

## RAMP UP - REACT Lesson Plan

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| <b>Title of Lesson:</b>             | What a Reaction! Classifying States of Matter Using a Coke and Mentos Experiment   |
| <b>Grade Level:</b>                 | 2  |
| <b>AL COS Standard:</b>             | SC15.2.1 - Conduct an investigation to describe and classify various substances according to physical properties (e.g., milk being a liquid, not clear in color, assuming shape of its container, mixing with water; mineral oil being a liquid, clear in color, taking shape of its container, floating in water; a brick being a solid, not clear in color, rough in texture, not taking   |
| <b>NGSS:</b>                        | 2-PS1-1 Matter and Its Interactions - Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.  |
| <b>Learning Targets/Objectives:</b> | <ul style="list-style-type: none"><li>● I can classify the substances in the experiment by physical properties.</li></ul>  |
| <b>Materials Needed:</b>            | <ul style="list-style-type: none"><li>● <b>RAMP UP REACT Kit</b><ul style="list-style-type: none"><li>○ All materials needed for the REACT experiment are included in the kit</li></ul></li><li>● <b>Videos</b><ul style="list-style-type: none"><li>○ States of Matter for Kids - What are the States of Matter? Solid, Liquid and Gas - <a href="https://www.youtube.com/watch?v=JQ4WduVp9k4">https://www.youtube.com/watch?v=JQ4WduVp9k4</a></li><li>○ Yes, Putting Mentos into Any Soda Can Make it Explode - <a href="https://www.youtube.com/watch?v=s1apaAnLIRY">https://www.youtube.com/watch?v=s1apaAnLIRY</a></li><li>○ VERIFY: The Science Behind Why Mentos Makes Soda Explode - <a href="https://www.youtube.com/watch?v=MaQ1QJpHEuE">https://www.youtube.com/watch?v=MaQ1QJpHEuE</a></li></ul></li><li>● <b>Other Materials</b><ul style="list-style-type: none"><li>○ chart paper</li><li>○ paper</li><li>○ crayons</li><li>○ markers</li><li>○ pencils</li></ul></li></ul> |

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|                               | <ul style="list-style-type: none"> <li>○ chart labeled with states of matter (can make your own)</li> </ul> <p>Links to the videos can also be found on the REACT Kit Resources page <a href="https://uahrapup.org/react/">https://uahrapup.org/react/</a></p>   |
| <b>Preparation:</b>           | <ul style="list-style-type: none"> <li>● Find a flat surface outside to put the drink bottle on</li> <li>● Gather all materials</li> </ul>   |
| <b>Lesson Logistics:</b>      | <ul style="list-style-type: none"> <li>● You will need to conduct the experiment outside</li> <li>● This will be a whole group lesson and could be completed with another class</li> </ul>   |
| <b>Vocabulary Words:</b>      | <ul style="list-style-type: none"> <li>● altitude</li> <li>● plume</li> <li>● physical reaction</li> <li>● chemical reaction</li> <li>● liquid</li> <li>● gas</li> <li>● solid</li> </ul>  |
| <b>Safety Considerations:</b> | Safety goggles should be used if students are putting the mentos in the soda in case of it spewing in their faces.   |
| <b>Engage:</b>                | <p><b>Step 1:</b> Watch the video, States of Matter for Kids - What are the States of Matter? Solid, Liquid and Gas. After the video, ask the following questions:</p> <ul style="list-style-type: none"> <li>● Can you think of something that is a solid?</li> <li>● Can you think of something that is a liquid?</li> <li>● Can you think of something that is a gas?</li> </ul> <p><b>Step 2:</b> Make a chart with the different states of matter and categorize the things the students name.</p> <p><b>Step 3:</b> Following the making of the chart, ask, “What happens that causes states to change?”</p> |
| <b>Explore:</b>               | <p><b>Step 1:</b></p> <p><b>Explain:</b> Today we are going to conduct an experiment. We will drop mentos into different carbonated drinks and see what happens. We also have different nozzles to try and see how those change the reaction.</p> <p><b>Ask:</b> What do you think will happen?</p>  |

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|                        | <p><b>Look For:</b> Students look for and see if you can identify the different states of matter in our experiment. Remember gas is not always easy to see.</p> <p><b>Step 2:</b></p> <p><b>Do:</b> Set up the experiment and follow the REACT guide to conduct the experiment. It is up to the teacher’s discretion if they want students to conduct the experiment or if they want the students to only watch. There is an altitude measurer in the kit. A student can measure the altitude if you would like to add that to the lesson. You can tie it in by asking, “Which drinks had the most gas?” “How do we know?”</p> <p><b>Step 3:</b></p> <p><b>Ask:</b> Why did the gas and liquid react that way when we put the solid mentos inside?</p>  |
| <p><b>Explain:</b></p> | <p><b>Step 1:</b></p> <p>Look back at the chart from the Engage phase. Ask students what states of matter they noticed in the experiment. Tell them all 3 states were in the experiment. Put their answers in the chart.</p> <p><b>Step 2:</b></p> <p><b>Explain:</b> The gas, carbon dioxide, wants to escape the liquid. The mentos have lots of nooks and crannies on it that allow the gas to cling to it and cause a physical reaction. Incorporate the vocabulary words in your explanation. You can use the videos below to help with the explanation:</p> <ul style="list-style-type: none"> <li>● Yes, Putting Mentos into Any Soda Can Make it Explode</li> <li>● VERIFY: The Science Behind Why Mentos Makes Soda Explode</li> </ul> <p>*Links to videos located in Materials section*</p> |
| <p><b>Extend:</b></p>  | <p>Have students draw a picture including all of the states of matter and label them. They can use the previously made chart to help them develop ideas. Then, write a paragraph explaining their picture and states of matter.</p>   |

**Evaluation:**

Evaluate the product from the activity in the Extend phase.  
Look for understanding and misconceptions students have about states of matter.