

How Can We Use Liquids and Solids to Keep Our World Clean?



Focus: Students investigate how to use liquids and solids to keep our world clean.

Specific Curriculum Outcomes

Students will be expected to:

- 27.0 identify problems to be solved [GCO 2]
- 28.0 apply their knowledge of liquids and solids to maintain a clean and healthy environment [GCO 1/3]
- 19.0 select and use materials to carry out their own explorations and investigations [GCO 2]

Performance Indicators

Students who achieve these outcomes will be able to:

- identify what liquids and solids to use for cleaning various messes
- describe how to use liquids and solids to help keep their world clean

NOTES:

Attitude Outcome Statements

Encourage students to:

- be sensitive to the needs of other people, other living things, and the local environment [GCO 4]

Cross-Curricular Connections

English Language Arts

Students will be expected to:

- respond critically to a range of texts [GCO 6]
- create texts collaboratively and independently, using a variety of forms for a range of audiences and purposes [GCO 9]

Getting Organized

Components	Materials	Before You Begin	Vocabulary
• Science Card 10 • IWB Activity 7 Literacy Place: • <i>Keep Us Clean</i> (Guided Reading, Level J)	• honey, paint, cereal in milk, mud, glitter • various surfaces or containers (e.g., foil trays, pieces of cardboard) • materials with varying degrees of absorbency (e.g., towels, newspaper, paper towels, tissue paper, J-cloths, felt, baby wipes) • ingredients to make homemade cleaners (e.g., baking soda, water, vinegar, olive oil, sea salt, peppermint or citrus essential oil, eggs, lemon juice) • small mixing bowls and tools, measuring spoons and cups • empty spray bottle • old toothbrushes • dish tubs (one per small group) • water • vegetable oil • small items to which oil would adhere (e.g., rubber ducks, small rocks, feathers) • various commercial cleaning products (glass cleaner, dish soap, laundry detergent) • students' Science Journals	• Create a number of contained spills (such as honey, paint, cereal in milk, mud, and glitter) on various surfaces and/or in various containers (e.g., foil trays, pieces of cardboard). • For each small group of students, fill a dish tub with water mixed with vegetable oil. Submerge various small items in the water (e.g., rubber ducks, small rocks, feathers).	• custodian • germs

Safety

- You may choose to have students wear aprons and/or gloves while they are exploring different cleaning products.

Science Background

- Cleaning products work because they contain some kind of detergent. The surface active agents, or surfactants, in detergents are composed of particles that are attracted to both water (or another liquid solvent) and dirt or grease. These particles help spread the solvent over the stain, attach to the dirt, and then help the solvent take the dirt away.
- We use different cleaning products for different stains because a stain can be made up of proteins, fats, starches, inorganic matter, petroleum, etc., so the product must contain the correct ingredients to break up the stain (i.e., enzymes, acids, or other petroleum-based substances). We may also need a product that contains an abrasive, if the stain is difficult to remove.

Possible Misconceptions

- Students might think that simply using water is enough to clean their teeth, body, clothes, or dishes. Water particles do not attach to dirt or grease particles, however, so some kind of detergent (toothpaste, soap, laundry detergent, dish soap) must be mixed with the water to remove the dirt or grease.

ACTIVATE

Custodians of the World

Ask students what kinds of things we clean at home (e.g., teeth, bodies, hair, bedrooms, clothes, furniture, floors, windows, pets, dishes). Ask them what kinds of things the school custodian cleans. Then invite students to imagine that they have been given jobs as the Custodians of the World. Ask them to brainstorm what problems they might have in this job. Students may respond with some of the following:

- **How do we clean certain things?**
- **Can we use one type of cleaner for everything?**
- **How do things get dirty?**
- **How does our environment get dirty?**
- **Can we clean our air? How?**
- **Why do some people not have clean water to drink? How can we help?**
- **How can we keep things from getting dirty?**

Record the problems that students identify.

Keep Our World Clean!

Display Science Card 10 and invite students to examine the photos and discuss the questions. Add to the list created above as students identify new problems, such as:

- **Is there a difference between solid and liquid messes?**
- **How can we clean oil spills that affect wildlife and our oceans?**



- How can we keep our environment from getting dirty?
- How can we stop germs from spreading?

Tell students that they will be exploring liquids and solids to try to solve some of these problems.



Literacy Place Connection:

Read or revisit *Keep Us Clean* (Guided Reading, Level J). Discuss with students how useful combinations of liquids and solids, such as soap and water, can help people to stay clean and healthy.

CONNECT

IWB Activity:

Challenge students to match each item or mess with the liquid or solid they would use to clean it using Activity 7: *Keep it clean!* (see the Teacher's Website).



Clean It!

Display a series of contained spills of various liquids and solids, such as honey, paint, cereal in milk, mud, and glitter on various surfaces and/or in various containers (foil trays, pieces of cardboard, etc.). Provide students with several types of materials with varying degrees of absorbency (e.g., towels, newspaper, paper towels, tissue paper, J-cloths, felt, baby wipes). Working with one spill at a time, invite students to discuss with an elbow partner which material they think would be most effective at cleaning up the spill, and why. Volunteers can take turns testing their predictions until the spill is cleaned up.

Homemade Cleaners

Explain to students that many of the products we use to clean our bodies, our homes, and our world contain ingredients that can make us sick and that are harmful to the environment. Invite students to help you create a variety of cleaning products using all-natural and non-toxic ingredients, such as the following:

- A paste made with baking soda and water for scrubbing rust, mildew, and hard-water stains
- A water-vinegar solution in a spray bottle for cleaning glass (3 tbsp vinegar per 2 cups water)
- An olive oil-vinegar solution for cleaning wood furniture (1 part oil to 1 part vinegar)
- A toothpaste made with 4 tsp baking soda, 2 tsp sea salt (finely ground), 4 drops peppermint or citrus pure essential oil, and enough water for desired consistency
- A shampoo made with 2 eggs, 3 tsp baking soda, 2 tsp olive oil, and 2 tsp lemon juice

Students can measure, pour, and mix the ingredients for any of the products above, with supervision. Invite partners to experiment with any of the first four products, providing them with cloths, paper towels, crumpled newspaper (for glass cleaning), and so on, as appropriate.

CONSOLIDATE

Oil Spill



Have students predict the best way to clean up an oil spill, based on their investigations of cleaners. Provide small groups with tubs of water mixed with vegetable oil and ask them to find the best way to clean off the items that have been submerged in the water (e.g., rubber ducks, small rocks, feathers). Groups should have access to the materials from the previous activities, as well as to commercial cleaning products such as glass cleaner, dish soap, laundry detergent, and so on. Have groups record their results in their Science Journals.



Revisit the list of problems created at the beginning of the teaching plan and ask students which ones they feel they have solved. Encourage them to research solutions to the ones they haven't solved. Invite students to add any new questions to the I Wonder Wall.

EXPLORE MORE

How Do We Stop Germs From Spreading?



Have students brainstorm ways we can use liquids and solids to keep from spreading germs to others when we are sick. For example, we can use a tissue or our sleeve to cover our nose and mouth when we sneeze or cough. We can wash our hands very well with soap. Some people take cough syrup to keep them from coughing. Some people wear a mask over their nose and mouth to keep their germs from spreading or from catching someone else's germs. Students can work in small groups to create posters illustrating these strategies, and post them around the classroom or school. Add the word "germ" to the Word Wall.