

Subject: Chemistry

Topic: Electrolysis

Sub-topic: The industrial applications of electrolysis

Level: S.4

Learning objective:

1. Content

Students should be able to use the knowledge they have learnt about electrolysis to produce a group project on a topic related to the industrial applications of electrolysis.

2. Language:

Students should be able to write a project report with clear section headings and sub-headings for their project.

S.4 Chemistry
Electrolysis
The industrial applications of electrolysis
Project Work

Name: _____ No.: _____ Class: _____ Date: _____



Part 1 Group Project (60% of total mark):

Instructions:

1. Work in groups of 6.
2. Choose *ONE* of the following topics to do a project:
 - ✧ Extraction of reactive metals
 - ✧ Purification of metals
 - ✧ Aluminium **anodization**
 - ✧ Manufacture of chlorine, hydrogen and sodium hydroxide
 - ✧ Electroplating
 - ✧ Environmental concerns of electroplating
3. Only *one* group can work on each topic: If there are two groups choosing the same topic, then a **draw** will be used to determine which group works on which topic.
4. Read the students' project learning handbook and complete all the tasks in it.
5. Write a *short project report (about 1000 - 1500 words)* with references included.

Part 2 Presentation (40% of total mark):

Instructions:

1. You are expected to do the presentation using Powerpoint.
2. *Group leaders* collect a notebook computer and peer-evaluation forms from the teacher's bench for the presentation.
3. Assign one or two group members as the presenters.

4. Each group gives a short oral presentation (about 5 minutes) on the chosen topic.
5. There will be a question and answer section (for about 3 minutes) after each group's presentation.
6. At the end of all presentations, each group will evaluate the other groups' performance.
This evaluation also contributes some marks to the project and will be used to determine the "Best Project Award".

The Industrial Applications of Electrolysis: Students' Project Learning Handbook

Instructions:

A. Stages of Project Learning

1. Formation of groups and selection of a topic

Get into groups of 6 and choose *ONE* of the following topics for your project:

- ✧ Extraction of reactive metals
- ✧ Purification of metals
- ✧ Aluminium **anodization**
- ✧ Manufacture of chlorine, hydrogen and sodium hydroxide
- ✧ Electroplating
- ✧ Environmental **concerns** of electroplating

2. Collection of information (Part **B**)

3. Processing of information (Part **C**)

4. Presentation of information in a written report (Part **D**)

B. How to Collect Information

1. Decide on what you would like to find out about your topic. Write them down as research questions. Think about the 5 W-questions to help you identify research questions. You can also think about possible areas such as the chemical basis, the industrial uses, what is required to make it work, examples of uses.
2. Search for information useful to answer your research questions.
3. Use various methods to collect information, e.g. reading books, magazines and newspapers, surfing the Internet, etc.
4. Collect various types of information, e.g. text, pictures.
5. Record the information collected properly. (Use Part A in the "Record of Work for Project" below).

C. How to Process Information

There are different methods you can use to process information. Some methods are:

1. Select relevant information. You can start by discarding information which is inaccurate, unreliable and irrelevant for the research questions.
2. Summarize the main points in the information.
3. Transform the information from one mode to another, e.g. from text to diagram or table.
4. Classify the information according to their nature, e.g. reasons, results, similarities and differences.
5. Identify the relationship between various parts of the information.

D. How to Present Information

1. Present your information in the form of a written report.
2. Your report should contain the following sections:
 - ✧ Topic and information of team members (full name, class, class number)
 - ✧ Introduction: State the objectives and methods of study.
 - ✧ Main body: Include main points, examples and figures
 - ✧ Conclusion: Summarize the main points.
 - ✧ Reference list: Include all references used in your report (e.g. books, newspaper, websites).
 - ✧ Appendix: Include any information for readers' reference.
3. Present your ideas through multiple media (words, diagrams and pictures).
4. Organize the content properly in each section:
 - ✧ Design suitable headings and subheadings. They can show the structure of the presentation clearly and summarize the main points.
 - ✧ Make sure the ideas under the headings and subheadings are related to them.
 - ✧ Write in proper paragraphs.
 - ✧ Avoid repetition of content.





- ✧ Match the words and diagrams i.e. texts can be supplemented with diagrams and diagrams should be accompanied by captions.
5. Make your presentation pleasant.
- ✧ Use computer softwares to edit texts and images.
 - ✧ Apply art work to the presentation (e.g. design of report cover and page layout).

E. Useful Websites

1. General references about project learning:
 - http://cd.emb.gov.hk/projectlearning/index_e.html (CDI)
 - <http://cmi.l-hku.hk/project/project.html> (CMI Centre. HKU)
 - http://www.fed.cuhk.edu.hk/~asp/asp_infolink.html (CUHK)
 - <http://www.fed.cuhk.edu.hk/~asp/Essav/ProjectLearn/index.html> (CUHK)
 - <http://www.project-approach.com/> (overseas institute)
 - <http://pblmm.k12.ca.us/index.html> (overseas institute)
2. School exemplars:
 - <http://pupil.skhlkyss.edu.hk/~project/>
 - http://cd.emb.gov.hk/projectlearnmg/sampler/st_st/sampler_e.html
 - http://cd.emb.gov.hk/projectlearnmg/sampler/wts_pt/sampler_e.html
 - http://cd.emb.gov.hk/projectlearnmg/sampler/tsw_mps/sampler_e.html
 - http://cd.emb.gov.hk/projectlearning/sampler/fyw/sampler_e.html
3. Specific skills/techniques relevant to project learning:
 - <http://www.graphic.org/goindex.html> (various graphic organizers)
 - <http://www.hked-stat.net/common/> (statistical diagrams)
4. Useful search engines on the Internet:
 - <http://www.yahoo.com> <http://www.google.com>

Assessment Criteria

Your project work will be assessed based on the following criteria.

Area	Items	Weightings (%)
Collection of information 	<ul style="list-style-type: none"> ◆ Relevance to topic ◆ Variety of methods ◆ Level of difficulty ◆ Record of sources 	20
Content of project 	<ul style="list-style-type: none"> ◆ Relevance to topic ◆ Richness ◆ Soundness of arguments and conclusion ◆ Originality 	30
Presentation of ideas 	<ul style="list-style-type: none"> ◆ Organization ◆ Diversification of presenting media ◆ Creativity and appearance ◆ Use of English 	40
Participation in group activities 	<ul style="list-style-type: none"> ◆ Communication and cooperation ◆ Attendance and involvement ◆ Discipline 	10

Working Plan for Project

Class: _____ Group No.: _____ Date: _____

Group No.: _____ Date: _____

Date: _____

[illegible]

[illegible][illegible][illegible][illegible]

Group No.: _____

Group leader:	
Group members:	

(A) Record of information collected:

[illegible]

(B) Progress of Work:

[illegible]

Peer-Evaluation Form:

Name:

Class Number:

Group Number:

Total marks: 10

Group Number	Mark	Comment

What have you learnt in this presentation?

N.B.: Hand in this paper at the end of the presentation.