



Mission: How can different processes affect final properties?

Age: 8+
Materials: \$8

Time: 4 hours (1 hour active)
(Set-up: 15 min | Activity: 30 min | Clean-up: 15 min)

NGSS Alignment of Lemon Freeze 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
 - Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties.
 - Different properties are suited to different purposes.
- 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
 - Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals).
 - 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.

Performance Expectations

- 2-PS1-1: Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
- 2-PS1-2: Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.
- 5-PS1-1: Develop a model to describe that matter is made of particles too small to be seen.
- 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.

Cause and Effect

- Grade 3-5
 - Cause and effect relationships are routinely identified, tested, and used to explain change.
- Middle School
 - Cause and effect relationships may be used to predict phenomena in natural or designed systems.

Engineering and Science Practices

Planning and Carrying Out Investigations

- Grade 3-5
 - Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.
 - Make predictions about what would happen if a variable changes.
 - Test two different models of the same proposed object, tool, or process to determine which better meets criteria for success.
- Middle School
 - Conduct an investigation and/or evaluate and/or revise the experimental design to produce data to serve as the basis for evidence that meet the goals of the investigation.
 - Collect data about the performance of a proposed object, tool, process, or system under a range of conditions.