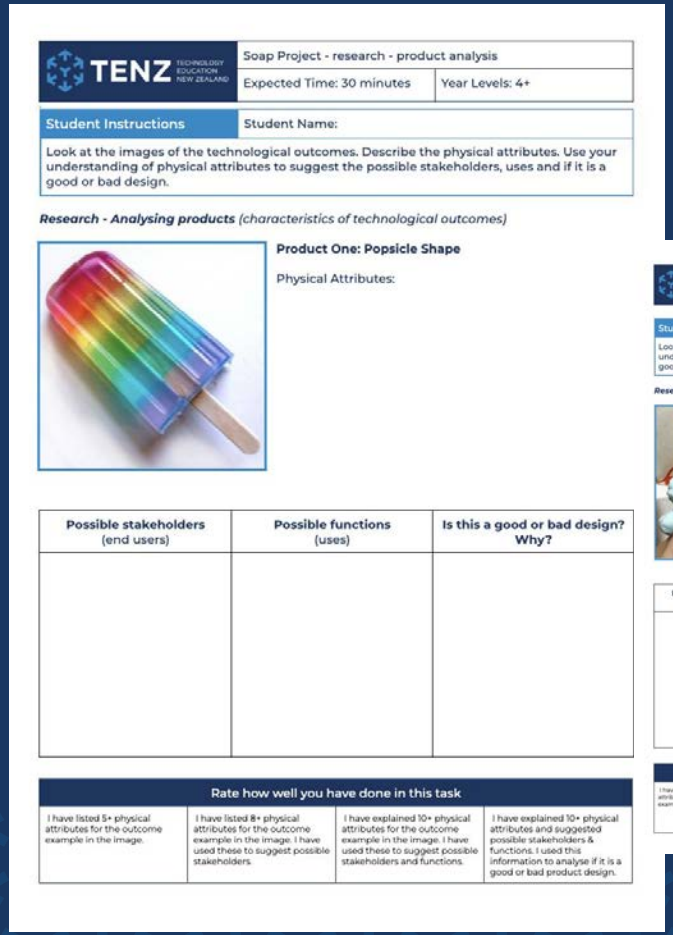
Product Analysis

Research : Another example of product analysis

https://go.tenz.org.nz/SoapProductAnalysis



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Soap Project - research - product analysis

Expected Time: 30 minutes | Year Levels: 4+

Student Instructions | Student Name:

Look at the images of the technological outcomes. Describe the physical attributes. Use your understanding of physical attributes to suggest the possible stakeholders, uses and if it is a good or bad design.

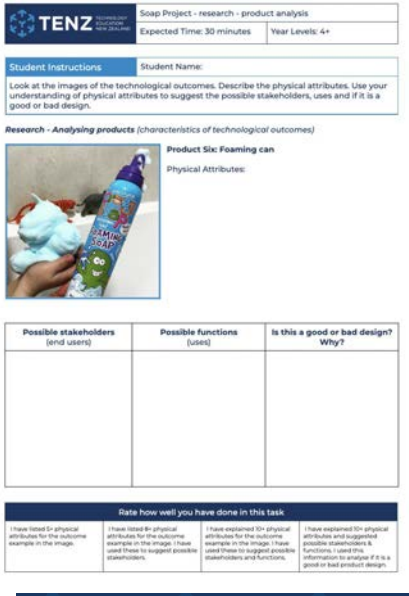
Research - Analysing products *(characteristics of technological outcomes)*

Product One: Popsicle Shape

Physical Attributes:

Possible stakeholders (end users)	Possible functions (uses)	Is this a good or bad design? Why?

Rate how well you have done in this task			
I have listed 5+ physical attributes for the outcome example in the image.	I have listed 8+ physical attributes for the outcome example in the image. I have used these to suggest possible stakeholders.	I have explained 10+ physical attributes for the outcome example in the image. I have used these to suggest possible stakeholders and functions.	I have explained 10+ physical attributes and suggested possible stakeholders & functions. I used this information to analyse if it is a good or bad product design.



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Soap Project - research - product analysis

Expected Time: 30 minutes | Year Levels: 4+

Student Instructions | Student Name:

Look at the images of the technological outcomes. Describe the physical attributes. Use your understanding of physical attributes to suggest the possible stakeholders, uses and if it is a good or bad design.

Research - Analysing products *(characteristics of technological outcomes)*

Product Six: Foaming can

Physical Attributes:

Possible stakeholders (end users)	Possible functions (uses)	Is this a good or bad design? Why?

Rate how well you have done in this task			
I have listed 5+ physical attributes for the outcome example in the image.	I have listed 8+ physical attributes for the outcome example in the image. I have used these to suggest possible stakeholders.	I have explained 10+ physical attributes for the outcome example in the image. I have used these to suggest possible stakeholders and functions.	I have explained 10+ physical attributes and suggested possible stakeholders & functions. I used this information to analyse if it is a good or bad product design.

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Creating ideas

Design sheet

https://go.tenz.org.nz/SoapInitialIdeas

TENZ Soap Project - Initial Ideas
Expected Time: 60 minutes | Year Levels: 4+

Student Instructions | Student Name:

Using your research, design brief and attributes create & sketch a range of ideas for your intended technological outcome. Annotate (label) the attributes of each idea. Linking back to the brief and attributes analyse each design - does the idea fulfil the brief?

Sketch and annotate ideas for the outcome:

TENZ Soap Project - Initial Ideas
Expected Time: 60 minutes | Year Levels: 4+

Analyse the ideas:

Idea	Good points (link to brief & attributes)	Bad points (link to brief and attributes)

Rate how well you have done in this task

I have sketched a range of ideas for the outcome (3+).	I have sketched and annotated a range of ideas for the outcome (4+).	I have sketched and annotated a range of ideas for the outcome (5+). I have started to analyse the designs.	I have sketched and annotated a range of ideas for the outcome (5+). I have analysed the designs in detail.

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Develop an Idea

Testing and trialling

Testing:

- Types of glycerine (opaque & transparent)
- Colouring (mica/powder or liquid dye)
- Fragrance
- Mould shapes

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Making the outcome

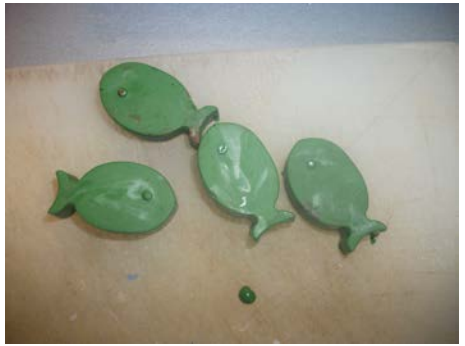
Melt and pour method

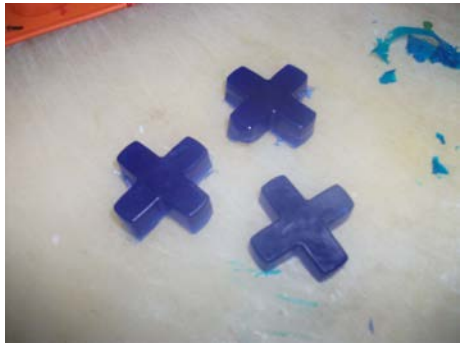
Method:

1. Cut glycerine into small chunks.
2. Set up a double boiler.
3. Slowly melt the glycerine.
4. Add colouring.
5. Add fragrance.
6. Add extra ingredients.
7. Pour into mould.
8. Leave to set.
9. Remove from mould.

Final Outcomes

Guest Soaps Year 5





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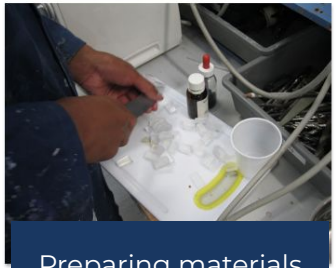
Final Outcomes

Year 8

Design for own stakeholders & need.

Designed & made the mould for the soap - vacuum form.

Designed & made packaging for final soap.



Preparing materials for soap making

Melting glycerine in double boiler

Test soaps - trialling colour, fragrance, and additives

Pouring molten glycerine into vacuum formed molds

Using sharp knifes to cut glycerine

Technology workshop in action

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The hook

Contexts

The process

Future

Making the Soap

The process

Let’s make a soap!

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Recipe

115g block of glycerine (transparent)
½ Tbsp honey
⅛ tsp turmeric (more means darker) (optional)
Up to ½ Tbsp Rolled Oats (optional)
10 drops almond oil
10 drops of essential oil

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Honey

Honey is a natural humectant, which means it absorbs moisture from the air. Humectants are great for the skin, as they can help the skin retain moisture. Honey also contains antioxidants and natural sugars which can increase the lather of cold process soap.

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Turmeric

Turmeric has anti-inflammatory qualities can target your pores and calm the skin. Turmeric is also known to reduce scarring. This combination of uses may help your face clear up from acne breakouts.
In addition, turmeric has a intense colour, so is great for changing the colour of the soap.

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Rolled Oats

Rolled Oats are there to give the soap a gentle exfoliating ability. Oats in soap are also known to anti-inflammatory and soothing abilities.

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Almond Oil

Almond oil produces a rich conditioning lather, therefore making the soap more “soapy”. It is also high in Vitamins E, A and D as well as Oleic and Linoleic fatty acids, this oil is good for soothing dry, flaky and irritated skin.

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Essential Oil

The essential oils key use is the aroma. An individual will like or dislike their soap often on whether they enjoy the smell of it.

Be careful with the amount - it can be quite pungent!

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Recipe

115g block of soap base ***(transparent)***

½ Tbsp honey

⅛ tsp turmeric ***(more means darker) (optional)***

Up to ½ Tbsp Rolled Oats ***(optional)***

10 drops almond oil

10 drops of essential oil

1. Cut block of soap base into small pieces (about 1cm)
2. Put the soap base pieces into a small glass measuring cup and microwave for 30 seconds
3. Warm up a dish of water and place the glass measuring cup in the water as a double boiler*
4. Add honey and stir carefully
5. Add turmeric depending on how dark you want the soap and stir carefully
6. Add rolled oats depending on whether you want the soap to be course and stir carefully
7. Add almond oil using an eye dropper and then stir carefully
8. Add the essential oil and then stir carefully
9. Remove the small glass measuring cup and pour the contents into the soap moulds.

**Note: A metal pan with enough water freshly boiled in a jug will suffice for a single batch. If doing more than one batch, replace water with freshly boiled water.*

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Exploration & Experimentation

Calendula Flowers

Benefits: Help with pain, irritated skin, inflammation, itchiness & wound healing. Assists with digestion & immune system, antioxidants.

Lavender Flowers

Benefits: Fragrance, support sleep, treat skin blemishes, reduce blood pressure, lesson menopausal hot flushes, combat fungus growth & promote hair growth!

Rosemary leaves

Benefits: Antioxidant, alleviate muscle pain, improve memory, boost immune & circulatory system, stimulate hair growth, anti-fungal.

The hook

Contexts

The process

Future

The Future

How can you extend this learning further?

- Make their own moulds
- Explore other methods for making soap
- Trial different soap bases e.g. glycerine, goats milk, cocoa butter, aloe vera, honey, hemp seed, olive oil, shea butter, etc
- Explore natural ingredients, which have beneficial properties.
- Explore other ingredients to provide other benefits e.g. exfoliation
- Explore liquid soap making

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Suppliers

Potential Suppliers of Soap equipment & materials

- Pure Nature: https://www.purenature.co.nz/collections/soap-making?gad_source=1&gclid=CjwKCAjwnv-vBhBdEiwABCYQA-4BE_CfJmzlbTEVzkuxwt3s_KN4NIfFoUX2e6AQlHmcqeugwKy29xoCLisQAvD_BwE
- Charity shops for kitchen equipment
- Kmart for silicon moulds

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He Karakia Whakamutunga

Ki a mātou katoa	*To those of us gathered*
Kua mutu mātou i a mātou mahi, i a mātou kaupapa hoki	*We have finished our work and practices*
Arahina mātou, kia kawe mātou i a mātou haepapa	*Once again help us with our responsibilities*
Kia whakatapua mātou ki ngā kaupapa me ngā mea e whakapono.	*We are dedicated to the things we do and believe*
Manaakitia mai mātou.	*Bless us all*

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Ngā mihi
Thank You

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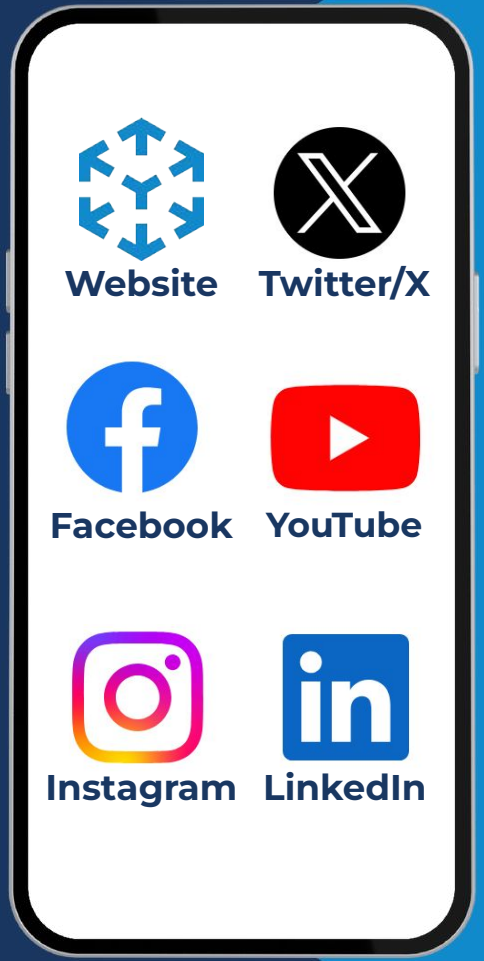
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