

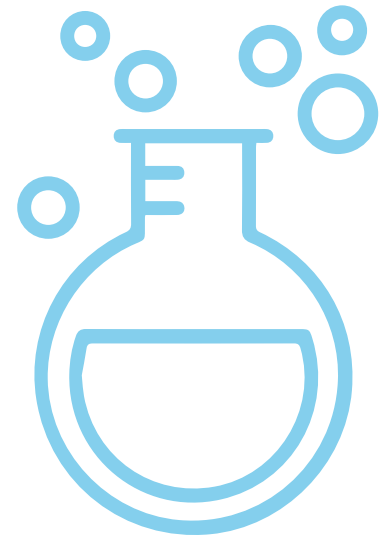
# L1 States of Matter

Kitchen Chemistry: Lesson 1 of 3

**Big Question:** What are two states of matter? (gas, liquid, solid)

**Set the Stage:** Hi Pals! Ruff Ruffman here! My brother and I are starting new catering businesses. Would you like to help me learn how to be a better cook? ASK! What do you know about liquids and solids, as in a pop cycle versus fruit juice?

**Resources:** [The Great Ruffet/Scruffet Cookoff](#) - PBS Video: 6 minutes, 16 seconds



## Activity:

**Procedure:** After the intro video – Engage

Ask your students to tell you what they saw happen to the ice (solid) when it was left out all night. Ask them how Ruff worked through his challenges.

## Let's Investigate!

Can your child help Ruff make predictions and observations about a solid (ice) turning into a liquid (water)? Have them visit three ice stations that you have designated. This can be done inside or out.

- Select one sunny location.
- Select one completely shady location.
- Select one partly shady and partly sunny location. Children can rotate to the three stations over 10-minute intervals, recording by words or drawings what they see happening to the ice in those locations, i.e. they should see some melting. They could measure the amount of melted water if you want them to.

## Reflection:

To communicate their observations: "I saw..."

To reflect on their predictions: "I thought...but then..."

To demonstrate science community skills: "I liked..." or "I respected..."

To make a conclusion: "If Ruff Ruffman wants to keep his popsicles frozen, he should..."

## Enrichment:

Make pop cycles for tomorrow's treat.



## Materials:

- Ice frozen in a plastic container
- Clipboard
- Pencil
- Ruler
- Timer

If making popsicles:

- Fruit juice
- Craft sticks
- Trays
- Clear wrap

## Credits/Standards:

Funding for The Ruff Ruffman Show™ and its video contents are provided by the U.S. Department of Education and the Corporation for Public Broadcasting. BSB – The Do Place: NGSS 2-PS1.B.1 - Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not.



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# L2 Liquids & Solids

Kitchen Chemistry: Lesson 2 of 3

**Big Question:** Can we change liquids to solids?

**Set the Stage:** Explore kitchen chemistry as Ruff Ruffman competes with his brother Scruff to make the tastiest egg dish in the shape of a duck in this video from The Ruff Ruffman Show. Remember our last activity? ASK – How did the solid ice become liquid? How did it then become liquid become solid?

**Resources:** [Duck, Duck, Egg!](#) - PBS Video: 4 minutes, 4 seconds



## Activity:

**Procedure:** After the intro video – Engage

Ask your students to tell you what they saw happen to the scrambled eggs. Reinforce the idea that a liquid can become a solid by using heat. We are going to do something similar.

## Let's Investigate!

We are going to make S'More Pops!

Our goal is to take chocolate, change its form by melting it. Next, we take large marshmallows on lollipop sticks. Note how the chocolate has changed form; once solid now liquid. Dip in crushed graham crackers. Allow to sit while students reflect orally or in picture form.

## Eat when dry!

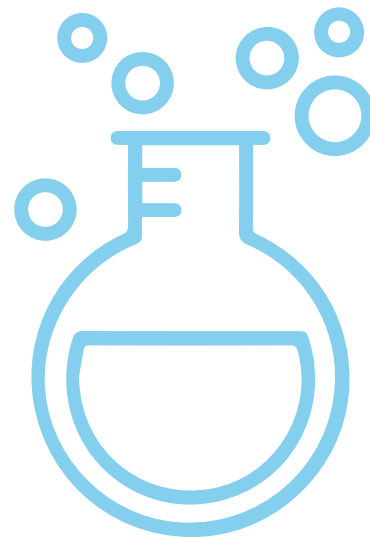
## Reflection:

To communicate their observations: "I saw..."

To reflect on their predictions: "I thought...but then..."

To demonstrate science community skills: "I liked..." or "I respected..."

To make a conclusion: "If Ruff Ruffman wants to melt his chocolate, he should..."



## Materials:

- Paper and markers
- graham crackers, coarsely crushed
- lollipop sticks
- large marshmallows
- 4 ounces milk chocolate candy coating, melted

## Note to Parents:

Visit [S'More Pops!](#)

Website to see step-by-step images

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# L3 What's Up With Mixtures?

Kitchen Chemistry: Lesson 3 of 3

**Big Question:** What's up with mixtures?

**Set the Stage:** Hi Pals! For our new catering business, we have been asked to make a sweet treat for a party, using the colors orange, purple, and green. Can you help us out by giving us some advice and then practicing what we learn? ASK – Do you have favorite or sweet treats that come in the colors orange, purple and green?

**Resources:** [Ruff Mixes It Up](#) - PBS Video: 5 minutes, 8 seconds



## Activity:

**Procedure:** After the intro video – Engage

Ask your students if they think that Ruff's mixture would have been selected as a winner if Chet had not ruined it. Ask your child if they have other ideas of using these colors and making a sweet treat.

## Let's Investigate!

Let's make a mixture! This is an example of making something new out of individual items where heating and cooling are not needed. Have your child create their own trail mix. Have them count how many items that that use to make it. Before they eat their mix, have students sort out the different components into piles; this demonstrates that this creation can be unmixed.

## Reflection:

Have students tell you how they went about mixing and unmixing the trail mix creation.



## Materials:

Creating Trail Mix:

- Bowls to hold individual trail mix components
- M&Ms, nuts, seeds, dried fruit, popcorn
- Spoons for scooping
- Paper or plastic bags for student to use to create their own trail mix
- Paper plates for sorting mixes

## Credits/Standards:

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