
Wack-a-Pack Science PQRST

Materials

Wack-a-Pack self-inflating balloons from Dollar Tree
Citric Acid
Sodium Bicarbonate (baking soda)
Distilled Water
Various graduated cylinders, test tubes, and measuring spoons
Thermometers
Scissors
Writing Utensil
Graph Paper for [STEMAZing Journal Hack](#)

Begin by making a STEMAZing Journal graph paper, scissors, and a writing utensil as shown in the hack linked above.

Phenomenon

Give each student or each table a Wack-a-Pack.

Instruct them to be prepared to make observations about what happens and then to generate questions associated with the phenomenon.

On the count of 3, let them wack the pack.

Questions

After students have had time to observe the wack-a-pack phenomenon, let them write questions they have in their journals silently.

Once students have had 5-10 minutes to generate questions, have them share out their questions one at a time and write them on poster paper. Let them exhaust their ideas and don't discount any questions they have.

You may want to categorize your questions into groups. The groups might include:
Fact-Check Questions – can easily be looked up in a book or online resource.

Scientifically Testable Questions – can be investigated using the Science & Engineering Practices

Beyond Science Questions – are connected to other subject areas and are not testable using science

Research

Let students read the original packaging to see what was inside the balloon.

Have students use their scissors to one or two balloons open to see what is inside. See if they can determine how the whole reaction was triggered. (Reverse engineering!)

If you have access to computers have your students look up the citric acid, baking soda, water reaction.

From <https://www.questacon.edu.au/outreach/programs/science-circus/activities/fizzy-sherbet>:

We can write the acid/carbonate reaction as a chemical equation:

Acid + Carbonate --> Carbon Dioxide + Water + Salt

For vinegar and sodium bicarbonate, the chemical equation is:

Vinegar + Sodium Bicarbonate --> Carbon Dioxide + Water + Sodium Acetate

$\text{CH}_3\text{COOH} + \text{NaHCO}_3 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{CH}_3\text{COONa}$

For citric acid and sodium bicarbonate, the chemical reaction reads:

Citric Acid + Sodium Bicarbonate --> Carbon Dioxide + Water + Sodium Citrate

$\text{C}_6\text{H}_8\text{O}_7 + 3\text{NaHCO}_3 \rightarrow 3\text{CO}_2 + 3\text{H}_2\text{O} + \text{C}_6\text{H}_5\text{O}_7\text{Na}_3$

Allow your students to conduct other research they may need to address some of the questions.

Science It!

Depending on the standard you are trying to address, let students select one or more of the testable questions to science (it is a verb!). They should identify the independent variables and the dependent variables and then use the Science & Engineering Practices to make sense of the question.

Give students a copy of the Practices Octagon to create their SEP adventure web as they are conducting their scientific investigation of a testable question related to the phenomenon.

Tell the SEP Adventure!

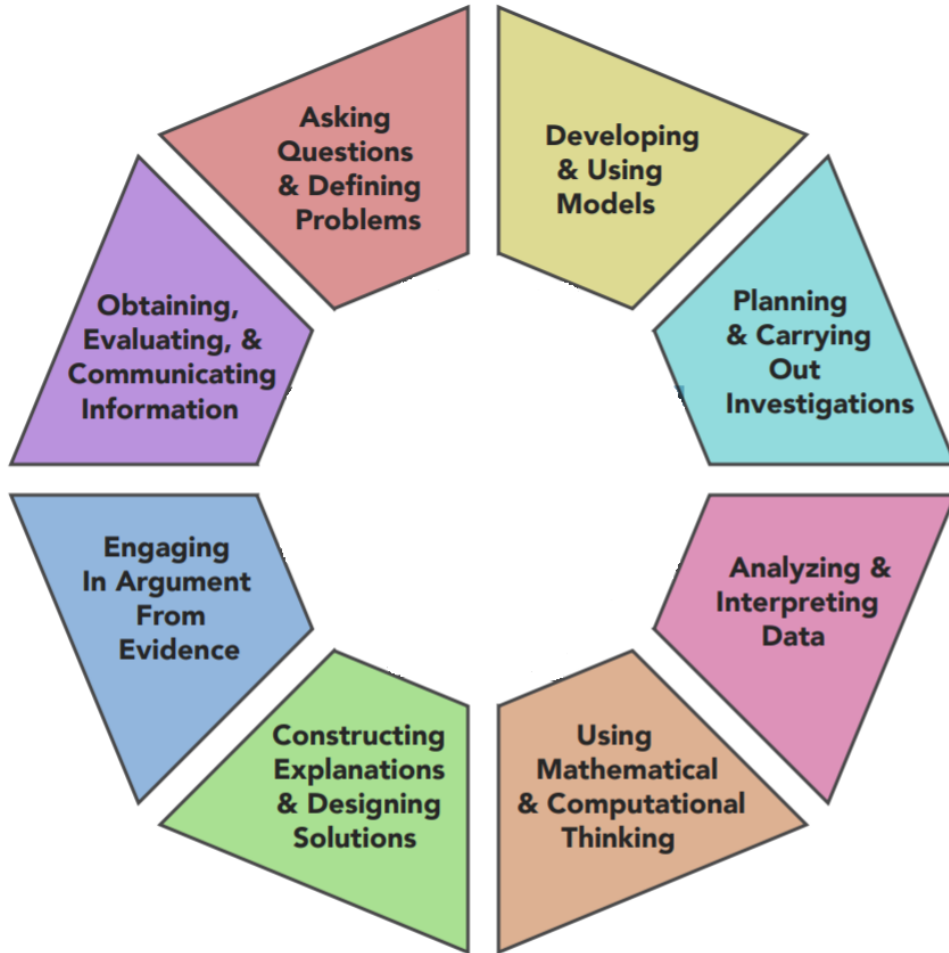
Once students have had a chance to investigate different questions or even the same question, they should be given an opportunity to tell the story of their SEP adventure. This is best done using the [Practices Web](#) from Next Generation Science Storylines with a cleared out web – we shall refer to this as the Practices Octagon.

Name _____

Date _____

Practices Octagon for _____

Testable Question: _____



SEP Adventure
