Fizzing Fun

Science, Technology and English, Level 2

The Learning Context:

In this unit students will work co-operatively to make a bath bomb and package it as a gift to a person in need of recognition.

During the first stage of the unit students will explore the properties of substances (both their physical and chemical properties), and understand the chemical reaction that takes place when you mix acids with carbonates. Students will then trial and evaluate a range of bath bomb recipes before creating their own formula.

In groups, students will produce a bath bomb that they can give to their special recipient. Students will need to work within a timeline, plan and prepare their product, and design and construct attractive packaging that presents their product well.

Once the bath bombs are made and packaged students will reflect on their success using feedback from their recipients as one way of determining their achievements.
Approximately 12 lessons

Achievement Objectives:

SCIENCE CURRICULUM: Level 1 and 2:

Participating and Contributing: *Explore and act on issues and questions that link their science learning to their daily living as they …*

Material World – Properties and changes of matter: *Observe and describe properties of familiar materials and group materials in different ways based on their properties.*

Material World – Chemistry and Society: *Find out about the uses of common materials and relate these to their observed properties.*

TECHNOLOGY CURRICULUM: Level 2:

Technological Practice – Planning for Practice: *Students will develop a plan that identifies the key stages and the resources that are required to complete an outcome.*

Technological Practice – Brief Development: *Students will explain the outcome they are developing and describe the attributes it should have, taking account of the need or opportunity and the resources available.*

ENGLISH CURRICULUM: Level 2:

Listening, Reading, Viewing

Processes and Strategies: *Select and use sources of information, processes, and strategies with some confidence to identify, form, and express ideas.*

Enterprising Attributes:

- Generating and using creative ideas and processes
- Monitoring and evaluating
- Working with others and in teams
- Identifying, recruiting, and managing resources
- Planning and organising
- Collecting, organising and analysing information

Teachers to observe and collect evidence of these enterprising attributes in action.

Resource Requirements:

- Text: Making Better Sense of the Material World, Levels 1–4, Ministry of Education,
- Ingredients as listed in the above text – Fizzing and Foaming section,
- Bath bomb recipes – see
  www.soapcrafters.com/recipes_fizzies.htm
  www.makebathbombs.com
  www.teachsoap.com/bombs.html
- Equipment to prepare bath bomb eg: mixing bowls, containers, plastic cups, etc,
- Local craft shops,
- Local pharmacy,
- Materials to use for packaging eg: coloured paper, cardboard, glitter, ribbon, cellophane, etc,
- Decision Making Grid.
- http://www.tki.org.nz/r/digistore/protected/objects/?id=43&vers=3.0

Speaking, Writing, Presenting ***Purposes and Audience:*** *Show some understanding of how texts are shaped for different purposes and audiences.* ***Structure:*** *Organise texts, using a range of structures.*	

Learning Outcomes:

Students will be able to:
1. Investigate and describe what happens when you mix acids with carbonates.
2. Devise a method of classifying unknown materials as either acids or carbonates.
3. Trial and compare a range of bath bomb recipes.
4. Work co-operatively in a group to invent, make and package bath bombs.
5. Evaluate the success, or otherwise, of their bath bomb.
6. Describe how they applied Enterprising Attributes to support the tasks in this unit.

Teaching and Learning Sequence

NB: Teachers are encouraged to gauge the prior knowledge of their students before implementing each unit so that they can provide personalised and meaningful learning opportunities. The teaching and learning sequence provided in each unit is to be viewed as a guide only. Teachers will need to adapt this sequence to meet the needs of their students, school and community.

The future focus issues of citizenship and enterprise can be explored during this unit. Students can explore what it means to be a good citizen when they identify an opportunity to give a gift to someone who has contributed to their community and well-being. Students can explore what it means to innovative and enterprising when they create, design, plan and make their gift. Acting responsibly and considering others is part of citizenship, and this learning provides students with the opportunity to identify people who contribute to their community and as such are good role models of citizenship.

The numbered activities listed below are learning steps rather than lessons. Teachers may choose to combine two or three learning steps into one lesson. Alternatively, they may spread one learning step out over several lessons. This will be largely dependent on students' prior knowledge and their subsequent learning needs.

Getting started: The teacher creates a 'volcano' in the school sandpit by mixing vinegar and baking soda and has the class observe and describe what happens. This activity will give the students a very visual introduction into the Fizzing and Foaming science focus. The teacher asks the students: "what happened when we put these two substances together?" The unit and focus for learning is described to the students. Explain that the class will: • Explore the scientific ideas behind things that fizz and foam • Test a range of bath bomb recipes • Work in co-operative groups to design and make bath bombs • Design and make a creative and attractive package to present their bath bomb in. The class creates a timeline for the unit with key dates for critical actions. This process will make the teaching sequence of the unit explicit to the students.	**LINKS TO BES** **Best Evidence Synthesis** ***5. Quality teachers create effective and sufficient learning opportunities and make effective links between different learning areas.***

Exploring:

1. The teacher sets up the opportunity for students to combine a variety of carbonates and acids (see list below). Students observe the chemical reaction closely and describe the results. Students then test other substances to see whether they can classify them as an acid, a carbonate or neither of these. The teacher explains to students that when you mix an acid with a carbonate the two ingredients react to form carbon dioxide gas.

   The escaping gas causes fizzing (from Making Better Sense of the Material World, Levels 1–4, Ministry of Education).

Acids	Carbonates
Lemon juice	Washing soda
Orange juice	Baking powder
Vinegar	A piece of limestone
Grapefruit juice	A piece of chalk or marble
Tomato juice	Crushed eggshells

   Learning Outcomes 1 and 2, Collecting, organising and analysing information Innovation, inquiry, and curiosity

4. Quality teachers use the existing effective models as defined in science.

Planning and Creating:

2. The teacher brings a store bought bath bomb to school to show the students. Students observe the packaging and presentation of the bath bomb before testing it out in water. Students guess what the ingredients could be in the bath bomb to make it fizz and foam using the knowledge they have gained at step 1.

3. Students brainstorm a list of people who they think would like to receive a bath bomb (suggested recipients could include mums, grandmas, sisters, friends, aunties, teacher aides, people in the community who do good deeds, etc). That is, students decided who their potential 'client' is for receiving the gift. Each student decides who they will give their bath bomb to.

4. The students use the Internet to obtain a range of bath bomb recipes (see websites listed in resource list or get students to do a Google Search – 'bath bomb recipes').

8. Quality teachers ensure tasks and classroom interactions provide support and guidance to facilitate student learning.

5. The teacher and students read these recipes during a whole class guided reading session and explore the structure, content and language of this type of writing. The students compare the differences between each recipe. NB: While this unit is progressing and before the students are expected to write a recipe (point 9), there is intense focus on recipes during guided reading and other aspects of the English programme (possibly homework too), where students have an in-depth look at language features of recipes, layout, etc. Collecting, organising and analysing information

2. Quality teachers encourage learners to work as a community and allow students to help each other.

6. The students work in co-operative groups to make a bath bomb from a selected recipe. Each group uses a different recipe. Learning Outcome 3, Working with others and in a team

7. The students test each bath bomb in water and observe the following: aesthetic appeal of the bath bomb before use (does it look good?), speed of dissolving, success of dissolving (did it all dissolve or break into big bits?), fragrance of bath water, etc. A Decision Making Grid could be used to judge the quality of each bath bomb and determine the best recipe. LO 3, Monitoring and evaluating

8. The students are told that they are about to design their own bath bomb recipe, however they will need to consider the preferences of their 'client'. Students may interview their client to determine such things as favourite colours, perfume likes and dislikes as well as details of environments where they bath bomb may be kept. 9. The class and or groups work together to develop success criteria for the completed bath bombs. Possible criteria could include: bath bomb looks nice, bath bomb has an attractive fragrance, bath bomb is durable and does not break up, bath bomb fully dissolves in water, etc. Excellence 10. The students work in small groups to invent their own recipe for bath bombs using the success criteria established at step 8 as a guide and the results from their previous bath bomb trial. Students are to write the recipe up using appropriate writing conventions (eg: list of ingredients, numbered steps, appropriate instructional language, etc). Encourage students to consider a range of additives for their bath bombs such as lavender flowers, rose petals, silver stars, fragrant oils, colouring, etc. Learning Outcome 4, Working with others and in a team, Planning and organising, Generating and using creative ideas and processes 11. Students make and test their invented bath bomb and modify their recipe if necessary. LO 4, Monitoring and evaluating 12. Students visit a pharmacy or invite a sales assistant from a pharmacy to visit their class. Students look at a range of bath products that are for sale in pharmacies and closely examine their packaging. Students consider the following questions: "Why are bath products put in packages?" and "What types of materials are used to package bath products?" "What type/style of packaging would be most suitable for my bath bomb?" LO 4, Collecting, organising and analysing information 13. Students source and experiment with a range of packaging materials, eg: cellophane, ribbons, cardboard, fabric, paper bags, etc. A useful website for packaging ideas is www.kidsdomain.com/craft/_wrap.html. Students to consider which packaging methods are best suited to the environment in which they will be stored, e.g. provide protection and preservation for their bath bombs. Encourage students to be resourceful and recycle materials where possible. LO 4, Planning and organising, Generating and using creative ideas and processes, Identifying, recruiting and managing resources	

14. Students plan, test and create a model package for their bath bomb to test dimensions and suitability. LO 4, Planning and organising, Generating and using creative ideas and processes, Monitoring and evaluating 15. Students source all the resources that they require to make their bath bomb and packaging. LO 4, Planning and organising, Identifying, recruiting and managing resources 16. Students work in their small groups to produce their bath bombs and packaging. LO 4, Working with others and in a team Community and participation **Sharing and Evaluating:** 17. The teacher and students share the bath bombs that they have created with each other and reflect upon their success based on the criteria set earlier. Learning Outcome 5, Monitoring and evaluating 18. Students give their gift to their chosen person.	***10. Quality teachers use evaluations that are purposeful and supportive of the learner.***

19. Students ask for feedback about their bath bomb from the recipient, particularly about how well the bath bomb dissolved in water and how it met the 'specifications' of the client. Students identify the strengths of their product and packaging and areas for improvement. LO 5, Monitoring and evaluating

Reflective Questions:

Exploring new knowledge and skills

- What happens when you mix a carbonate with an acid?
- What food and drink products are available that make use of this chemical reaction?
- What other substances do you think could be a carbonate? Why?
- What other substances do you think could be an acid? Why?
- How is a recipe set out? What information do you find in a recipe?
- What ingredients in bath bombs cause them to fizz?
- Was I pleased with the bath bomb that I made?
- What other ingredients could be added to a bath bomb to make it appealing?
- Would I do anything differently if I was able to make a bath bomb again?

Exploring what it is to be innovative and enterprising

- What Enterprising Attributes did you use in this unit and at what stage? Learning Outcome 6
- How could you improve on using the Enterprising Attribute/s for next time? LO 6
- Can you transfer this learning to your other topics?

Exploring further future focus issues

- Why do we do things for no monetary gain, sometimes?
- Why do we have to do things for monetary gain other times?
- How does our social entrepreneurship benefit others? What do we gain from this entrepreneurship?
- What values did you apply in this learning? Did that help to make it a success?

Possible Assessment Activities (Teacher):

Science: The students are asked to draw a picture that illustrates the chemical reaction that occurs when a carbonate and acid are combined. Students to include captions and labels to clearly explain what is taking place.

English: The teacher assesses the written language in the students' bath bomb recipes using the progress indicators from the NZ Curriculum English Exemplars: http://www.tki.org.nz/r/assessment/exemplars/eng OR the students write another recipe for a popular food item such as popcorn, coconut ice, fruit kebabs, etc, and the teacher assesses this.

Have groups write their recipe and then have another student group to follow their recipe – students could peer review each other's recipes as they follow it. Either students can make assumptions about any omissions of information but note these. Or you can have them follow the recipe to the detail! Students may be surprised at what important information they had left out!

Handy Hints:

- Students will need to be accurate in their measurements in this activity!
- Look for bulk purchases with reduced prices for the ingredients; it can be costly from the supermarket. Or ask students to make a donation to cover the costs, etc.

Or seek product (resources for bath bombs) sponsorship from the local Supermarket. They can be one of the 'good' citizens.

Decision Grid

Choices / Criteria						
						Total