

Wash Bag Chemistry

Teachers' Guide



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Overview

There are a number of ways the lessons in this activity can be organised. A suggested method has been outlined on the following pages.

'Wash Bag Chemistry' has the potential to be a truly cross curricular activity. On trialling the material – the Business Studies department in a school can take on the task of compiling the product reports and teaching the business outcomes that could be covered. The Art department could also be involved – pupils could design logos for their chosen brands.

Brief

Your group is a Research and Development (R&D) Team chosen to lead the design of a new consumer product for a company called 'SEB'. There are three products being considered for development by the company, a shampoo, a lip balm and a body moisturising lotion but only one product can be put forward into production. It is your team's responsibility to research which product should be chosen by the company. You will then present your findings to the company president.

Be warned, there are other R&D teams that have also been asked to take on this task and the most successful team stand to win a substantial bonus.

Acknowledgements



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Scottish Schools Equipment Research Centre

Brief outline of possible lessons

Activity	Title	Brief outline	Skills / concepts	Outcome
1	Introduction (15 - 30 mins)	Video outlining the pupils brief. Initial research into the products – reading the product pack. Preparation for practical work. Teacher demo of steam distillation. Formation of research teams. Selection of oil to be extracted.	Researching, investigating; changes of state	SCN 3-05a – Planet Earth (changes of state) SCN 3-17b – Materials (extracting substances from natural sources) LIT 3-02a LIT 3-05a LIT 3-14a
2	Steam distillation – practical (45 mins to 1 hour)	In research teams, an oil is extracted using a non quick-fit steam distillation.	Changes of state, distillation, condensation, evaporation, steam distillation, extraction from a natural source	SCN 3-05a – Planet Earth (changes of state) SCN 3-17b – Materials (extracting substances from natural sources) SCN 3-16a – Properties (distillation and dissolution) LIT 3-02a
3	Product 1 – practical, evaluation and product report writing. (45 mins +)	In research teams, product 1 is made and observations and potential problems noted. Each team will begin with a different product. After making the product, teams could begin the product report.	Solubility in different solvents, collaborative working, numeracy	SCN 3-16b – Properties (solubility using different solvents) LIT 3-02a LIT 3-05a LIT 3-14a HWB 3-15a HWB 3-19a MNU 3-01a MNU 3-07a MNU 3-20a TCH 3-07a TCH 3-07b SOC 2-22a
4 + 5	Product 2+3 – practical, evaluation and product report writing. (45 mins +)	In research teams, products 2 and 3 are made and observations and potential problems noted. Each team will begin with a different product. After making the product teams could begin the product report.	Solubility in different solvents, collaborative working, numeracy	SCN 3-16b – Properties (solubility using different solvents) LIT 3-02a LIT 3-05a LIT 3-14a HWB 3-15a HWB 3-19a MNU 3-01a MNU 3-07a MNU 3-20a TCH 3-07a TCH 3-07b SOC 2-22a
6	Preparation for Board Meeting Presentation (home exercise?) (45 mins)	Teams should decide which product is to be presented to the board and begin work on their presentations. A help sheet is available for this.	Collaborative working, evaluating, concluding, presenting scientific information	LIT 3-02a LIT 3-05a LIT 3-14a TCH 3-07a TCH 3-07b SOC 2-22a

7	Scientific report writing (exam conditions?) (45 mins)	Individually each pupil could compile a scientific report. This allows an assessment to be made of pupil learning. A help sheet is available for this.	Evaluating, concluding, summarising, processing and presenting scientific information	LIT 3-06a LIT 3-21a LIT 3-24a LIT 3-28a
8	Board Meeting (45 mins)	Suggested assessment criteria is available.	Collaborative working, presenting scientific information	SCN 3-20b LIT 3-09a LIT 3-21a LIT 3-24a LIT 3-28a TCH 3-07b

Supporting information

Resources

▶ Product Pack

This pack contains much of the information groups will need to research and make their cosmetic products.

There are some computer mouse icons throughout the pack and these are to prompt pupils to find out information about various scientific words that are being used. These could be set as home exercises.

▶ Business Pack

This contains all the relevant financial information groups will need to work out which product will generate the greatest profit.

For each product, teams must complete a business plan, which can be found in the business pack, allowing all the relevant information to be gathered together.



Sources of chemicals and other equipment

- ▶ Neal's Yard Remedies www.nealsyardremedies.com
- ▶ Gracefruit (based near Stirling) www.gracefruit.com/
- ▶ Xanthan Gum (available in some supermarkets and health food shops)
- ▶ Castile Soap (available from a number of internet retailers including Amazon)
- ▶ Sepigel (manufactured in the UK by SEPPIC UK – small quantities may be available using internet companies such as Saffire Blue) www.saffireblue.ca

Health and safety



Under the COSHH Regulations, the Management of Health and Safety at Work Regulations, and other regulations, employers are responsible for making a risk assessment before hazardous procedures are undertaken or hazardous chemicals are used or made. Teachers are required to co-operate with their employers by complying with such risk assessments. For further information contact SSERC in Scotland and CLEAPSS in the rest of the UK.

Shampoos and moisturisers



The following advice has been provided by SSERC on the use of moisturisers and shampoos.

"If the components used to make the shampoos and moisturisers have come from a source intended for cosmetics making and if the measuring equipment and area used in preparation are scrupulously clean and the bottles and equipment sterile, then the shampoos and moisturisers should be safe to test out on a small area of skin on the back of the hand on the day of manufacture, provided the tester has no skin conditions such as eczema and has no known skin or related allergies.

Shampoos and moisturisers are made in industry under incredibly strict sterile conditions. As well as this, these products would normally contain preservatives. It is not recommended that shampoos or moisturisers made under the conditions present in a normal school laboratory are used outside the classroom."

Lip balm



The following advice has been provided by SSERC on the use of lip balm material.

"If the components used to make the lip balm have come from a source intended for lip balm making and if the measuring equipment and area used in preparation are scrupulously clean (e.g. a food preparation area) and the bottle and equipment sterile, then the balms should be safe to use on the day of manufacture. If not, or if there is any doubt, the product should be tested on the back of a hand. SSERC can be approached for specific advice.

Please bear in mind that no preservative has been added to the product. It is not recommended that lip balms made under the conditions present in a normal school laboratory are used outside the classroom.

You cannot stress enough to the students the importance of this.

Anyone suffering from a known skin or related allergy should not use the product.

Particular attention should be paid to anyone suffering from nut allergies. They should NOT use the product as it contains oils such as sweet almond or jojoba which are derived from nuts. This is important to bear in mind both during the manufacturing process and for their peers who may be asked to take part in any survey."

IMPORTANT NOTE

Due to the high moisture content, lack of preservatives and method of application, it is not recommended that moisturisers, shampoo products and lip balms are taken from the classroom. Teachers should resist any plea from pupils to take the product(s) home.

It would be sufficient to use them in class on the day it was made only. The risk of bacterial infection is high.

Outcome number	Outcome description
SCN 3-05a	By contributing to experiments and investigations, I can develop my understanding of models of matter and can apply this to changes of state and the energy involved as they occur in nature.
SCN 3-16a	I can differentiate between pure substances and mixtures in common use and can select appropriate physical methods for separating mixtures into their components.
SCN 3-16b	I have taken part in practical investigations into solubility using different solvents and can apply what I have learned to solve everyday practical problems.
SCN 3-20b	Through research and discussion, I have contributed to evaluations of media items with regard to scientific content and ethical implications.
LIT 3-02a	When I engage with others, I can make a relevant contribution, encourage others to contribute and acknowledge that they have the right to hold a different opinion. I can respond in ways appropriate to my role and use contributions to reflect on, clarify or adapt thinking.
LIT 3-05a	As I listen or watch, I can make notes and organise these to develop thinking, help retain and recall information, explore issues and create new texts, using my own words as appropriate.
LIT 3-06a	I can independently select ideas and relevant information for different purposes, organise essential information or ideas and any supporting detail in a logical order, and use suitable vocabulary to communicate effectively with my audience.
LIT 3-09a	When listening and talking with others for different purposes, I can: communicate information, ideas or opinions; explain processes, concepts or ideas; identify issues raised; summarise findings or draw conclusions.
LIT 3-14a	Using what I know about the features of different types of texts, I can find, select, sort, summarise, link and use information from different sources.
LIT 3-21a	I can use a range of strategies and resources and spell most of the words I need to use, including specialist vocabulary, and ensure that my spelling is accurate.
LIT 3-24a	I can consider the impact that layout and presentation will have on my reader, selecting and using a variety of features appropriate to purpose and audience.
LIT 3-28a	I can convey information, describe events, explain processes or concepts, and combine ideas in different ways.
HWB 3-15a	I am developing my understanding of the human body and can use this knowledge to maintain and improve my wellbeing and health.
HWB 3-19a	I am developing the skills and attributes which I will need for learning, life and work. I am gaining understanding of the relevance of my current learning to future opportunities. This is helping me to make informed choices about my life and learning.
MNU 3-01a	I can round a number using an appropriate degree of accuracy, having taken into account the context of the problem.
MNU 3-07a	I can solve problems by carrying out calculations with a wide range of fractions, decimal fractions and percentages, using my answers to make comparisons and informed choices for real-life situations.
MNU 3-20a	I can work collaboratively, making appropriate use of technology, to source information presented in a range of ways, interpret what it conveys and discuss whether I believe the information to be robust, vague or misleading.
TCH 3-07a	When participating in a collaborative enterprise activity, I can develop administrative and entrepreneurial skills which contribute to the success of the activity.
TCH 3-07b	I can select and use a range of media to present and communicate business information.
SOC 2-22a	By experiencing the setting up and running of a business, I can collaborate in making choices relating to the different roles and responsibilities and have evaluated its success.

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