

# Science in schools: **Cosmetics**



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The resources in this unit will provide opportunities for your students to investigate links between science and society and to develop their practical skills by using everyday ingredients to make their own cosmetics in the form of an exfoliator scrub, and/or a bath bomb.

## Preparation needed

### You will need:

- Access to the internet, magazines, large pieces of paper, post it notes, various everyday, natural ingredients (see recipes)
- Mixing equipment such as bowls, forks and spoons, measuring cups, scales. The bath bomb procedure uses a spray bottle like those used for spraying houseplants.

### You will need to:

- Practise the recipes - depending on your source of the natural ingredients, the exact quantities used and methods may give variable results.
- Risk assess the use of the ingredients in your classroom.

**Age range:** 13-18

**Science:** Chemistry/Biology

**Curriculum Links:** Science, English, Media Studies, Personal, Social and Health Education

### Objectives:

- To carry out research about cosmetics advertising and analyse reviews.
- To learn about the use of natural chemicals in the manufacture of skincare products.
- To develop practical skills in Science.
- To learn some technical terms in Biology and Chemistry and practise reading and writing technical English.

**Skills and attributes:** Collaborating, critical thinking, communicating, self awareness.

**Learning Focus:** Analysis of cosmetic products and reviews. Making cosmetic skin products.

**Language Functions:** Describing, naming, asking and answering questions

## Vocabulary

- Exfoliator, epidermis, cells, healthy, rejuvenate, absorb, anti-inflammatory, sensitive, skin, vitamin, salt, sugar, oil, almond, lemon, lime, orange, cranberry, olive, consistency, corn flour, glitter, acid, vanilla, colouring, baking soda, jojoba



## Activities and teaching notes

Divide the class into small groups and start your lesson by showing some examples of popular adverts for cosmetics.

Ask them to note their first impressions of these and the claims they make. Invite each group to make a list of the cosmetic products they use and discuss and note what influences their decisions when buying these brands?

Are they influenced for example mostly by cost, brand reputation or loyalty, celebrity endorsements, ingredients, or testing regimes? Bring the group back together and reflect on their conclusions. Do patterns emerge across the class? What are the three main reasons given for buying new products?



## Activity 1: Analysing online reviews

Ask each group to search the Internet for 'cosmetics reviews.' Encourage them to choose two or three examples from different websites. Invite them to read the reviews together, making sure they fully understand what they say and create a set of notes about each one using the following headings on the template provided on **Worksheet 1**:

- Name of product reviewed and website (+URL)
- Organisation behind website (name and purpose)
- Does the website include links to buy the products?
- Review format (scoring system, length, subsections, aim of reviews)
- Purpose of product
- Overall message of the review about this product
- Indications of bias by the reviewer
- Your trust level of this review

Depending on the time available and Internet access, you may wish to pre-prepare a list of carefully chosen reviews that highlight different aspects to be studied.

Invite students to either feedback orally to the class, or produce a written report of their analysis. Which did they find most helpful to the consumer? Did they find any examples of manipulation of data or bias in the presentation of information as well as some impartial scientific advice?



## Worksheet 1 Cosmetic reviews: Analysing online reviews

Use the following template to record information for your cosmetic product review:

Name of product reviewed
Purpose of product
Does the website include links to buy the products or other advertisements?
Name of website (+URL)
Organisation behind website (name and purpose)
Overall message of the review about this product
Indications of bias by the reviewer
Your trust level of this review from 1-10 (1 being low, 10 high)

## Activity 2: Writing your own review

Having analysed the content and style of different types of professional cosmetics reviews, challenge your students to write one of their own.

Ask them to select a cosmetics product. Ideally encourage them to choose one they actually use or provide some suitable samples. Divide them into pairs or small groups to make notes on the ingredients, packaging instructions, and claims made by the manufacturers. Encourage them to research via the Internet any scientific information available about the ingredients or processes used in the product and with appropriate risk assessments for allergies, test the samples for application.

The template on **Worksheet 2** can assist with the organisation of this task.

Invite your students to then create a review of their product in an appropriate style of their choice. This could be an illustrated magazine article, objective science based website, community forum, radio, television or YouTube format.


When this process is complete, ask your students to present their review to another audience. This could be another class or year group, content for a school magazine or website or via Skype with a partner school.



## Worksheet 2 Cosmetic reviews: Writing a review

Make notes about the product you have chosen using these headings:

Name of product, and price
Organisation behind product: (manufacturer or shop)
List the important/active ingredients
Note anything important from the instructions for use
Research what you can find out about the active ingredients and compare this information with the manufacturers' claims, and the purpose of the product



## Activity 3

Having explored the market for cosmetic products, ask the students to set up an experiment to create their own new skincare product from everyday ingredients.

They have two options:

- 1) An exfoliating scrub (three recipes are given to help flexibility in sourcing the necessary ingredients) or
- 2) A bath bomb (some ingredients overlap with the sea salt scrub above)

### What to do...

#### Exfoliator

- Divide your class into groups and give out the resources required along with **Worksheet 3**.
- Describe the process of keratinization and the importance of exfoliation outlined on the worksheet.
- Ask each group to follow the instructions carefully and measure the correct quantities of each ingredient, and mix them in a bowl and leave them to set overnight.

#### Bath bomb

- Explain the science behind the fizzing or effervescence of the bath bomb. This occurs as gas is released from an acid-alkali reaction between the baking soda and citric acid.

Ask your students to:

- Give out the resources required along with worksheet 4
- Measure out the correct quantities of each of the dry ingredients, and mix them in a bowl, using a whisk or fork.
- Carefully measure the correct quantities of each of the wet ingredients, and mix them in a spray bottle.
- Follow the instructions for combining wet and dry ingredients and leave the mixture to set overnight in an ice cube tray.
- In the following session, invite them to give their skincare creations a name, create ideas for packaging and devise success criteria in order to evaluate the effectiveness of their own and another pair's product.
- Students can either feedback orally to the class, or produce a written report of their results.



## Worksheet 3: Exfoliator

### Scrubilicious Sea Salt Body Scrub

- ½ Cup of Sea Salt
- ½ Cup of Sweet Almond Oil
- ½ Teaspoon of Lemon/Lime Juice

### Sweet Sugar Face Scrub

- 4 tsp. Fine Organic Brown Sugar
- 4 tbsp. Extra Virgin Olive Oil
- 2 tbsp. jojoba oil

### Fruit Cocktail Up Scrub

- 1 tbsp. Fine White Sugar
- 1 tsp. Cranberry Oil
- A Drop Orange and Lemon & Extracts
- A few drops of Cranberry Juice

**Exfoliators** are an essential part of any skin care regime! The skin undergoes a natural exfoliation process called **keratinization**. The live cells at the bottom of the **epidermis** (top layer of your skin) work their way up through the other layers, becoming harder as they reach the top of the surface. At the top, these cells die and flake off (good riddance!) revealing the newer, **healthier cells** underneath. Our exfoliators help to **slough away** those dead skin cells, **unclog** the oil and dirt in our pores, and leave our skin looking healthy and **rejuvenated!**

Almond oil is **intensely hydrating**, and is particularly good for **sensitive skin** and dry skin types.

Jojoba Oil has a very high **wax ester** content, making it very similar to **sebum** (the skin's natural moisturising oil). This means the oil is very **well absorbed** by the skin for maximum, more natural, hydration!

Cranberry Oil contains a balance of **omega-3** and **omega-6** fatty acids. These are hydrating and **anti-inflammatory** - perfect for chapped lips! Cranberry oil is the richest natural source of **vitamin E**, giving it powerful **anti-oxidant** properties to protect against those pesky **free radicals** that can damage the skin!



## Worksheet 4: Bath bomb

### Dry Ingredients

- 50g Baking Soda
- 25g Powdered Citric Acid
- 25g Corn Flour
- 25g Coarse Sea Salt
- A Sprinkling of Glitter!!

Weigh all these and then mix up in a bowl. Use a whisk or fork to break up any lumps.

### Wet Ingredients

- 1 tbsp. water
- 1/2 tbsp. almond oil
- Around 5 drops of food colouring
- Around 5 drops of vanilla essence or tea tree oil

Make the ingredients up into a spray bottle. Spray around of the volume evenly over the surface of the dry ingredients in the bowl and mix with a whisk or a fork. Add the other quarters and mix in turn.

### It's all in the consistency!

The consistency of the mix is a bit of an art form! The mix should still appear dry, but you should be able to crush it together to form a solid (if slightly crumbly) lump. If it's too crumbly or too wet then they won't set properly! Once you think you've cracked the consistency, press the mixture into an ice cube tray and leave to set over night.

### The Science Behind The Ballistics

We're all familiar with the satisfying cloud of bubbles that come from a bath bomb after it has splashed into the water. The fizzing, also known as effervescence, is gas being released from an acid-alkali reaction between two of the ingredients in the bath bomb. The baking soda (sodium bicarbonate) acts as an alkali, reacting with the citric acid to produce carbon dioxide gas, water and a neutral salt, sodium citrate. This reaction is endothermic, which means that it takes in energy. Because carbon dioxide gas is being released into the environment the mass of the reaction goes down throughout. The bath bomb dissolves into the water amidst the bubbles, releasing the other ingredients in the bath bomb. The almond oil is released into the water to help moisturise our skin while we soak in the bath, while the sea salts are freed to exfoliate. Vanilla essence and tea tree oil are for fragrance, and if you've opted for the tea tree, that has loads of properties including acne-fighting benefits!



## Additional activities

Your students could also:

- Try different recipes to observe the differing outcomes
- Experiment with the relative quantities of ingredients and see how this affects the product created.
- Research the science behind the ingredients and processes in greater detail
- Create packaging and an advertising campaign for their products and perhaps make and sell the most successful at a school event to raise funds for charity.

## Further information can be found at:

- Newcastle university linked Beauty by the Geeks: <http://www.beautybythegeeks.com>
- The Beautypedia website: <http://www.paulaschoice.com/beautypedia/>
- The Society of Cosmetic Scientists: <http://www.scs.org.uk/>

## Partner School Activities

If you are working with a partner school you could:

- Compare popular cosmetics and the reasons behind this in each country
- Share your product reviews with your partner school
- Exchange photographs and evaluations of the skin care products you create.