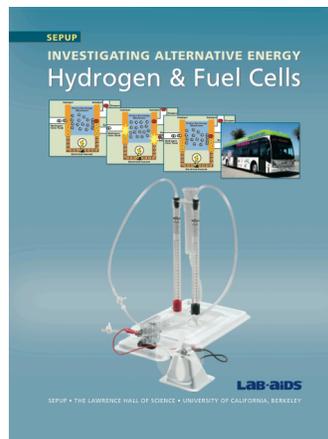


NSES 9–12 Content Standards Correlation for *Investigating Alternative Energy: Hydrogen & Fuel Cells*

Activity 1: Hydrogen for Transportation?

1. Decisions involve assessment of alternatives and are made based on perceptions of benefits, risks, and trade-offs. (*Perspectives: 6*)
2. Many factors influence environmental quality, including materials from human societies that induce hazards. (*Perspectives: 4, 5*)
3. Students use evidence, apply logic, and construct an argument for proposed explanations. (*Inquiry: 1*)
4. Technological designs have constraints, benefits, risks, and trade-offs. (*SciTech: 2; Perspectives: 6*)
5. Progress in science and technology can be affected by social issues and challenges and have a direct effect on society. (*SciTech: 2; Perspectives: 6*)



Activity 2: Obtaining Hydrogen through Electrolysis

1. Chemical reactions occur all around us, for instance in automobiles. (*PhysSci: 3*)
2. Chemical reactions may release or consume energy. (*PhysSci: 3*)
4. Stoichiometric relationships can be used to calculate the amount of reactants, products, and energy consumed or released in a chemical reaction. (*PhysSci: 3*)
5. The decomposition of water to produce hydrogen gas requires energy. (*PhysSci: 3*)
6. Mathematics is integral in scientific inquiry. (*Inquiry: 2*)

Activity 3: Observing a Fuel Cell

1. Chemical reactions occur all around us, for instance in automobiles. (*PhysSci: 3*)
2. Chemical reactions may release or consume energy. (*PhysSci: 3*)
3. The total energy of the universe is constant. Energy can be transferred but not (created or) destroyed. (*PhysSci: 5*)
4. Students evaluate completed technological designs and their consequences. (*SciTech: 1*)

Activity 4: Modeling the Fuel Cell Reaction

1. Chemical reactions occur all around us, for instance in automobiles. (*PhysSci: 3*)

2. Chemical reactions may release or consume energy. (*PhysSci: 3*)
3. A large number of important reactions involve the transfer of electrons (oxidation/reduction reactions). (*PhysSci: 3*)

Activity 5: Fuel Cell Efficiency

1. Chemical reactions occur all around us, for instance in automobiles. (*PhysSci: 3*)
2. Chemical reactions may release or consume energy. (*PhysSci: 3*)
3. A large number of important reactions involve the transfer of electrons (oxidation/reduction reactions). (*PhysSci: 3*)
4. The total energy of the universe is constant. Energy can be transferred but not (created or) destroyed. (*PhysSci: 5*)
5. Students evaluate completed technological designs and their consequences. (*SciTech: 1*)

Activity 6: Hydrogen for Buses?

1. Decisions involve assessment. (*Perspectives: 6*)
2. Many factors influence environmental quality, including materials from human societies that induce hazards. (*Perspectives: 4, 5*)
3. Students use evidence, apply logic, and construct an argument for proposed explanations. (*Inquiry: 1*)
4. Technological designs have constraints, benefits, risks, and trade-offs. (*SciTech: 2; Perspectives: 6*)
5. Progress in science and technology can be affected by social issues and challenges and have a direct effect on society. (*SciTech: 2; Perspectives: 6*)

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