



Lots of Ways to Learn (🧠 A Cognitive Health Story)
(2nd Grade 7 – 8 yrs.)
Experiment: States of Matter



STORY CONNECTION – SLIDE 7 (Approx Time: 25-30 mins)

The secret to being able to learn is to find a way to learn using a way that your brain “likes” to do things. Let us say that you are learning about different states of matter in science. You learn that there are gases, liquids, and solids. Some people will try to learn and remember this information by writing it down on cards or saying it aloud to themselves or others (in study groups). Did you know that cooking can also help you to learn about different states of matter? Lots of people like to think about cooking and baking and they love cooking and watching cooking shows. Did you know that when you start to make a cake the cake batter is “liquidy” at first? You then pour it into a pan and put it in the oven. The heat turns the “liquidy” batter into solid cake – yum! You also just learned that if you change the heat the state of the matter will change --- you turned a liquid into a solid by adding heat – if you have molecules that can combine and link together. You can also change a liquid to a solid by taking away heat ---think about making popsicles. If you heat a liquid – like when you boil water – you get a gas – steam. Thinking about things in a way that you enjoy is an easy way to learn – and you tend to remember things better that way.

Materials needed:

- Ice
- Water
- Ziploc baggies
- Masking tape for taping bags to the window
- State of Matter chart (1 per student; included below- optional)
- Paper
- pencils

Preparation needed:

- Prepare bags of ice for student(s) (1 per student)
 - 4-6 cubes per bag
 - You could also start with water and freeze it to get the ice IF you have time and IF this is something you want to do.
 - Suggestion: Show them in the water in the morning and plan to do the activity later in the day.
- Determine how bags will be heated in the room.

Instructions:

This part of the story talks about finding ways to learn that your brain “likes.” For many student(s) in 2nd grade, this means hands-on activities. The story also references states of matter which is a 2nd grade science standard. This activity provides a fun, hands-on experiment for student(s) to do to explore the states of matter.

Part I: State of Matter Chart

1. Give the student(s) the States of Matter chart or a piece of paper divided into three columns labeled Solid, Liquid, Gas.
2. Give them a few minutes to get with a partner and write or draw anything they know or think they know about each state of matter.
3. Have student(s) share what they included in their charts.
***Note: Do not worry if there is inaccurate information at this point. At the end of the experiment, any inaccuracies can be corrected. ***
4. Next, ask student(s) if they have ever heard of the water cycle. Take all responses. Hopefully, student(s) will know that this is the cycle that all water on earth goes through.
For example, it rains and there are a lot of puddles, the sun comes out and the rain evaporates and goes back up into the clouds, the clouds become too saturated, and precipitation falls again. The precipitation can be rain, hail, sleet, freezing rain, snow, etc. Regardless of the precipitation, the process or cycle remains the same.
5. Next, ask student(s) how the water cycle is related to the states of matter. Take responses and discuss as needed.
6. Show student(s) the ice. Ask the following questions and allow student(s) to respond.
 - How did it go from water to ice?
 - It was frozen.
 - Explain that it went from a liquid to a solid when placed in a cold environment—the freezer.
 - How could it get back to the liquid state of water?
 - To do this a heat source will need to be introduced.
 - Brainstorm ideas for heat sources within the room or space the student(s) are in.
 - Lamp, window, hair dryer, warm water, body heat from hands, etc.
 - Which way do they think would melt the ice the fastest?
 - Make and record predictions.

Part II: Experiment

7. Give each student a Ziploc bag with 4-6 ice cubes in it.
8. Next, they must decide where they want to put their bag for it to melt (change from a solid to a liquid) in the shortest amount of time. Try to have some student(s) in each of the brainstormed ideas from #8.
9. Start a timer or watch the clock and record the time(s) when all the ice has melted in the bag and the location.
***Note: You can do this for all student(s), or you can do this for the first one completely melted from each heat source. This will depend on your time constraints and your student(s). ***
10. Bring all student(s) back together and discuss the predictions versus what happened. Ask the following questions and have student(s) respond:
 - Were they correct?
 - Was anyone surprised by what happened?
 - Would anyone change their heat source next time? Why?
11. Discuss that the ice started as a liquid, was frozen into a solid in the freezer, and then melted when heat was added back into a liquid.
12. Ask student(s) how they could turn the liquid into gas. Hopefully, they will say more heat.
13. Discuss ways to turn the liquid into a gas and do what you can do based on your situation/environment.
Ideas might include boiling the water, heating it up in the microwave, pouring the water into a cup and just leaving it out in the room, etc.
14. Observe the water and record observations.
15. Have student(s) go back to their States of Matter chart from earlier and make any corrections or adjustments based on new learning.

16. In closing, circle back to the idea in the story that everyone learns in different ways. Some people could have read a book about the water cycle and states of matter and completely understood the concept. However, others will remember and learn better when they are doing something, like they did today with states of matter. The key is to find the way that works for them so that learning is fun and makes sense to them. By learning the best way for them, their brains will be happy and healthy.

Experiment Idea Credit: <https://www.sciencefun.org/kidszone/experiments/bag-full-of-states-of-matter-easy-science-experiment/>

States of Matter Chart

Name _____		Date _____
Solid	Liquid	Gas