

Science

SCI.IV.2.2

Grade: 4

Strand: **Using Scientific Knowledge in Physical Science
- Changes in Matter**

Standard: **All students will investigate, describe and analyze ways in which matter changes**

Benchmark: **Prepare mixtures and separate them into their component parts.**

Constructing and Reflecting:

SCI.I.1.1 - Generate reasonable questions about the world based on observation.

SCI.I.1.2 - Develop solutions to problems through reasoning, observation, and investigation.

SCI.I.1.3 - Manipulate simple devices that aid observation and data collection.

SCI.I.1.5 - Develop strategies and skills for information gathering and problem solving.

SCI.I.1.6 - Construct charts and graphs and prepare summaries of observations.

SCI.II.1.1 - In the scientific world, decisions must be based on factual evidence that can be replicated.

Vocabulary

Mixture, solutions, separation techniques, filtration, using sieves, using magnets, floating versus sinking, dissolving soluble substances, evaporating.

Tools – filter paper, funnels, magnets, sieves, beakers, solar stills.

Context

Mixtures of various kinds, salt and pepper, iron filings and sand, sand and sugar, rocks and wood chips, sand and gravel, sugar or salt solutions.

Knowledge and Skills

Physical change occurs when materials are mixed together. Differences in physical properties are what enable students to separate the mixture (solid) or solution (liquid). Students will prepare and separate a prepared mixture or solution by choosing the appropriate tools and separation techniques based on physical properties.

Separation Techniques:

- Filtration
- Using a sieve
- Using magnets
- Floating v. sinking
- Dissolving soluble substances
- Evaporating

Tools:

- Filter paper
- Funnels
- Magnets
- Sieves
- Beakers
- Solar stills

Resources

Coloma Resources:

Scott Foresman Discover the Wonder – 4th Grade

Module B

B10-B11, B18-B19 (Lab experiments)

Acid Rain experiment (is on Module in 3rd grade book)

Elodeo Experiment – Scott Foresman 3rd grade experiment

Other Resources:

SVSU MASER DISK BENCHMARK 2 or

www.ocps.k12.fl.us/frameworks/sc/resource/lessons/83.htm

Instruction

Benchmark Question: How are mixtures separated into their component parts?

Focus Question: What are the different strategies for separating mixtures?

In small groups students brainstorm types of mixtures (e.g. salt & pepper, sand & sugar, iron filings & sand, rocks & wood chips, sugar or salt solutions) Report the findings to the whole groups. Using student's generated list of mixtures, evaluate the mixtures and predict the appropriate method to separate them into individual components. Obtain mixtures; choose appropriate method and appropriate tools (e.g. filter paper, funnels, magnets, sieves, beakers, solar stills) and methods. Students will experiment with ways to separate the mixtures into their components.

Weigh the separate components and compare to the measurement of the original mixture.

Mixture Form

Mixture / Solution	Method of Separation	Component Parts

Assessment

Optional Assessment:

Teacher prepares a variety of solutions and mixtures using water, salt, sugar, dirt, sand gravel, leaves, iron filings, etc. Using the scientific process, groups will choose the appropriate tools to separate the solution or mixture. The group will present their method of separation to an audience.

Individual journals will reflect their method of separation.

(Give students rubric prior to assignment)

Scoring Rubric

Criteria	Apprentice	Basic	Meets	Exceeds
Completeness of data table	Creates incomplete data table.	Creates incomplete data table.	Creates complete data table.	Creates complete data table.
Accuracy of evaluations	Provides many inaccurate evaluations.	Provides some inaccurate evaluations.	Provides a few inaccurate evaluations.	Provides accurate evaluations

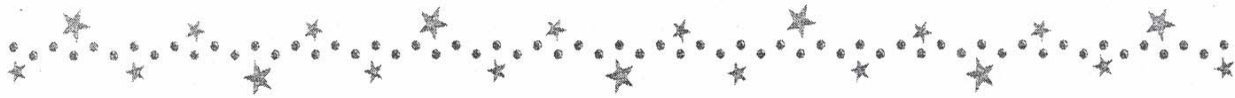
Teacher Notes:

Investigate, describe and analyze ways in which matter changes.

Matter can be changed in many ways. Changes of state and changes in size and shape are two common changes that are important in the elementary school. All matter can exist as a solid, liquid, or gas depending on the temperature and pressure. In the early elementary years, instruction focuses on melting and freezing. In the later elementary years, changes such as dissolving and evaporating are added to students' experiences. Changes in the size of familiar objects such as making snowballs or crumbling cookies can be a part of the elementary grade experiences.

Students might also prepare mixtures and separate them to show how matter can be changed. Using filtration and sieves students can investigate many different types of mixtures. In the later elementary years, dissolving soluble substances and evaporation should also be included.

In the middle school years, sublimation, thermal expansion and contraction are concepts that are added to evaporation and condensation. Experiences that help students understand that mass is conserved as matter is changed are also important at this level. Chemical changes are important in the middle school years. Students should describe common chemical changes in terms of properties of reactants and products by the middle school years. Burning, rusting and photosynthesis are but some of the common chemical changes students should investigate.



Landforms & Bodies of Water Postcard Packs

Students can work individually or in groups as they learn about the landforms and bodies of water located in your state.

Materials

- manila file folder · white construction paper
- scissors · tape · markers and colored pencils

Getting Started

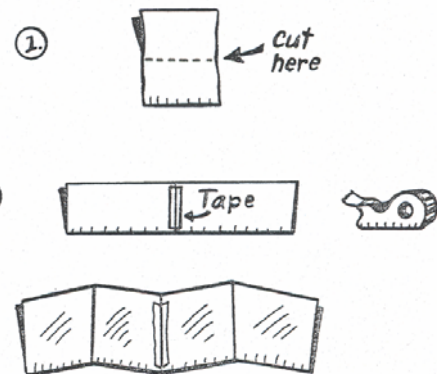
If students work individually; they can each create three postcards for their pack. To make this activity go a little faster, have students work in groups of four to six. Each group member can create one postcard for a group pack. (One student can be in charge of creating the case for the postcard pack.)

How-Tos

(These directions are for students working individually to create a postcard pack of three postcards.

Adapt them if you want the students to work in groups.)

1. Each student should cut a sheet of white construction paper in half horizontally;
2. They should place the strips side by side to form one long strip, and then tape the two strips together. Have them fold the strip accordion style into four sections.
3. Tell students to measure the size of one of the postcards and then cut out a cover for the postcard pack from the folded edge of a manila file folder. This will serve as the case into which the postcards will be inserted. (You should be able to get two covers from each folder.)



4. Have students open the folded paper and place it on their desks so that it forms two peaks (like the letter M). They should use a glue stick to attach the far-left rectangle to the underside of the manila cover. This leaves three postcards that fall out of the manila cover.
5. Have students choose three landforms or important bodies of water located in your state and create a colorful postcard for each. (See sample for the state of Louisiana on page 12.) On the back of each postcard, they should write a paragraph to the class that describes and defines the landform or body of water. The postcards can be addressed to the class, and students can create a stamp that is reflective of the geography of their state.
6. Finally, have them design an illustration for the cover of their postcard pack.

