

# BLUEBERRY CABBAGE MAGIC SNAPSHOT

## DRIVING QUESTION: HOW CAN WE USE PLANTS IN CHEMISTRY?

Recommended Grades: K – 6; Adaptations for 7 – 12.

Classroom or Center Activities	Outside or Larger Space Activities	Technology-Based Activities	Stem-to-Go Take Home	Field Work and/or Natural Area Needed
X	X	X	X	X

**Materials:** Fresh or frozen blueberries, 2 – 3 leaves of red cabbage, hot water and microwave access, small clear containers with lids, sandwich bags, two mason jars to store testing solutions, water, baking soda, lemon juice, measuring spoons or graduated cylinder, coffee mug, fork, clear plastic cups, two dropping pipets. Optional: beach ball, other household liquids and Universal Indicator Solution

**Teacher Prep:** <15 Minutes

**Participant activity:** 30 minutes

**Objectives:**

1. Identify properties of acids and bases.
2. Use a known indicator to compare the precision and accuracy of homemade indicators.
3. Explain solvent, solution, solution, and concentration.
4. Apply the pH scale to household solutions using homemade indicator solutions.
5. Prepare a neutralization reaction and observe chemical changes.

### STEM Skills

**S:** Classify liquids as acids and bases. Apply controls and independent variables.

**T:** Compare and evaluate solutions for their precision and accuracy.

**E:** Prepare a neutralization reaction to form a new chemical compound.

**M:** Prepare solutions with a mathematic ratio of 6:1.

### Teacher Tips: Blueberry and Cabbage Magic

**Plan ahead:** Universal indicator solution can be ordered through Carolina Biological or purchased at many pet stores with fish sections or a swimming pool store. Dropping pipets can be purchased from craft stores like Michaels, or in bulk from Carolina Biological. All other materials should be available at the grocery store.

**Total prep:** < 15 minutes to make copies,

**Safety:** Hot water from the tap is safer than heating water in a microwave. Please note that I have only included edible items to reduce the risk of ingestion of anything (even soap) that could make a participant sick. If a participant accidentally ingests any of the materials, it may not be pleasant, but it is not dangerous.

**Sensory Integration Issues:** Strong smells of cabbage may be unpleasant for some participants. Store cabbage indicator liquid in a sealed container. Smashing blueberries inside a sandwich bag can prevent an unpleasant sticky experience. Please note that we have chosen lemon juice instead of vinegar for the neutralization reaction instead of the more commonly done vinegar.

**Cost:** Minimal, <\$1 per person.

**What else do I need?** Paper towels/rags.

**Clean Up:** Hands, equipment, and surfaces can be washed with soap and water. The acids and bases we chose should not cause damage if mixed during cleanup.

## NC CAP's Unit Planner

<i>Classroom or Center Activities</i>	<i>Outside or Larger Space Activities</i>	<i>Technology-Based Activities</i>	<i>Stem To-Go</i>	<i>Field Work and/or Natural Area Needed</i>
Blueberry and Cabbage Magic	Hydrogen Ion Partner Exchange	Virtual Lab <a href="http://www.glencoe.com/sites/common_assets/science/virtual_labs/E22/E22.html">http://www.glencoe.com/sites/common_assets/science/virtual_labs/E22/E22.html</a>	Penny Cleaners	Acid Rain Capture
Neutralize It!				

### NC Essential Standards Correlations: Blueberry and Cabbage Magic

K.P.2.1: Classify objects by observable physical properties (including size, color, shape, texture, weight, and flexibility).

1.E.2.1: Summarize the physical properties of Earth materials, including rocks, minerals, soils, and water that make them useful in different ways.

2.P.2.1: Give examples of matter that change from a solid to a liquid and from a liquid to a solid by heating and cooling.

3.P.2.2: Compare solids, liquids, and gases based on their basic properties.

3.L.2.2: Explain how environmental conditions determine how well plants survive and grow.

4.P.2.1: Compare the physical properties of samples of matter (strength, hardness, flexibility, ability to conduct heat, ability to conduct electricity, ability to be attracted by magnets, reactions to water and fire).

5.P.2.2: Compare the weight of an object to the sum of weight of its parts before and after an interaction.

5.P.2.3: Summarize properties of original materials, and the new material(s) formed, to demonstrate that a change has occurred.

6.P.2.1: Recognize that all matter is made up of atoms and atoms of the same element are all alike, but are different from the atoms of other elements.

8.P.1.1: Classify matter as elements, compounds, or mixtures based on how the atoms are packed together in arrangements.

8.P.1.3: Compare physical changes such as size, shape, and state to chemical changes that are the result of a chemical reaction to include changes in temperature, color, formation of a gas, or precipitate.

8.E.1.3: Predict the safety and potability of water supplies in North Carolina based on physical and biological factors, including pH.