

DURATION:

50 minutes

GRADE:

4–5

30 students maximum

KEYWORDS:

Chemical change

Physical change

Acid

Base

Indicator

Molecule

Atom

Matter

Mixture

Solubility

CURRICULUM**LINKS BY GRADE:**

Grade 4 (Matter, Chemical Energy)

Grade 5 (Solutions)

CURRICULAR**COMPETENCIES:**

Questioning and Predicting

Planning and Conducting

Processing and Analyzing

Communicating

Evaluating

THIS WORKSHOP IS A GREAT WAY TO INTRODUCE OR CONCLUDE A CHEMISTRY UNIT. STUDENTS WILL OBSERVE DEMONSTRATIONS AND CARRY OUT HANDS-ON ACTIVITIES TO RELATE THE PROPERTIES OF FAMILIAR (AND MORE EXOTIC) SUBSTANCES WITH THE ATOMS THAT THEY'RE COMPOSED OF.

WHAT WILL HAPPEN IN THE CHANGING MATTER WORKSHOP?

How can matter change? Working in small groups, students will combine materials and look carefully for signs of physical and chemical change. They'll see carbon dioxide turn directly from solid to gas and see acid/base indicators at work.

CLASSROOM ACTIVITY: CRYSTAL GARDENS

Here is something you can do to get your students thinking about changing matter.

WHAT YOU NEED:

- » Table salt (plain, not iodized)
- » Ammonia solution (regular household ammonia, not sudsy type)
- » Laundry bluing (such as Mrs Stewart's—available at a grocery store)
- » Food colouring
- » Lava rock or charcoal briquettes (for crystal garden)
- » Bottle to hold crystal solution
- » Aluminum foil muffin pans
- » Stirrers

WHAT TO DO:**Preparation:**

1. To prepare the crystal growing solution, mix the following in a beaker or suitable container:
 - 90mL (6 tbsp) water
 - 90mL (6 tbsp) liquid laundry bluing
 - 15mL (1 tbsp) household ammonia
 - 100 grams (6 level tbsp) table salt (NaCl)
2. Stir until the salt is dissolved. Use immediately. Put the solution in an airtight bottle for short delays but do NOT store this solution because the solution decomposes to form cyanides.

CAUTION: Ammonia fumes are irritating, particularly to the eyes. Work in an area with good ventilation. Wear gloves and goggles.

Activity:

1. Place a charcoal briquette or lava rock in an aluminum foil muffin pan.
2. To give the crystals some colour, put drops of food colouring on the briquette/lava rock and allow it to dry before the addition of the crystal growing solution.

Activity continued on other side



3. Add 1 to 2 tbsp of the crystal growing solution around the briquette/lava rock. Allow the garden to stand undisturbed for several hours or overnight.

The solution you make in this activity is a very concentrated salt solution. As soon as the water starts to evaporate, crystals will start to form.

NOTE: Depending on temperature and humidity conditions, crystals can begin growing within 2 hours.

TEACHER TIP: Liquid materials used in this experiment can be washed down the drain with running water.

MORE ABOUT CHEMISTRY AT TELUS WORLD OF SCIENCE

Peter Brown Family Centre Stage Shows:

Fire
Chemistry
Cold
Bubbles

Check scienceworld.ca/centrestage for availability.

RECOMMENDED RESOURCES:

- » Science World Resources | Units | States of Matter
scienceworld.ca/resources/units/states-matter
- » Science World Resources | Units | Wonderful Water
scienceworld.ca/resources/units/wonderful-water
- » Science World Resources | Units | Bubbles
scienceworld.ca/resources/units/bubbles
- » *Teaching Chemistry with Toys* by Jerry L. Sarquis, Mickey Sarquis, and John P. Williams (Terrific Science Press 1995). ISBN 0-07-064722-4
- » American Chemical Society | Inquiry in Action | Resources for inquiry chemistry
inquiryinaction.org
- » American Chemical Society | Middle School Chemistry
middleschoolchemistry.com