LESSON 7:
POP ROCKS AND SODA

Students will experiment with the chemical reaction of pop rocks and soda, exploring different variables to assess the differences in reactions.

OBJECTIVES

- [x] What is the product of the chemical reaction?
- [x] Does one type of soda create a bigger chemical reaction than the others?
- [x] What is the evidence that a chemical reaction has occurred?

SUPPLIES

- 9-10 packets of Pop Rocks
- 1 bottle each of
  - Coke
  - Diet Coke
  - 7-Up or Sprite
  - Seltzer Water
- 4 funnels (or these can be shared between groups)
- 8 balloons
- Extra bottles of water and/or juice (optional)
- 12 pieces of paper and 12 pencils

KEYWORDS

- Carbon dioxide
- Catalyst
- Gas
- Carbonation

HOOK

5-10 min

Ask students if they are familiar with Pop Rocks. Let students try a few.

- What happens when you put Pop Rocks in your mouth?
- Why do you think this happens?

HYPOTHESIS

3-5 min

Discuss with students:

- What do you think will happen when Pop Rocks and a soda combine?
- What product do you think will be produced from the chemical reaction?

Then, have students draw out the 'Scientist's Worksheet' and make the following predictions:

- Which soda will produce the biggest chemical reaction?
- Which soda will produce the smallest chemical reaction?

EXPERIMENT

20-25 min

1. Split students into groups of 4.
2. Each group will test a different soda. Give each group one type of soda and 2 packets of Pop Rocks.
3. Ask each group to stretch the balloons over the funnel and fill each two with packets of Pop Rocks.
4. Then, pinch the end of the balloon so the Pop Rocks are sealed off from the balloon opening.
5. Attach the balloon to the soda bottle without combining the Pop Rocks and soda.
6. Once the bottle is set up groups can take turns to raise the balloon so that the Pop Rocks fall into the soda. Observe what happens to the balloons.

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OBSERVATION

5-10 min

Ask students to discuss:

- What happened to the balloons?
- Were all the balloons the same size?
- What did you notice happening inside the bottle?

Students should report that the balloons began to inflate. It is likely that the balloons will be slightly different sizes. If any balloon does not inflate at all, this is probably due to a broken seal where the balloon was not secured properly to the bottle. Inside the bottle, students will see some foam or bubbles created.

CONCLUSION

3-5 min

Ask students to share their findings.

- What happened when Pop Rocks and a soda combined?
- What product do you think was produced from the chemical reaction? Explain your answer.
- Which soda produced the biggest chemical reaction?
- Which soda produced the smallest chemical reaction?

When the Pop Rocks and the soda combined, a chemical reaction occurred. Students should be able to note this from the bubbles that were created and the gas that filled the balloon. Students may remember from previous balloon experiments or their taste of Pop Rocks from last lesson that carbon dioxide should have been produced. Usually, Diet Coke produces the biggest chemical reaction while 7 Up or Ginger Ale produces the smallest reaction, but this will be dependent on the drinks you chose. Have students compare results to see which drink produced the biggest and smallest reaction for your group.

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CHEMICAL REACTION

A chemical reaction is where different substances (reactants) are changed into a new substance (product)

SIGNS

- change of color
- change of temperature
- change of smell
- production of gas
- production of a solid
- emission of light

EXTENSION 5-10 min

If students have time to expand on this experiment, try one of these alternatives:

- Have students repeat the experiment but with bottled water and juice. How do the results change?

These experiments should produce the following results:

- Water and juice should still create some carbonation from the Pop Rocks, but significantly less than the soda or fizzy drinks. This is because the water and juice do not have carbonation, so there is less of a buildup or volume of carbon dioxide.

EXPLANATION 5-10 min

Pop Rocks are candy that has been heated to evaporate the water and then combined with pressurized carbon dioxide. If you look closely at Pop Rocks, you may even be able to see some of the carbon dioxide bubbles. When Pop Rocks are combined with a liquid, like water or saliva, the candy dissolves and the pressurized carbon dioxide is released. The pressurized carbon dioxide bubbles pop when they are released, making the sound we associate with Pop Rocks.

In this experiment, the Pop Rocks combined with soda. Soda has added carbon dioxide bubbles, which is how it becomes carbonated, or fizzy. When the Pop Rocks combine with the soda, the carbon dioxide bubbles in the soda attach to the Pop Rocks. The candy shell of the Pop Rocks breaks down, releasing the carbon dioxide from the candy and from the soda. The carbon dioxide released from both the Pop Rocks and the soda is a gas and begins to fill the soda bottle and eventually when enough builds up, begins to inflate the balloon.

Different types of soda may have different amounts of carbon dioxide in them, which is why the results between fizzy drinks varied. Diet Coke usually has the most carbonation. 7 Up or Ginger Ale usually is less carbonated than other fizzy drinks.

CLEAN UP & DISMISSAL 3-5 min

Students must then clean their workspace. Liquids can be disposed of safely. Make sure to leave the classroom the way you found it.

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SCIENTIST'S WORKSHEET

Tip: Can draw or write the following down on whiteboard!

	Hypothesis - Size of the balloon (Large, medium, or small)	Observation - What happened inside the bottle?	Observation - Size of the balloon (Large, medium, or small)
Diet Coke			
Coke			
7 Up/Sprite			
Plain Seltzer Water