

Atoms and Molecules Sets

Teach abstract concepts in concrete ways

Conveys the concepts found in the Next Generation Science Standards with crosscutting lessons about matter in chemistry, biology and earth science



Set includes 10+ lessons in chemistry, biology and earth science. Each LEGO brick represents an atom, and brick colors are the universal CPK standard colors for elements. Students can model elements, compounds and mixtures with the bricks and also model more complex concepts such as chemical reactions.

Classroom set includes

- 14 student kits
- 14 student laminated instructional mats for each lesson
- Teacher guides and instructional keys
- 2 large posters for Photosynthesis
- Extra LEGO bricks for further experiments
- Kit management tools

About the kits

- Students work in pairs with one kit.
- Each LEGO brick is an atom.
- Element colors correspond to chemistry (CPK) standards.
- Lessons meet Massachusetts State Standards, AAAS Benchmarks, and NGSS.
- The kit layout mat enables quick brick counting and cleanup. With this classroom management tool, the students stack and measure their bricks on the mat.

About the project

- The Edgerton Center underwrites the cost of the development and part of the procurement costs for the Atoms and Molecules Sets. Our compensation of \$400 per classroom set helps to defray our expenses incurred in the development of these materials. Additionally, users can download for free, teacher and student lessons and supporting documentation at: <http://edgerton.mit.edu/atoms-molecules>.



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Atoms and Molecules curriculum

Atoms and Molecules in Chemistry (4-6 lessons)

The Chemical Reactions lessons teach students that a chemical reaction is a rearrangement of atoms into new molecules.

- Students observe a real chemical reaction (calcium chloride and baking soda). Products can be separated from the mixture and compared to standards.
- Students model the reaction with LEGO atoms. They can build products from reactants to show conservation of matter.
- Students build LEGO molecules, compounds, and mixtures, and practice formula writing.
- Students can try out additional reactions: baking soda and vinegar, rusting iron, epsom salts and ammonia, and more!



Atoms and Molecules in Biology (2-3 lessons)

The Photosynthesis lessons aid students in understanding that plants create most of their mass from air.

- Students build the LEGO carbon dioxide and water into a glucose molecule, and can see exactly where those carbon atoms go. Later, those glucose molecules are combined into starch and cellulose, making plant structures.
- Cellular respiration can also be modeled to show how glucose is burned with oxygen to provide energy for plant and animal cells.



Atoms and Molecules in Earth Science (2-3 lessons)

The Understanding Air lessons help students visualize the molecules in air to make sense of climate change and air pollution.

- Students build a model of air and arrange the components in a pie chart with correct proportions.
- Students model the burning of fossil fuels (hydrocarbons) with oxygen. Note the production of carbon dioxide, the major greenhouse gas contributing to climate change.
- Students model incomplete combustion producing common air pollutants hazardous to human health.
- WGBH Teachers Domain website has environmental health video clips for this lesson.



Download curriculum materials online at: <http://edgerton.mit.edu/atoms-molecules>
Curriculum questions: email Kathy Vandiver at: kathymv@mit.edu
To inquire about classroom sets, contact edgerton-k12-info@mit.edu