**Uses of Polymers**

**Should we use plastic microbeads in body scrubs?**

You may have a body scrub at home that contains polyethene microbeads. Microbeads are minute pieces of plastic defined as 0.1 to 0.5 millimetres in size, used to give beauty products like facial and body scrubs a grainy texture for exfoliation. But what happens to microbeads when they are flushed down the drain?

Use the website below as a starting point to find information on the use of polyethene microbeads in body scrubs.

<http://www.abc.net.au/btn/story/s4425888.htm>

Other useful websites include:

<http://unep.org/gpa/documents/publications/PlasticinCosmetics2015Factsheet.pdf>

<http://beatthemicrobead.org/en/science>

<http://www.abc.net.au/news/2014-08-21/microplastics-found-in-sydney-harbour-floor/5686472>

Use other sources also to answer the following questions.

* Describe the properties of polyethene that make it suitable for use in body scrubs
* Evaluate of the advantages and disadvantages of using petroleum to manufacture polyethene
* Describe effective alternatives for polyethene in these products
* Describe the chemical structure of polyethene and explain why it is resistant to degradation in the environment
* Discuss the problem of microplastics, such as polyethene microbeads, entering marine environments as an example of the use of scientific knowledge having unexpected consequences

Present your findings in a format of your choice. Include an appropriate acknowledgement of your sources of information.

**Assessment Conditions:**

Some class time is provided for research and support. Students have 1 week to complete the task.

Students may submit one draft for feedback.

As a guide, aim for a maximum of 1000 words or 6 minutes for an oral presentation.

| ``- | Investigation, Analysis, and Evaluation | Knowledge and Application |
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| A | Critically deconstructs a problem and designs a logical and coherent chemistry investigation with detailed justification.  Obtains, records, and represents data, using appropriate conventions and formats accurately and highly effectively.  Systematically analyses and interprets data and evidence to formulate logical conclusions with detailed justification.  Critically and logically evaluates procedures and discusses their effect on data. | Demonstrates deep and broad knowledge and understanding of a range of chemical concepts.  Applies chemical concepts highly effectively in new and familiar contexts.  Critically explores and understands in depth the interaction between science and society.  Communicates knowledge and understanding of chemistry coherently, with highly effective use of appropriate terms, conventions, and representations. |
| B | Logically deconstructs a problem and designs a well-considered and clear chemistry investigation with reasonable justification.  Obtains, records, and represents data, using appropriate conventions and formats mostly accurately and effectively.  Logically analyses and interprets data and evidence to formulate suitable conclusions with reasonable justification.  Logically evaluates procedures and their effect on data. | Demonstrates some depth and breadth of knowledge and understanding of a range of chemical concepts.  Applies chemical concepts mostly effectively in new and familiar contexts.  Logically explores and understands in some depth the interaction between science and society.  Communicates knowledge and understanding of chemistry mostly coherently, with effective use of appropriate terms, conventions, and representations. |
| C | Deconstructs a problem and designs a considered and generally clear chemistry investigation with some justification.  Obtains, records, and represents data, using generally appropriate conventions and formats, with some errors but generally accurately and effectively.  Undertakes some analysis and interpretation of data and evidence to formulate generally appropriate conclusions with some justification.  Evaluates procedures and some of their effect on data. | Demonstrates knowledge and understanding of a general range of chemical concepts.  Applies chemical concepts generally effectively in new or familiar contexts.  Explores and understands aspects of the interaction between science and society.  Communicates knowledge and understanding of chemistry generally effectively, using some appropriate terms, conventions, and representations. |
| D | Prepares a basic deconstruction of a problem and an outline of a chemistry investigation.  Obtains, records, and represents data, using conventions and formats inconsistently, with occasional accuracy and effectiveness.  Describes data and undertakes some basic interpretation to formulate a basic conclusion.  Attempts to evaluate procedures or suggest an effect on data. | Demonstrates some basic knowledge and partial understanding of chemical concepts.  Applies some chemical concepts in familiar contexts.  Partially explores and recognises aspects of the interaction between science and society.  Communicates basic chemical information, using some appropriate terms, conventions, and/or representations. |
| E | Attempts a simple deconstruction of a problem and a procedure for a chemistry investigation.  Attempts to record and represent some data, with limited accuracy or effectiveness.  Attempts to describe results and/or interpret data to formulate a basic conclusion.  Acknowledges that procedures affect data. | Demonstrates limited recognition and awareness of chemical concepts.  Attempts to apply chemical concepts in familiar contexts.  Attempts to explore and identify an aspect of the interaction between science and society.  Attempts to communicate information about chemistry. |

Performance Standards for Stage 1 Chemistry