

Lesson #9: Friedrich Wohler - Organic-Inorganic

Stage 1 – Desired Results	
Established Goals: GLO B 1. Examine mental models about science and its role in decisions about how to TAKE resources, MAKE material goods from those resources and deal with the WASTE.	
Understandings: Students will understand that... 1. SLO B1: Scientific developments in the past impact individuals/societies/environment locally and globally 2. SLO B2: Scientific endeavours have been influenced by societal and historical contexts	Essential Questions: What is the basic chemistry of hydrocarbons and how do we TAKE them from earth and MAKE products out of them? SLO A2: Recognize both the power and limitations of science as a way of answering questions about the world and explaining natural phenomenon SLO D1: How can we use the concepts of similarity and diversity for organizing our experiences with the world?
Students will know... 1. Compare and contrast inorganic and organic chemistry (<i>C11-5-01</i>) 2. Historical development of organic chemistry	Students will be able to... Use appropriate strategies and skills to develop an understanding of chemical concepts (see SYSTH compare/contrast frame) (<i>C11-0-U1</i>)
Stage 2- Assessment Evidence	
Knowledge: 1. Assess knowledge of historical facts 2. Assess knowledge of differences and similarities between organic and inorganic compounds	Skills: Using the Mystery Box, have students ask questions to determine whether the “mystery compound of the day” is organic or inorganic. The questions they ask can be used to assess their understanding of the characteristics of organic/inorganic compounds. Repeat each day as the students get a sense of how diverse organic compounds are in terms of physical and chemical properties. Display organic and inorganic compounds and have students ask questions that can be safely tested on the compounds (ie can it dissolve in water?)
Materials Required	
Powerpoint Presentation “Examining Our Mental Models” Educator Reading: Teacher notes from Manitoba Education, Citizenship & Youth. (2006). Grade 11 Chemistry: A Foundation for Implementation. (Topic 5, page 5,6): Manitoba. Handout: Biography of Friedrich Wohler (Source: unknown. AIChem 20. Alberta: J. M. LeBel Enterprises Ltd.) Handout: Compare/contrast sheet (Source: Manitoba Education and Training. (1997). Senior Years Science Teacher Handbook. Manitoba: Manitoba. (p. 10.15–10.18)) Handout: Inorganic/Organic (Source: Physical Science 301, correspondence course, no longer in print) Materials for demo: see Educator Notes below (Source: Manitoba Education, Citizenship & Youth. (2006). Grade 11 Chemistry: A Foundation for Implementation. Appendix 3.8: Manitoba.)	
Stage 3 – Learning Plan	
1. Handout: Biography of Friedrich Wohler (Reference: AICHEM) 2. DIRECT students to pair up, read the biography and discuss “What is so significant about the statement that the “...mystical distinction between organic compounds and inorganic compounds was eliminated.” 3. DEFINE what is natural and what is synthetic, revealing the ambiguity. 4. DISCUSS: What is the mental model of the scientists in this “story”? They began to think that they could create the same compounds that natural systems could. Do you agree that humans can make the same compounds that natural systems can? Can you think of some examples when we thought we could “replicate” nature but we could not?	

PLEASE SAVE THE RESPONSES FOR LATER REFERENCE

5. DISCUSS Is there an “arrogance” to science?
6. DESCRIBE how to complete a COMPARE/CONTRAST sheet (Reference: SYSTH)
7. **Slide 31: DIRECT** students to complete the compare/contrast sheet on the topic of organic and inorganic. Information can be obtained from many sources. A simple and readable summary is included. **HANDOUT: Organic/Inorganic (Source: Physical Science 301, out of print)**. Review ionic/covalent bonding as needed.
8. DEMO: There is a demonstration attached (Part B step 2) in which sugar and sulphuric acid are mixed to yield carbon (a “carbon sausage”). It can be used to demonstrate reaction rates. Be sure to discuss the sustainability of doing such demonstrations (ie does it violate any of the 4 guiding ideas? The acid removes water from sugar but the products are not benign - sulphur dioxide and carbon dioxide are formed)(Source: **Manitoba Education, Citizenship & Youth. (2006). Grade 11 Chemistry: A Foundation for Implementation. Appendix 3.8: Manitoba.**)

Homework Learning Activities**Extension Learning Activities**

The demo can be used to introduce the concepts of indications of a chemical reaction and the other demonstrations can be incorporated. Do not hesitate to extend the chemistry component where interest exists.

Teacher notes- History of Organic Chemistry

(Source: Manitoba Education, Citizenship & Youth. (2006). Grade 11 Chemistry: A Foundation for Implementation. (Topic 5, page 5,6): Manitoba.)

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DEMO: Sulphuric Acid with Sugar → Carbon (see Part B step 2)

(Source: Manitoba Education, Citizenship & Youth. (2006). Grade 11 Chemistry: A Foundation for Implementation. Appendix 3.8: Manitoba.)

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