

Puking Pumpkins

Overview: Halloween is a great time to explore different fall activities, excite your students' creative side, and... make pumpkins vomit? In this experiment, students will explore different chemical reactions when trying to make their pumpkin look a little more gruesome than intended!

Procedure:

- 1) Prior to this activity, hollow out and cut out a pumpkin face on each student's small pumpkin. Be sure to cut the mouth opening near the bottom of the pumpkin.
- 2) Each student will receive a prepared pumpkin to begin the experiment.
- 3) With the teacher's pumpkin, mix your two "mystery substances" (i.e. vinegar and baking soda) in the hollowed out pumpkin. Let the students see that a new substance foams out of the pumpkins mouth.
- 4) Ask the students "What two substances do you think could make that happen?"
- 5) Compile all the of students' answers, noting any similarities or differences between the answers.
- 6) Have each student choose one combination that they feel will most likely result in the pumpkin "puking" the foamy substance out of its mouth.
- 7) Each student should then use the two substances they chose and mix them together in their hollowed out pumpkin.
- 8) Record the results of each student's pumpkin experiment (i.e. did a foamy substance occur?)
- 9) If a student did not choose the vinegar + baking soda combination to experiment with, reveal your "mystery substances."
- 10) Discuss with the students why a foamy substance (carbon dioxide + water) was made from the two original substances. For a more detailed explanation of the reaction of a base and an acid, [click here](#).

ASOLs Covered in this Activity:

SCIENCE

- 5S-SI 1:** The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
- a) distinctions are made among observations, conclusions, inferences, and predictions;
 - b) objects or events are classified and arranged according to characteristics or properties;
 - e) predictions and inferences are made, and conclusions are drawn based on data from a variety of sources;
 - f) independent and dependent variables are identified;
 - g) constants in an experimental situation are identified;
 - h) hypotheses are developed as cause and effect relationships;
 - i) data are collected, recorded, analyzed, and displayed using bar and basic line graphs;
 - k) data are communicated with simple graphs, pictures, written statements, and numbers;

5S-SI 2 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigation in which

- d) hypotheses are formed from testable questions;
- e) independent and dependent variables are identified;
- f) constants in an experimental situation are identified;
- g) data are collected, recorded, analyzed, and communicated using proper graphical representations and metric measurements;
- h) predictions are made using patterns from data collected, and simple graphical data are generated;
- i) inferences are made and conclusions are drawn;

8S-SI 1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations which

- a) observations are made involving fine discrimination between similar objects and organisms;
- d) hypotheses are stated in ways that identify the independent and dependent variables;
- e) a method is devised to test the validity of predictions and inferences;
- f) one variable is manipulated over time, using many repeated trials;
- h) data are analyzed and communicated through graphical representation;
- i) models and simulations are designed and used to illustrate and explain phenomena and systems.

8S-SI 2 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which

- d) models and simulations are constructed and used to illustrate and explain phenomena;
- f) dependent variables, independent variables, and constants are identified;

HSS-SI 1 The student will plan and conduct investigations in which

- e) variables are manipulated with repeated trials.

HSS-SI 2 The student will demonstrate an understanding of the nature of science and scientific reasoning and logic. Key concepts include

- b) evidence is required to evaluate hypotheses and explanations;
- c) observation and logic are essential for reaching a conclusion

Extension Idea:

These standards can be addressed through the course of this activity's scientific process.

5S-FME 5 The student will investigate and understand that matter is anything that has mass, and takes up space; and occurs as a solid, liquid, or gas. Key concepts include

- a) distinguishing properties of each phase of matter;
- e) mixtures including solutions.

Extension Idea:

This activity illustrates how a solution is made from two different substances. It also demonstrates the differences between a solid (baking soda), a liquid (vinegar), and a gas (the Carbon Dioxide that is formed).

- 8S-SI 3** The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
- a) chemicals and equipment are used safely;

Extension Idea:

Prior to mixing substances, review the safety concerns about handling chemicals. (i.e. wear goggles to protect your eyes, wear gloves to protect your hands, don't smell chemicals, etc)

- 8S-FME 2** The student will investigate and understand that all matter is made up of atoms. Key concepts include
- d) two or more atoms interact to form new substances, which are held together by electrical forces (bonds);

Extension Idea:

A discussion will be held at the completion of the experiment explaining the concept of how the two substances combined to make a new substance.

- 8S-FME 5** The student will investigate and understand the nature of matter. Key concepts Include
- b) elements, compounds, mixtures, acids, bases, and salts;
 - c) solids, liquids, and gases;
 - d) physical properties;
 - e) chemical properties;

Extension Idea:

Emphasis will be placed on describing the qualities of the substances used in the experiment (i.e. baking soda is a base, a solid, has physical properties of being white and powdery, etc).

READING & WRITING

- 3E-RW 2a:** The student will use newly acquired vocabulary drawn from reading and other content areas.
- 3E-RW 3g:** The student will identify words from other content areas.
- 3E-CN 1g:** The student will sequence at least two steps in a procedure or ideas/incidents in an event.
- 4E-RW 1c:** The student will use newly acquired vocabulary drawn from reading and other content areas.
- 5E-RW 1f:** The student will demonstrate understanding of content-specific words.
- 5E-WP 1b:** The student will select an event or personal experience and use drawing, writing, or dictating to compose a message about it;
- 5E-WP 2a:** The student will use technology (including assistive technologies) to produce and

publish writing;

5E-WP 3c: The student will select an event or personal experience and write one thing about it;

5E-WP 6a: The student will use technology to produce and share writing;

5E-WP 9a: The student will list words that describe an event or personal experience to use when writing about it;

6E-RW 1b: The student will use context clues to determine the meaning of vocabulary words drawn from reading and other content areas

7E-RW 1b: The student will determine the meaning of words and phrases;

c: The student will use context clues to determine the meaning of vocabulary words drawn from reading and other content areas;

8E-RW 1b: The student will demonstrate knowledge of new vocabulary drawn from reading and other content areas;

e: The student will acquire and use content words and phrases.

8E-WP 1a: The student will write to convey ideas and information including facts, details, and other information.

b: The students will write about a personal experience by introducing the event or experience, at least one character, and two or more events in sequence.

d: The student will use content specific vocabulary when writing about a topic.

8E-WP 3b: The student will write to convey ideas and information including facts, details, and other information as well as graphics and multimedia as needed.

8E-WP 5a: The student will write an argument to support a claim with one clear reason or piece of evidence.

b: The student will write to convey ideas and information clearly including facts, details, and other information.

HSE-RW 2c: The student will acquire and use content words and phrases.

HSE-RW 3c: The student will demonstrate knowledge of the meaning of words and phrases from reading and other content areas by using context;

HSE-WP 1b: The student will write to convey ideas and information using clear organization and including facts, details, and other information as well as graphics and multimedia as needed.

c: The student will write about an event or personal experience by introducing the event or experience, at least one character, and describing multiple events in sequence.

Extension Idea:

Upon completion of this experiment, students will write a text that summarizes their experiences and findings. This can be a fun way for the students to demonstrate what they have learned. Particular attention may be given to content words, figurative language, and sequence of events. Encourage students to include illustrations, tables, graphs, and digital photographs. Texts might take the form of a PowerPoint presentation, book, journal entry, newsletter, or blog. These texts might make great additions to self-selected reading libraries.

MATH

3M-NSCE 7a: The student will differentiate between whole, half, and fourth.

5M-NSCE 4a: The student will differentiate between halves, fourths, and eighths;

6M-NSCE 3a: The student will compare the relationships between two unit fractions.

7M-NSCE 1a: The student will add fractions with like denominators (halves, thirds, fourths,

and tenths) with sums less than or equal to one.

8M-MG 2a: The student will identify volume of common measures (cups, pints, quarts, gallons, etc.).

Extension Idea:

After determining what two substances to mix together for the experiment, students will measure exact amounts of their substances (as prescribed by the teacher) using variations of the cup measuring system ($\frac{1}{4}$ cup, $\frac{1}{2}$ cup, etc). Students can then determine the total amount of substances they mixed together by adding their measurements.

7M-MG 2a: The student will draw or classify and recognize basic two-dimensional geometric shapes without a model (circle, triangle, rectangle/square).

8M-MG 3b: The student will identify similar shapes with and without rotation.

Extension Idea:

Prior to the teacher cutting a face into each student's pumpkin, students can choose and identify which shapes they would like their pumpkin face to consist of. Students may draw the shapes onto the pumpkin. Students can then compare pumpkins and determine which shapes are similar.

Materials Needed:

- small pumpkins for each student
- sharp knife (for teacher use only prior to the activity)
- vinegar
- baking soda
- other substances that students could combine/choose from for their experiment (i.e. dish soap, laundry soap, vegetable oil, flour, sugar, soda water, etc)
- pouring cups
- chart paper (or some other writing surface to gather students' hypotheses)
- writing utensil

Instructional Setting:

This activity requires a flat surface such as a table or counter. It should be completed in an area that is easy to clean up (i.e. tile floor or plastic garbage bags laid out over top of carpeting)

Community Connections and/or Peer Interaction:

Students can work together in small groups to mix their substances for their pumpkins. Students can take this easy experiment home to show their family and friends.

Functional Activity/Routine:

This activity encourages functional skills such as turn-taking, following instructions, and cleaning up afterward.

Strategies to Collect Evidence:

For collection of evidence, be sure that each student records a hypothesis and checks their hypothesis for accuracy. The student should revise their hypothesis if necessary.

Specific Options for Differentiating this Activity:

- Conduct the experiment on a surface that can be accessed by all students.
- For students with poor fine motor skills, use assistive technology such as an automatic pourer (or use peer assistance) to pour the substances into the pumpkins.
- Allow students to use their preferred “pencil” when writing. This may include writing utensil, keyboard, alternative pencil, or dictating to a scribe.
- Prepare, as necessary, for each student to make choices and communicate with their preferred method. This may include using augmentative communication.