



## Chemical Properties – LAB SUMMARY

*This class brings the periodic table alive! From protons, neutrons, and electrons to chemical reactions, students explore the chemistry of different elements and compounds through exciting demonstrations and hands-on experiments.*

**Grade Levels:** 4-8

### Educational Outcomes:

- 1) Student will understand the format of the periodic table and be able to identify the name, atomic number, and atomic symbol.
- 2) Students will gain an understanding of the basic difference between physical, endothermic, and exothermic reactions.
- 3) Students will gain first-hand experience creating hypotheses, observing the results of an experiment, and judging the accuracy of their hypotheses based on their observations.

**Estimated Time:** 1.5 hours

- **Introduction:** 5 min.
- **Atomic Structure and Magnesium Demonstration:** 10 minutes
- **Compounds and Compounds Demonstration:** 10 minutes
- **Periodic Table introduction, worksheet, and demonstration:** 15 minutes
- **Physical Reaction Experiment and discussion:** 15 minutes
- **Chemical Reaction Experiments and discussion:** 30 minutes
- **Closing Demonstration and discussion:** 5 minutes

### California Science Content Standards Connections:

- **Grade 5** - Physical Science: **1a, 1b, 1d, 1g**  
- Earth Science: **3b**
- **Grade 8** - Physical Science: **3a, 3b, 3f, 5a, 5c**

### Pre-Visit Vocabulary

These are words and concepts that we will discuss in the lab. Your students' lab experience will be enhanced if they are familiar with these terms prior to your visit.

- Element: a substance comprised of identical atoms that cannot be separated into simpler substances by chemical means
- Atom: the smallest component of an element having the chemical properties of the element
- Nucleus: the positively charged central region of an atom, composed of protons and neutrons and containing almost all of the mass of the atom
- Electron: an elementary particle having a negative charge, found outside the nucleus of an atom
- Neutron: an elementary particle having no charge, found in the nuclei of all atoms except those of hydrogen
- Proton: an elementary particle having a positive charge that is a fundamental constituent of all atomic nuclei
- Compound: two or more elements bonded together whose composition is constant
- Control: a standard of comparison in scientific experimentation
- Hypothesis: educated guess about what we think will happen
- Catalyst: something that causes a chemical reaction that remains unchanged by the reaction



### Tech Museum Gallery Connections:

- Exploration Gallery: Journey into Space
  - EX1 Science Pod and Journey to Space Theater
    - Students can investigate some common compounds found in our solar system.
    - Students can participate in this interactive exploration of our solar system and investigate the chemical compositions of different planets and moons.

### Teacher Resources

- **Fireworks and elements:**  
<http://www.pbs.org/wgbh/nova/kaboom/textindex.html>
- **Glow sticks:**  
<http://scifun.chem.wisc.edu/HOMEEXPTS/Chemilum.html>
- **Chemistry Experiments:**  
[https://portal.acs.org/portal/acs/corg/memberapp?\\_nfpb=true&\\_pageLabel=PP\\_TRANSITIONMAIN&node\\_id=878&use\\_sec=false&sec\\_url\\_var=region1](https://portal.acs.org/portal/acs/corg/memberapp?_nfpb=true&_pageLabel=PP_TRANSITIONMAIN&node_id=878&use_sec=false&sec_url_var=region1)
- **Acids and Bases:**  
<http://scifun.chem.wisc.edu/HOMEEXPTS/ACIDBASE.html>
- **General chemistry you can do with everyday materials:**  
[http://www2.ncsu.edu/ncsu/pams/science\\_house/learn/CountertopChem/index.html](http://www2.ncsu.edu/ncsu/pams/science_house/learn/CountertopChem/index.html)

### Post-Lab Activity: Make Ice Cream in a Bag (1 class session of 40-50 minutes; handout available in Tech lab classroom)

*Students conduct an experiment using a physical reaction to create ice cream.*

- Students will demonstrate and apply their knowledge of physical properties of compounds, such as freezing point.
- Students will conduct a scientific process to form a hypothesis and analyze results to draw conclusions.
- Students will get additional experience in the design process that scientists and engineers undergo.