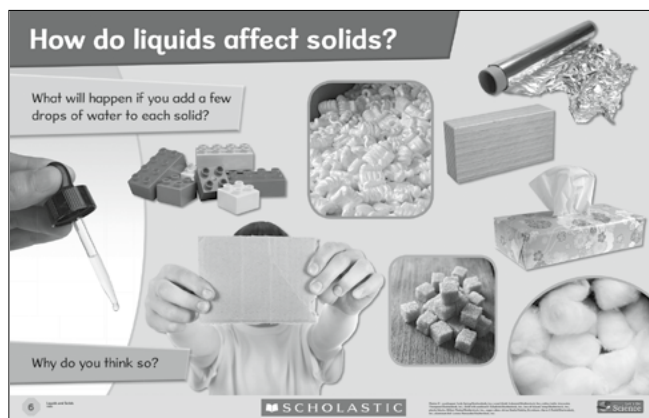
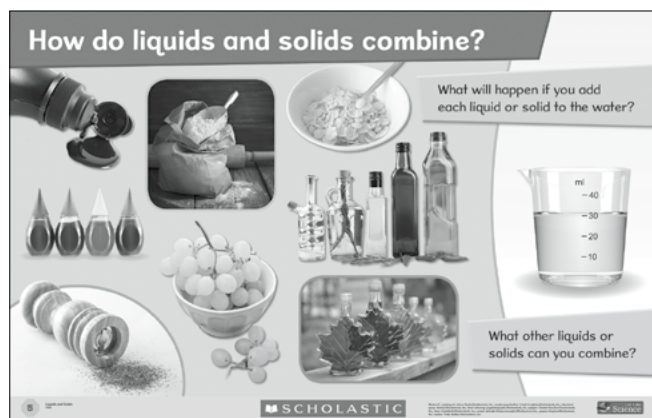


What Happens When We Combine Liquids and Solids?



Focus: Students investigate the ways in which familiar liquids and solids can interact with one another.

Specific Curriculum Outcomes

Students will be expected to:

- 24.0 investigate the interactions of familiar liquids and solids [GCO 1/3]
- 7.0 make and record observations and measurements [GCO 2]
- 14.0 communicate procedures and results [GCO 2]

Performance Indicators

Students who achieve these outcomes will be able to:

- predict the ways that specific liquids and solids will interact with one another

NOTES:

Attitude Outcome Statements

Encourage students to:

- be open-minded in their explorations [GCO 4]

Cross-Curricular Connections

English Language Arts

Students will be expected to:

- communicate information and ideas effectively and clearly, and to respond personally and critically [GCO 2]
- respond personally to a range of texts [GCO 6]

Getting Organized

Components	Materials	Before You Begin	Vocabulary
• <i>Perfect Snow</i> (Read Aloud) • Science Card 5 • Science Card 6 • BLM <i>Results Table</i> Literacy Place: • <i>An Early Worm Got Out of Bed</i> (“The Muddy Puddle,” pages 16–17, Shared Reading—Active Learning Kit)	• snow • bottle of oil-and-vinegar dressing containing rosemary/basil and black pepper pods • beakers of water (one per group) • eyedroppers of water (one per group) • small portions of cooking oil, maple syrup, chocolate syrup, food colouring, ground black pepper, flour, grapes, and dry cereal (one portion of each per group) • small blocks of wood (two per group) • cotton balls (two per group) • pieces of cardboard (two per group) • pieces of tissue (two per group) • plastic blocks (two per group) • sugar cubes (two per group) • Styrofoam packing “peanuts” (two per group) • tin foil (one sheet per group) • digital camera (optional) • sensory bottle (plastic water bottle filled with oil and coloured water, with one or more solids such as glitter, plastic confetti, sea shells, pebbles, beads, or fish tank gravel) • plastic water bottles pre-filled with an oil-and-water mixture (one per pair of students) • glitter, plastic confetti, sea shells, pebbles, beads, fish tank gravel, etc. • small spoons • hot glue gun	• Arrange for an Elder or Indigenous Knowledge Keeper to visit the class to describe the perfect snow for building a traditional snow house. • Combine 3 parts olive oil and 1 part balsamic vinegar in a bottle. Add a sprig of rosemary or basil and some black pepper pods. Do not shake the bottle—the oil and vinegar should remain separated. • Create a sensory bottle by filling a plastic water bottle with oil and coloured water, and adding one or more solids such as glitter, plastic confetti, sea shells, pebbles, beads, or fish tank gravel.	• combined • combination • interact • interaction • dense • density • predict • prediction • results • results table • sink • float • absorb • dissolve

Safety

- Remind students not to taste any of the substances they are investigating.
- You may choose to have students wear aprons and/or gloves while they are combining liquids and solids.
- Students are not to handle the hot glue gun.

Science Background

- Because of variables such as density, absorbency, and buoyancy, simply combining various liquids and solids will yield several observable results, including floating, sinking, absorbing, and dissolving. No stirring or agitation is required for students to observe these results.

ACTIVATE

Read Aloud: *Perfect Snow*



Summary

An overnight snowfall sets the stage for two boys to anticipate recess and the endless possibilities of “perfect” snow.

Before Reading

Begin by asking students if snow is a liquid or a solid. Explain that snow is made of individual ice crystals. Lead students to conclude that individual snowflakes are solids. Then show students the cover of the book and ask:

- **What is “perfect” snow?**
- **What can you do with perfect snow?**
- **What do you think these boys are doing?**

Involve students in a Think-Pair-Share strategy. After providing time for students to ponder the questions, have them turn to the person next to them and share their thinking. After students have had a chance to share their thinking with a partner, invite a few students to share their ideas with the class.

Ask students to listen as you read to discover why the boys think this snow is perfect and what they do with the perfect snow.

During Reading

As you read the story to students, pause frequently to discuss the text and illustrations. Prompts for discussion could include:

- **Why do you think the boys are happy to see snow?**

- **What does it mean when the text says, “Jim packed a handful”?** (He pressed the snow together to make it stick together.)
- **When Jim says that conditions are perfect to build a snow fortress, what do you think he means? What “conditions” is he talking about?**
- **Scott says that the snow is perfect to build the World’s Greatest Snowman. What made the snow perfect?**
- **Why do Jim and Scott decide to work together?** (There’s not enough snow for all the kids to build separate things.)
- **What do the kids do to the snow when they’re building with it?** (They pack it and pile it high.)
- **Was it a good idea to combine a snow fort with the snowmen?**
- **What happens to the perfect snow when it rains during the night?**
- **What do you think “slush” is? What might it be perfect for?**

After Reading

Prompts for discussion could include:

- **What properties made the snow perfect for building a snowman fort?** (It was wet. It was heavy. It packed together well.)
- **Would other snow have worked?**

If possible, have students gather snow from outside. Ask them to describe the snow’s properties. Ask:

- **Is it wet or dry?**
- **Does it pack together or fall apart?**



Tell the students they are going to work in small groups to investigate the snow and to test whether they can make the snow “perfect” by adding water. Students can gather the materials they need and use them to carry out the investigation. Students can record their observations in their Science Journals. Prompt by asking:

- **What will happen if you mix the snow with a little water? With a lot of water?**
- **What will happen to fluffy, dry snow?**
- **What will happen to heavy, wet snow?**

Explain to students that perfect snow for building is called packing snow. This is wet, heavy snow that falls when the temperature is close to freezing (0°C). These warmer snowflakes have more moisture which acts like a ‘glue’ to hold the flakes together when pressure is applied to pack it. When the air is very cold (below freezing), the snow is fluffy and dry and doesn’t stick together. If you pack snow that is too wet (slush), it packs too hard and becomes lumps of ice.

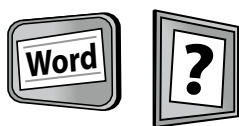
Perfect Snow for a Snow House

You might invite an Elder or an Indigenous Knowledge Keeper to visit the class to describe the perfect type of snow for building a traditional snow house.

Oil and Vinegar

Show students a bottle of oil-and-vinegar dressing containing a sprig of rosemary or basil and some black pepper pods. Have them examine the bottle and help them identify what liquids and solids have been combined. Encourage students to observe and discuss how these liquids and solids are interacting in the bottle (the black pepper pods sink to the bottom, and the oil floats on top of the vinegar). Encourage students to brainstorm why these interactions occur. Explain that

- the oil is less dense than the vinegar, so it floats; and
- the pepper pods are more dense than both the oil and vinegar, so they sink.
- “Density” is how tightly the particles in a substance are packed together.



Add the words “dense” and “density” to the Word Wall. Invite students to add any questions they may have to the I Wonder Wall.

CONNECT

Predicting Results

Display Science Cards 5 and 6, and explain that they show how different liquids and solids might be combined. Ask students to identify each liquid and solid shown on the cards. Then invite a few students to take turns choosing a combination suggested on the cards (such as adding some black pepper to a beaker of water) and predicting the result of the combination. List any verbs that students use on the left side of a sheet of chart paper or on the IWB, such as “mix (dissolve),” “soak up (absorb),” “float,” and “sink.” Title the list Combination Results.



CONSOLIDATE

Combination Class

Distribute a copy of BLM *Results Table* to each student and then have students form small groups. Ask each group to choose a total of five combinations from Science Cards 5 and 6 to investigate. Groups should record their combinations in the first column on their BLMs, and then record their prediction of the result of each combination, using words from the Combination Results list.

Note: Students may choose to combine items with water, or they can combine solids with solids, non-water liquids with solids, or non-water liquids with one another.

Provide each group with a beaker of water, an eyedropper of water, and samples of the liquids and solids they have chosen to investigate. Then have

A blank table with 4 columns and 6 rows. The columns are labeled: Combination Number, Prediction Result, Actual Result, and Prediction Observation. The table is titled 'Results Table' and has a small 'Name' field at the top left.

Combination Number	Prediction Result	Actual Result	Prediction Observation

groups combine each of their chosen pairs of substances, either drawing or digitally photographing first the separate substances and then the combined substances. Have groups describe their observations of their actual results on their BLMs. Students will then determine and record whether their predictions were supported or rejected.

Note: Students should not actively mix pairs of substances, but simply observe what happens when they are combined. Mixing substances will be done in the following teaching plan.

Bring the class back together and revisit the list of Combination Results. Ask groups to name combinations that they now know fit into each category (for example, pepper floats on water, a sugar cube soaks up (absorbs) water). Record each combination to the right of the appropriate result. Add the words “dissolve,” “absorb,” “float,” and “sink” to the Word Wall.



Literacy Place Connection:

Read or revisit “The Muddy Puddle” from *An Early Worm Got Out of Bed* (Shared Reading). Ask:

- What liquid and solid combine to make mud?
- Is mud a liquid or a solid? Why do you think so?

EXPLORE MORE

Sensory Bottles

Show students a sensory bottle. Shake the bottle vigorously and have students observe the results (the solids float and drift in the liquid). Explain that sensory bottles can be used by people as a tool to relax and relieve stress.

Tell students they are going to make their own sensory bottles, and further explore how different solids react in liquids. Have students partner up, and ask each pair to choose a bottle pre-filled with an oil-and-water mixture. Provide small spoons and a variety of small solids (glitter, plastic confetti, sea shells, pebbles, beads, fish tank gravel, etc.) and invite each pair to choose and add a small amount of a few different solids to their bottle. Encourage each pair to discuss and explain their choice of solids. When bottles are complete, attach the lids with a hot glue gun.



More Combinations

Place Science Cards 5 and 6 at the Curiosity Centre and invite students to choose some of the materials shown on the cards (or other materials) to combine, predict what will happen, and then test the combinations. Students can record their predictions and results in their Science Journals.

Results Table

Name: _____

Combination Tested	Predicted Result	Actual Result	Prediction Supported?