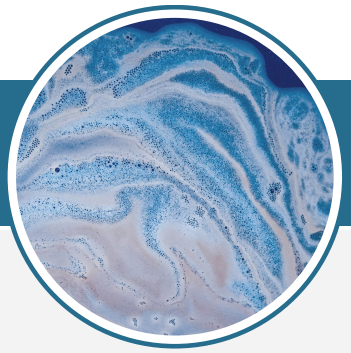
7.1 Chemical Reactions & Matter



Unit Structure

Driving question: How can we make something new that was not there before?

Lesson Set 1: *What is in the Bath Bomb that causes a gas to form?*

Lesson 1

Students make observations of a store bought bath bomb before, during and after combining with water. With a small group, students observe how homemade bath bombs behave in water to compare to the store bought bath bomb. Students find there are gas bubbles that are created when any of the bath bombs are added to water.

Lessons 2-6

Students investigate whether the gas bubbles are trapped in the solid bath bomb or made when the bath bomb is combined with water and find the later is true. Students test different ingredients in water on their own, and in different combinations to see if any of them create a gas when added to water. They find that citric acid and baking soda combined in water create a gas. Using properties of gases, students narrow down what the gas from the bath bomb could be.

Lesson 6 + Problematize

Students apply what they have figured out about properties of substances to a new phenomena (elephant toothpaste) where a chemical reaction occurs. Now that students have figured out that a new substance is made when a bath bomb is added to water, they wonder how this happens. .

Lesson Set 2: *How can a new substance be made that wasn't there before?*

Lessons 7-12

Now that students know baking soda, citric acid and water create gas bubbles when combined and this gas is a (new)different substance, they wonder how this happens. Through electrolysis of water, they figure out that molecules can be broken apart into their separate atoms and rearranged to form a new molecule (a chemical reaction). Students return to the phenomenon from Lesson 1 and explain what happens when the bath bomb is added to water in terms of reactants and produces.

Lesson 13

Students still have lingering questions around the different odors bath bombs have, how we smell the different odors and why odors are considered a property of a substance. Students investigate different odors to identify them and analyze their molecular composition to argue why odor is a property of a substance. Students read an article and find that our noses have receptors that send signals to our brain about different odors we smell.

Lesson 14

Students apply their model for chemical reactions to a transfer task around what is happening to the Taj Mahal. Students begin by reading about the Taj Mahal, the crumbling of the surface of the Taj Mahal, and the pollution around the Taj Mahal. Using what they have figured out about chemical reactions, students argue whether that is what is happening to cause the changes to the surface of the Taj Mahal.

Before Teaching the Unit

Watch the unit webinar.

Read the unit storyline.

Join the Facebook Group for the unit.

Review the Assessment System Overview in the Unit Overview to complete the Grading Planning Tool for the unit.

Review the Unit Overview, Material List and Lesson Teacher Edition to check for the required materials and supplies necessary for the unit. Take note of these unit-specific items related to materials:

- Homemade bath bombs for lesson 1 need to be prepared in advance! Watch the teacher prep video for guidance.
- Homemade bath bomb B is best to use in lessons 2 and 5.
- Lesson 9 includes graphing; it can be helpful to check in with your math colleagues in advance of this lesson.
- Lesson 5 and lesson 10 investigations require advanced teacher preparation and practice before facilitating with students.

While Teaching the Unit

- Watch teacher set-up videos for investigations.
- Keeping a running record of class discoveries and investigations throughout the unit to help absent students catch up and as a reference for future years. Approaches could include a teacher version of a student notebook, or a running shared Google document.
- Organize handouts and digital materials as you go for future use.

After Teaching the Unit

- Make notes of future revisions, modifications.
- Take pictures of posters, consensus models and exemplary student work.
- Survey students at end of unit for feedback and self-reflection.

Unit Fast Facts for Planning

Unit Length	14 Lessons, 25 Days
Lessons with Hands-On Investigations	1, 2, 3, 4, 5, 6, 9, 10, 12, 13
Lessons Requiring Student Devices	N/A
Lessons that Require In-Advance Material Preparation	1, 2, 3, 4, 5, 9, 10, 12, 13
Lessons with Mid-Point or Summative Assessment Moments	5, 6, 10, 12, 14