



VEA

Bringing Learning to Life

Program Support Notes

18mins

Chemical Equations in the Real World

Program Support Notes by **Jodie Ashby**, B.Ed., B.Sc.

Produced by **VEA Pty Ltd**

Commissioning Editor **Sven Shepherd** B.Ed.

Executive Producer **Simon Garner** B.Ed.

© Video Education Australasia Pty Ltd 2009

Reproducing these teacher notes

You may download and print one copy of these teacher notes from our website for your reference. Further copying or printing must be reported to CAL as per the *Copyright Act 1968*.

Suitable for:

Chemistry

To order or inquire please contact VEA:

VEA (Video Education America)

6902 Hawthorn Park Dr

Indianapolis, IN 46220

Tel 1.866.727.0840

Fax 1.866.727.0839

E-mail

orders@veavideo.com

Website

www.veavideo.com

Chemical Equations in the Real World

For Teachers:

Introduction

Not many people realize that chemistry is an important feature in our everyday lives. Many of the important advances in technology and the production of materials can be directly related to chemistry. This program looks at five very different materials and the chemical process behind each one. Students will gain an insight into how surface chemistry, redox chemistry, metals and polymers have directly affected their everyday life.

Program Timeline

00:00:00	Introduction
00:01:01	Soap
00:05:02	Polystyrene
00:07:34	Aluminum
00:12:08	Paint
00:14:37	Car batteries
00:17:38	Credits
00:18:50	End program

Website References

www.chemistry.nus.edu.sg
www.americanchemistry.com
www.chemguide.co.uk/inorganic/extraction/aluminium.html

Other Relevant Programs available from VEA

Our Chemical Environment Series
Chemical Equations – Material World Series
Chemical Reactions
Acids and Bases

Please visit our website for more relevant programs www.veavideo.com

VEA – Bringing learning to life

Chemical Equations in the Real World

Student Worksheet:

Before Viewing the Program

1. List three solutions used in everyday life that have developed through chemistry.

2. List three solid materials used everyday that have also been developed through chemistry.

3. Investigate how a regular alkaline battery works.

4. Define the following words

a) Monomer

b) Polymer

c) Polar

d) Hydrophobic

e) Hydrocarbon

f) Anode

g) Micelle

5. List four properties of metals.

Chemical Equations in the Real World

While Viewing the Program

1. Name three things you do everyday that involve the use of chemistry.

2. What are detergents?

3. Soap belongs to a group of detergents known as _____

4. Explain how soap helps to mix water and oil.

5. Where can we find the chemical styrene in nature?

6. Draw a diagram of the styrene monomer below.

7. What blow agents are used when making polystyrene and what is their purpose?

Chemical Equations in the Real World

8. Why is aluminum so useful for outdoor buildings?

9. Where does aluminum come from?

10. What does 'electrolysis' stand for?

11. Aluminum is an excellent product to recycle. What are two of the major advantages of recycling aluminum?

12. What is the purpose of using a resin in paint?

13. What are the two most common solvents in paint?

14. What role do solvents play in paint?

15. What is the purpose of using a pigment in paint?

16. A battery changes _____ energy into _____ energy.

17. Lead acid batteries are a specific type of battery used in a car. Why does it have the ability to last so long compared with a regular alkaline battery?

Chemical Equations in the Real World

After Viewing the Program

1. Investigate the history of soap making.
2. Three main types of detergents are anionic detergents, cationic detergents and non-ionic detergents. Explain the difference between each type of detergent and where it is best used.

Anionic detergents

Cationic detergents

Non-ionic detergents

3. PVC or Polyvinylchloride is another very common material that we use in everyday life. What is the monomer of PVC? What are five uses of PVC?

Chemical Equations in the Real World

4. Investigate why polystyrene makes a good flotation device.

5. Research & report another common metal that we use in everyday life. In what form is it found and what chemical processes are used to make it into the material we require. Examples might include iron, gold, silver, stainless steel, copper.

6. The manufacturing of paint usually occurs in four stages. What are these four stages? Explain what occurs at each stage.

Stage 1

Stage 2

Stage 3

Stage 4

Chemical Equations in the Real World

Suggested Student Responses

While Viewing the Program

1. Name three things you do everyday that involve the use of chemistry.
2. What are detergents?
Products that clean oil, dirt, grease from our clothes, hair and bodies.
3. Soap belongs to a group of detergents known as **surfactants**.
4. Explain how soap helps to mix water and oil.
When soap is put into water, the hydrocarbon tails of the soap, which are hydrophobic, are attracted to each other and form micelles. The oil is then attracted to the centre of the micelles. Since the micelles are negatively charged they repel each other and hence the oil and water appear mixed.
5. Where can we find the chemical styrene in nature?
Nuts and fruits.
6. Draw a diagram of the styrene monomer below.
A good diagram is provided in the program. Students should have the same diagram.
7. What blow agents are used when making polystyrene and what is their purpose?
A range of gases such as carbon dioxide or pentane can be used. Their purpose is to help the mixture of styrene blow up.
8. Why is aluminum so useful for outdoor buildings?
Aluminum is resistant to corrosion, it forms an oxide layer when exposed to air and this prevents any other reactions with water or chemicals.
9. Where does aluminum come from?
The ore, bauxite
10. What does 'electrolysis' mean?
To break something down, using electricity
11. Aluminum is an excellent product to recycle. What are two of the major advantages of recycling aluminum?
 - **Aluminum doesn't lose quality when recycled.**
 - **The process only uses about 5% of the energy required to produce fresh aluminum.**
12. What is the purpose of using a resin in paint?
To bind the ingredients in paint together
13. What are the two most common solvents in paint?
Water and oil
14. What role do solvents play in paint?
The role of a solvent is to keep the paint a liquid whilst in the tin. Once used, the solvent evaporates, leaving behind the paint fixed to a surface.
15. What is the purpose of using a pigment in paint?
Pigment gives color to paint.

Chemical Equations in the Real World

16. A battery changes **chemical** energy into **electrical** energy.
17. Lead acid batteries are a specific type of battery used in a car. Why does it have the ability to last so long compared with a regular alkaline battery?
The redox reactions occurring in a lead acid battery are able to be reversed, hence their ability to last for years.