

**DURATION:**

50 minutes

**GRADE:**

6–7

30 students maximum

**KEYWORDS:**

Chemical change

Physical change

Acid

Base

Indicator

Molecule

Atom

Matter

Mixture

Solubility

**CURRICULUM****LINKS BY GRADE:**

Grade 6 (Mixtures)

Grade 7 (Elements and Compounds,  
Chemical Change)

**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 REACTIONS AND INDICATORS WORKSHOP?**

Chemistry is all about atoms—but atoms are too small to see. Chemists use the observable properties of substances to deduce their atomic structure. In this workshop, students will use indicator chemicals that distinguish acids from bases, carry out safe chemical reactions and look for signs of chemical and phase change.

**CLASSROOM ACTIVITY: CABBAGE JUICE INDICATOR**

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

**WHAT YOU NEED:**

- » Goggles
- » Red cabbage
- » Small clear plastic or glass cups or beakers
- » A variety of household substances:
  - Lemon juice (citric acid)
  - Vinegar (acetic acid)
  - Baking soda (sodium bicarbonate, a base)
  - Washing soda (sodium carbonate, a base)
  - Cream of tartar (potassium bitartrate, an acid)
  - Antacids (various bases)
  - Soda water (carbonic acid)
  - Ammonia (a strong base)
  - Ivory soap (not detergent, a base)

**WHAT TO DO:**

1. Mix up some cabbage juice in advance. Chop up half a red cabbage into small pieces and put them in a pitcher. Pour boiling water over the cabbage and let it steep for an hour.
2. Put a different household chemical in each cup. Label them!
3. Add a bit of cabbage juice to each cup and observe any colour changes.

Students can do steps 2 and 3 themselves for most of the household chemicals listed above. The teacher should demonstrate the results with ammonia, which is strong enough to be dangerous (wear goggles).

Red cabbage contains a pigment called flavin, which changes colour depending on the pH of the solution it is in. Acids, with a low pH, turn cabbage juice red or pink. Bases, with a high pH, turn cabbage juice blue or green.

Activity continued on other side



## **MORE ABOUT REACTIONS AND INDICATORS AT TELUS WORLD OF SCIENCE**

### **Peter Brown Family Centre Stage Shows:**

Fire  
Chemistry  
Cold  
Bubbles

Check [scienceworld.ca/centrestage](http://scienceworld.ca/centrestage) for availability.

### **RECOMMENDED RESOURCES:**

- » Science World Resources | Units | States of Matter  
[scienceworld.ca/resources/units/states-matter](http://scienceworld.ca/resources/units/states-matter)
- » Science World Resources | Units | Wonderful Water  
[scienceworld.ca/resources/units/wonderful-water](http://scienceworld.ca/resources/units/wonderful-water)
- » Science World Resources | Units | Bubbles  
[scienceworld.ca/resources/units/bubbles](http://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](http://inquiryinaction.org)
- » American Chemical Society | Middle School Chemistry  
[middleschoolchemistry.com](http://middleschoolchemistry.com)