Everyday applications of changes of state

Sheet 7

Instructions:

In this research task you will investigate an application of a change of state such as from a liquid to a gas or a gas to a liquid. You should answer the research questions by finding useful websites. These websites will be evaluated in Part C.

Note

If you do not have access to the internet, contact your teacher for advice about other research materials you can use.

Part A: Research an everyday application of changes in state

1. Open a new document on your computer and save it using the title 'An everyday application of change of state'.
2. Choose one of the everyday applications listed below as a topic of research:
   - aerosol cans
   - smoke machines
   - moth balls
   - air fresheners
   - LPG gas bottles for your BBQ
   - eucalyptus oil inhalation
   - other.
3. Use the internet to locate information about your everyday use. Some useful questions to guide your research are the following:
   - What is the name of the material undergoing a change in state?
   - What is the change of state? (for example, from solid to liquid)
   - Why is this change of state useful?
4. Read the example response on refrigeration provided below.
5. Insert the table shown below into your document. Record your information in this table and name it after your chosen everyday use.

Website title: _____

URL: _____

Date accessed: _____

Original information	Summary of information	In my own words
Cut and paste your information from the website here.	Summarise the information in dot points.	Write your dot points in sentences using your own words.

Example response on refrigeration

Website title:	Refrigeration/Refrigerants
URL:	http://en.wikipedia.org/wiki/Refrigeration http://en.wikipedia.org/wiki/Refrigerant
Date accessed:	14 January 2015

Original information	Summary of information	In my own words
If there is too much text to be inserted here, mention the part of the website or resource that you are referring to, for instance the 'How it works' video on a site about compressor refrigerators.	A refrigerant. For example: ammonia, is circulated through fridge. Refrigerant — a substance which easily changes state from liquid to gas — has a low boiling point Stages in cycle — refrigerant: • enters compressor as gas at high temperature • leaves compressor at higher temperature • enters condenser — gas cooled to liquid • enters expansion valve — gas expands to become gas/liquid mixture at lower temperature • cold gas/liquid enters evaporator coils — cold gas/liquid mixture absorbs heat from warm air, cooling the fridge • liquid in mixture evaporates to gas	Refrigeration works because a substance called a refrigerant has a low boiling point — so it readily changes state between liquid and gas, absorbing and releasing heat energy. Ammonia is an example of a refrigerant used in refrigerators. The refrigerant cycles through different components of the refrigerator. As a high temperature gas, it is compressed and condensed, releasing heat energy and changing state to a liquid. Further on in the cycle it enters evaporator coils, where it absorbs heat energy from the air, changing state to a gas. This causes cooling in the refrigerator cabinet. The cycle then begins again.

Part B: Explaining the change of state

Write two to three paragraphs explaining the change of state you investigated. Your paragraphs should include:

- a description of the change of state, identifying the properties of the different states of matter
- labelled diagram/s explaining the differences in the states of matter, in terms of the particle model of matter
- an explanation of how the change of state is used
- a justification for how and why the change of state is suited to this use.

Part C: Evaluate the website

1. Go to the **Website — The 5W's of Website Evaluation** (Kathy Schrock) http://www.schrockguide.net/uploads/3/9/2/2/392267/5ws.pdf.
2. Choose one question from each heading and transcribe it into your document.
3. Use these questions to evaluate the website you accessed in **Part A.** Write your answers in sentence form under the questions you chose.
4. Write a short statement summarising how credible, reliable and valid you believe the site to be. Justify your opinion with evidence collected during your evaluation.

Example response on refrigeration

Who? Who wrote the website? Are they an expert?	There is no author provided.
What? What does the author say is the purpose of this website?	There is a general heading which says the page is from a free encyclopaedia, and there are many authors, so no one author has a purpose.
When? When was the website created?	This page was modified in January 2015, at the time of printing (look at the bottom of the page).
Where? Where does the information on the website come from? Where does the funding for the website come from (For example: government?)	Wikipedia sponsors the page. It is a non-profit organisation. A number of people have created it and we don't know who they are, but it has references from reputable sources (For example: journal articles produced for/by universities). Facts can be edited by anyone and this could make the information more unreliable.
Why? Why is this information useful?	It covers the basics of materials involved and describes the processes leading to changes of state. The text is, however, fairly technical and requires understanding of scientific terminology to understand the text. The diagram helps with understanding.

Evaluation summary: This source may not have **credibility** because its author is unknown. It has been written by a number of authors and can be edited by anyone. The references show that the text has been sourced by many of these authors, from **reliable** and **valid** resources, such as chemistry and engineering textbooks, university journal articles, the New York Times.