1st Physical Science

Liquids and Solids

Teacher Background Information – for teacher content knowledge only, NOT student learning goals

Objects have many observable properties, including size, weight, shape, color, and temperature. Objects are made of one or more materials such as paper, wood, and metal. These can be described by the properties of the material from which they are made and those properties can be used to separate or sort a group of objects or materials. Materials can exist in different states- solid, liquid, and gas. Some common materials, such as water, can be changed from one state to another by heating or cooling.
The definition of a solid is based on macroscopic properties such as an object keeping its shape and having a definite volume. The students' macroscopic definition of a liquid is based on the object taking the shape of its container and having a definite volume.

Instructional Implications

Students need many experiences to describe and manipulate objects.

Encourage children to be observant and to sort collections of objects in many ways.

Science centers or stations are an effective way to give students opportunities to explore physical science concepts.

Big Idea
Objects have observable properties and these properties can change.

Essential Question
How can you describe the properties of objects and the changes that can happen to them?

AAAS Benchmarks/National and Science Education Standards

Structure of Matter

- AM 1. Magnifiers help people see things they could not see without them. 5C/P1*
- AM 3. Objects can be described in terms of their properties. Some properties, such as hardness and flexibility, depend upon what material the object is made of, and some properties, such as size and shape, do not. 4D/P1 *
- CM 1.Water left in an open container disappears, but water in a closed container does not disappear. 4B/P3
- CM 2. Water can be a liquid or a solid and can go back and forth from one form to the other. If water is turned into ice and then the ice is allowed to melt, the amount of water is the same as it was before freezing. 4B/P2

Local Connections

Indoor and outdoor environment

Materials/Resource

GEMS Kit: Liquid Explorations
STC Kit: Solids and Liquids

Related Scientist or Career Path

Marie Curie: Nobel Prize Winning Physicist
by Liza N. Burby

Assessments
Science Notebooks

Assessment Probes: adapted for primary
Vol. 3, Probe #2: Is It A Solid?
Discussion vs. paper/pencil use of probe

Anecdotal notes – continuum

Photo documentation - of student work

Science Process Skills

Observation
Classification
Simple Investigation
Prediction
Data Collection
Communication

Student Difficulties and Misconceptions

Most students will have difficulty with the generalization that many substances can exist as either a liquid or solid. Students are familiar with the change of state between water and ice, but the idea of liquids having a set of properties is more nebulous and requires more instructional effort than working with solids. How water changes states within the water cycle will be covered in 4th grade and should not be taught at this time.