



Mission: How are materials organized on an atomic level?

Age: 8+
Materials: \$8

Time: 20 min
(Set-up: 5 min | Activity: 10 min | Clean-up: 5 min)

NGSS Alignment of Atomic Models Activity

The information below may not include every area that this activity can be linked to NGSS concepts

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

- 2nd Grade
 - A great variety of objects can be built up from a small set of pieces.
- 5th Grade
 - Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.
- Middle School
 - Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms.
 - Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals)

PS1.B: Chemical Reactions

- 5th Grade
 - When two or more different substances are mixed, a new substance with different properties may be formed.

Performance Expectations

- 2-PS1-3: Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.
- 5-PS1-4: Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
- MS-PS1-1: Develop models to describe the atomic composition of simple molecules and extended structures.



Crosscutting Concepts

Patterns

- **Grade 3-5**
 - Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena and designed products.
- **Middle School**
 - Macroscopic patterns are related to the nature of microscopic and atomic-level structure.

Scale, Proportion, and Quantity

- **Grade 3-5**
 - Natural objects and/or observable phenomena exist from the very small to the immensely large or from very short to very long time periods.
- **Middle School**
 - Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.

Engineering and Science Practices

Developing and Using Models

- **Grade 3-5**
 - Develop and/or use models to describe and/or predict phenomena.
 - Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution.
- **Middle School**
 - Develop or modify a model—based on evidence – to match what happens if a variable or component of a system is changed.
 - Develop and/or use a model to predict and/or describe phenomena.
 - Develop a model to describe unobservable mechanisms.

Asking Questions and Defining Problems

- **Grade 3-5**
 - Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.
 - Ask questions about what would happen if a variable is changed.
- **Middle School**
 - Ask questions to clarify and/or refine a model, an explanation, or an engineering problem.
 - Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify and/or seek additional information.