

Ohio

Correlations to SEPUP's *Investigating Alternative Energy: Hydrogen & Fuel Cells*

Investigating Alternative Energy: Hydrogen & Fuel Cells was developed by SEPUP at The Lawrence Hall of Science, and is published by, and available exclusively from, LAB-AIDS, Inc. This document is intended to show selected locations in the *Hydrogen & Fuel Cells* module that support the Ohio Department of Education standards for high school science. It is not an exhaustive list; other locations may exist that are not listed here.

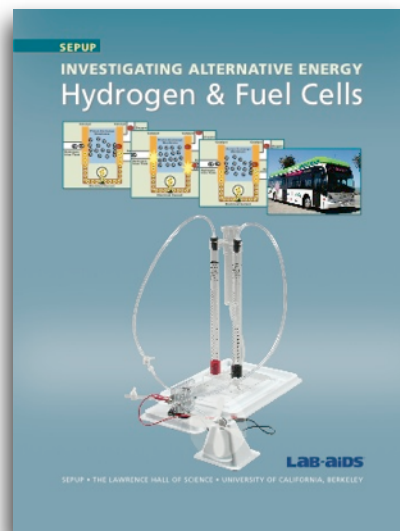
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Physical Science Grade Nine

Nature of Matter

Performance Indicator Descriptor	Location in Module	Where Assessed
2. Illustrate that atoms with the same number of positively charged protons and negatively charged electrons are electrically neutral.	Activity 4	Procedure, Part B
5. Describe how ions are formed when an atom or a group of atoms acquire an unbalanced charge by gaining or losing one or more electrons.	Activity 4	Procedure, Part B



Nature of Energy

Performance Indicator Descriptor	Location in Module	Where Assessed
15. Trace the transformations of energy within a system (e.g., chemical to electrical to mechanical) and recognize that energy is conserved. Show that these transformations involve the release of some thermal energy.	Activities 3 and 5	Throughout Activity 5

Science and Technology

Performance Indicator Descriptor	Location in Module	Where Assessed
Understanding Technology		
1. Describe means of comparing the benefits with the risks of technology and how science can inform public policy.	Activities 1, 5 and 6	Throughout Activities 1 and 6; Activity 5, Analysis #5
Abilities To Do Technological Design		
2. Identify a problem or need, propose designs and choose among alternative solutions for the problem.	Activities 1, 3, 4, 5, and 6	Throughout Activities 1 and 6; Activity 3, Analysis #5; Activity 4, Analysis #1

Grade 10

Science and Technology

Performance Indicator Descriptor	Location in Module	Where Assessed
Understanding Technology		
2. Describe examples of scientific advances and emerging technologies and how they may impact society.	Activities 1 and 6	Throughout Activities 1 and 6
Abilities To Do Technological Design		
3. Explain that when evaluating a design for a device or process, thought should be given to how it will be manufactured, operated, maintained, replaced and disposed of in addition to who will sell, operate and take care of it. Explain how the costs associated with these considerations may introduce additional constraints on the design.	Activities 1 and 6	Throughout Activities 1 and 6

Grade 11

Science and Technology

Performance Indicator Descriptor	Location in Module	Where Assessed
Understanding Technology		
2. Predict how decisions regarding the implementation of technologies involve the weighing of trade-offs between predicted positive and negative effects on the environment and/or humans.	Activities 1, 5 and 6	Throughout Activities 1 and 6; Activity 5, Analysis #5
4. Explain why basic concepts and principles of science and technology should be a part of active debate about the economics, policies, politics and ethics of various science-related and technology-related challenges.	Activity 6	Throughout Activity 6
5. Investigate that all fuels (e.g., fossil, solar and nuclear) have advantages and disadvantages; therefore society must consider the trade-offs among them (e.g., economic costs and environmental impact).	Activities 1 and 6	Throughout Activities 1 and 6

Performance Indicator Descriptor	Location in Module	Where Assessed
6. Research sources of energy beyond traditional fuels and the advantages, disadvantages and trade-offs society must consider when using alternative sources (e.g., biomass, solar, hybrid engines, wind and fuel cells).	Activities 1 and 6	Throughout Activities 1 and 6

Grade 12

Nature of Matter

Performance Indicator Descriptor	Location in Module	Where Assessed
1. Explain how atoms join with one another in various combinations in distinct molecules or in repeating crystal patterns.	Activity 4	Procedure, Part B

Science and Technology

Performance Indicator Descriptor	Location in Module	Where Assessed
Understanding Technology		
4. Explain why basic concepts and principles of science and technology should be a part of active debate about the economics, policies, politics and ethics of various science-related and technology-related challenges.	Activity 6	Throughout Activity 6