

The Asian International School
Unit Backward Design
Chemistry, TOEFL-Intermediate, 2018-2019
Topic: Petrochemicals and Polymers

Stage 1 - Desired Results

Established Goals:

This chapter covers the ideas about fossil fuels and their major example that were created by action of heat and pressure. This unit also highlights alternative fuels and energy sources. We will be looking at the important concept of some plastic materials that usually non-biodegradable and pose problems for waste disposal.

In addition, this chapter conveys the main types of food substances- vitamins, though needed only in small quantities, are important for a good health. The discussion will use several basic concepts of chemistry that should be familiar to the students from their earlier studies of science.

Understandings:

Students will understand ...

- ✓ Understand the three major fossil fuel
- ✓ Understand the process of cracking
- ✓ Understand the uses of shorter alkanes
- ✓ Understand that Hydrogen fuel cells are being used to power cars.
- ✓ Understand the properties of Polymers
- ✓ Understand the uses of the different polymers
- ✓ Understand the importance of re-use, recycling and disposal of plastic waste
- ✓ Understand Proteins and able to name its building blocks (20 different amino acids).
- ✓ Understand the main constituents of food.

Essential Questions:

- ✓ What are the three major fossil fuels?
- ✓ What is meant by “cracking” and how it process?
- ✓ What are the alternative fuels and energy sources?
- ✓ How draw the structure of the repeating unit in the Polymers: poly (propene) and poly (chloroethene) (PVC)
- ✓ What are the uses of these following polymers: a. poly (propene)
b. poly (vinyl chloride)
c. poly (tetrafluoroethene)
- ✓ What is the importance concept of re-use, recycling and disposal of plastic waste
- ✓ What are the building blocks of proteins?

Knowledge:

Students will know...

- Think critically based on scientific concepts and theories being thought
- How to make observations from a scientific perspective
- How to be able to think scientifically a use scientific knowledge to make decisions real world problems.
- How to Think analytically by evaluating evidence using relevant criteria ; develop appropriate conclusions as well as new questions
- How to be open-minded in communicating and sharing ideas towards peers
- How to read, interpret & examine scientific claims

Skills:

Student will be able to:

- ✓ Name the major fossil fuels
- ✓ Name the alternative fuels and energy source
- ✓ Understand the meaning of cracking and how it process
- ✓ Understand the properties of given sample polymers
- ✓ Draw the structure of the repeating unit in the Polymers: poly (propene) and poly (chloroethene) (PVC)
- ✓ Understand the concept of re-use, recycling and disposal of plastic waste
- ✓ Name the 20 building blocks of protein which is the amino acid.
- ✓ Name and understand the main constituents of food.

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- How to pose questions & form hypotheses based on personal observations, scientific articles, experiments & knowledge
- Develop teamwork in group activities
- Enhance creativity and resourcefulness upon doing the task

Stage 2 - Assessment Evidence

Performance tasks:

- **Brainstorming:** What are the alternative fuel and energy that we usually use?
- **Poster Making:** Concept: The Importance of Re-use, reduce and recycle/ proper waste disposal.
 * Showing the real world today
 ---applying the proper waste disposal
VERSUS neglecting the proper disposal

Other Evidence:

- ✓ Two individual assessments (Mid-Term/Final) accounting for the assigned percentage of the overall course grade.
- ✓ Homework, participation, behavior and attendance.
- ✓ Grades based on presentation of knowledge and ideas.

Stage 3 – Learning Plan

Learning Activities

- Lecture/Discussion/Overhead Presentation.
- Small-group work/Cooperative Learning.
- Videos related to the subject.
- Explanation/proper discussions of the learning topics, class interaction, encourage students to brainstorm.
- Brainstorming: What are the alternative fuel and energy that we usually use?
- Poster Making: Concept: The Importance of Re-use, reduce and recycle/ proper waste disposal.
- * Showing the real world today
 ---applying the proper waste disposal **VERSUS** neglecting the proper disposal

What are the alternative fuels and energy sources?

- Brainstorming/ group interaction
- Enumeration type of test

What is the importance concept of re-use, recycling and disposal of plastic waste?

- Poster Making: Concept: The Importance of Re-use, reduce and recycle/ proper waste disposal.
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 ---applying the proper waste disposal **VERSUS** neglecting the proper disposal

Discuss in groups

- What are the three major fossil fuels?
- What are the alternative fuels and energy sources?
- What are the building blocks of proteins?
- The main constituents of food.
- Presentation on ways to measure air pollution and measures of control.
- worksheet on greenhouse effect and global warming

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Chemistry, TOEFL-Intermediate, 2018-2019
Topic: Combustion

Stage 1 - Desired Results

Established Goals:

In this chapter, we will be looking at the origin, nature and identification of fossil fuels, our main energy sources, by surveying simpler classes of carbon compounds. Energy aspects of combustion, kinetic aspects of reactions and factors affecting them along with safety issues surrounding the storing of fossil fuels and compounds extracted or made from them will also be studied.

Understandings:

Students will understand ...

- ✓ understanding the basic concepts of energy and its traditional sources
- ✓ identifying the differences of exothermic and endothermic reactions
- ✓ being able to write chemical equations for common types of reactions, regardless of which particular compounds are involved
- ✓ being able to do simple quantitative calculations based on chemical formulae and equations.

Essential Questions:

- ✓ What is combustion reaction?
- ✓ What are the reactants and products of a combustion reaction?
- ✓ What evidence shows that chemical changes have occurred?
- ✓ What do enthalpy and enthalpy change mean in terms of chemical reactions and processes?
- ✓ How do we calculate quantities involved in chemical reactions?
- ✓ How is energy lost or gained during changes of state?
- ✓ How is the heat that is absorbed or released in a chemical reaction calculated?
- ✓ How is combustion useful in daily life?
- ✓ What are the safety issues surrounding the storing of fossil fuels and compounds extracted or made from them?
- ✓ What is The Greenhouse effect?

Knowledge:

Students will know ...

- How to make observations from a scientific perspective
- How to be knowledgeable about scientific concepts and theories
- How to be able to think scientifically a use scientific knowledge to make decisions real world problems.
- How to Think analytically by evaluating evidence using relevant criteria ; develop appropriate conclusions as well as new questions
- How to Communicate ideas clearly, both written and verbal

Skills:

Student will be able to:

- ✓ Define the term 'combustion reaction'
- ✓ Describe what occurs during a combustion reaction
- ✓ Name the reactants and products of a combustion reaction
- ✓ understanding the basic concepts of energy and its traditional sources
- ✓ identifying the differences between exothermic and endothermic reactions
- ✓ being able to write chemical equations for common types of reactions, regardless of which particular compounds are involved.
- ✓ The student will demonstrate the ability to summarize and apply the Law of Conservation of Matter and

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<ul style="list-style-type: none"> • How to read, interpret & examine scientific claims • How to pose questions & form hypotheses based on personal observations, scientific articles, experiments & knowledge 	<p>Energy.</p> <ul style="list-style-type: none"> ✓ Distinguish between reactants and products of a chemical reaction. ✓ Use the Law of Conservation of Mass and Energy to prove that the mass remains constant during both physical and chemical changes ✓ Being able to do simple quantity calculations based on chemical formulae and equations.
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Stage 2 - Assessment Evidence

<p>Performance tasks:</p> <ul style="list-style-type: none"> • investigate the factors that determine the heat produced • Experiment-Acid Rain • Analyzing and Investigating Environmental Issues • Make on proposal for implementation of school recycling program. (including cost, logistics, the process etc) • <u>Homework:</u> Research work on regulation of industrial pollution. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> ✓ Two individual assessments (Mid-Term/Final) accounting for the assigned percentage of the overall course grade. ✓ Homework, participation, behavior and attendance. ✓ Grades based on presentation of knowledge and ideas.
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Stage 3 – Learning Plan

<p>Learning Activities</p> <ul style="list-style-type: none"> • Lecture/Discussion/Overhead Presentation. • Small-group work/Cooperative Learning. • Videos related to the subject. • video on regulation of industrial pollution <p><u>What is the origin of fossil fuels?</u></p> <ul style="list-style-type: none"> • Make a poster/ Diagrammatic presentation • Compare and contrast using a table. <p><u>Identifying the differences between exothermic and endothermic reactions</u></p> <ul style="list-style-type: none"> • Laboratory experiment: Exothermic and Endothermic Reactions <p><u>Temperature effect and Activation energy</u></p> <ul style="list-style-type: none"> • Understanding relationship using graph <p><u>Discuss in groups -</u></p> <ul style="list-style-type: none"> • Students will describe the differences and similarities between kinetic energy and potential energy.
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- How fossil fuels are made, obtained and used. The composition of crude oil.
- The difference between endothermic and exothermic reactions.
- The safety issues surrounding the storing of fossil fuels and compounds extracted or made from them.
- Presentation on ways to measure air pollution and measures of control.
- Discussion /debate Environmental Issues cause and effects
- Class discussion-sources of carbon monoxide, sulfur dioxide, oxides of nitrogen pollution
- class discussion-slow combustion, fast combustion and explosion

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Topic: Chemicals analysis and investigation

Stage 1 - Desired Results

Established Goals:

This chapter covers the ideas about the nature of the scientific method, planning experimental investigations, controlling variables, and interpreting observations and data. Chemistry can be used in industry, medicine, and agriculture and environment science. Many of the uses in these areas depend on our ability to identify chemical substances. We need to know what chemicals we are dealing with.

In addition, this chapter covers the ideas of inorganic analysis, organic analysis as well as experimental design and investigation.

Understandings:

Students will understand ...

- ✓ Understand the qualitative analysis
- ✓ Understand the process testing ions and testing cations
- ✓ Understand the methods of collecting gases
- ✓ Understand the methods of drying gases
- ✓ Understand the other two useful general tests: pH testing and testing for the presence of water
- ✓ Understand the organic analysis:
 - The test for unsaturated hydrocarbons
 - The test for ethanol and ethanoic acid
 - Chromatography
- ✓ Understand the scientific investigation and scientific method

Essential Questions:

- ✓ What is qualitative analysis?
- ✓ What are the tests for inorganic analysis?
- ✓ What are the process in testing Negative ions and positive ions?
- ✓ What is the process of testing gas?
- ✓ What are the different methods for collecting gases?
- ✓ What are the different methods of drying gases?
- ✓ What are the other two useful general tests in qualitative inorganic analysis?
- ✓ What are the organic analyses testing?
- ✓ What is chromatography and its process?
- ✓ What are the process of scientific method that is used in experimentation and investigation?

Knowledge:

Students will know ...

- Think critically based on scientific concepts and theories being thought
- How to make observations from a scientific perspective
- How to be able to think scientifically a use scientific knowledge to make decisions real world problems.
- How to Think analytically by evaluating evidence using relevant criteria ; develop appropriate conclusions as well as new questions
- How to be open-minded in communicating and sharing ideas towards peers
- How to read, interpret & examine scientific

Skills:

Student will be able to:

- ✓ Understand the meaning and process of qualitative analysis
- ✓ Enumerate some qualitative tests
- ✓ Identify the process of testing the negative ions and positive ions
- ✓ Name the different methods for collecting gases
- ✓ Enumerate the different methods of drying gases
- ✓ Understand and perform the testing for gases
- ✓ Understand and perform the pH testing and testing for the presence of water
- ✓ Understand and perform chromatography
- ✓ Understand the process of Scientific Investigation

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claims <ul style="list-style-type: none"> • How to pose questions & form hypotheses based on personal observations, scientific articles, experiments & knowledge • Develop teamwork in group activities • Enhance creativity and resourcefulness upon doing the task 	
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Stage 2 - Assessment Evidence

Performance tasks: <ul style="list-style-type: none"> • Brainstorming: <ul style="list-style-type: none"> -What is qualitative analysis? - What are the process in testing Negative ions and positive ions? -What are the different methods for collecting gases? -What are the different methods of drying gases • Experimentation: <ul style="list-style-type: none"> -The test for gases -pH testing - Experiment on limewater test for CO₂ -Chromatography -Experiment on presence of water using cobalt chloride paper • Research and presentation <ul style="list-style-type: none"> → --How are the analytical ideas applied in organic and inorganic chemistry. <p>→ Students shall describe various careers in chemistry and the training required for the selected career.</p> <p style="text-align: center;">→</p>	Other Evidence: <ul style="list-style-type: none"> ✓ Two individual assessments (Mid-Term/Final) accounting for the assigned percentage of the overall course grade. ✓ Homework, participation, behavior and attendance. ✓ Grades based on presentation of knowledge and ideas.
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Stage 3 – Learning Plan

Learning Activities <ul style="list-style-type: none"> • Lecture/Discussion/Overhead Presentation. • Small-group work/Cooperative Learning. • Videos related to the subject. • Explanation/proper discussions of the learning topics, class interaction, encourage students to brainstorm. • Brainstorming: What is qualitative analysis? Name some testing. • Experimentation: <ul style="list-style-type: none"> -The test for gases -pH testing

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-Testing for the presence of water

-Chromatography

What is the process of testing gas?

→ Experimentation: The limestone test for carbon dioxide

What are the other two useful general tests in qualitative inorganic analysis?

→ Experimentation: pH testing and Testing for the presence of water

What is chromatography and its process?

→ Experimentation: Chromatography

Discuss in groups/Brainstorming

- What is qualitative analysis?
- What are the process in testing Negative ions and positive ions?
- What are the different methods for collecting gases?
- What are the different methods of drying gases
- How is chromatography used in the real world