

CHEMISTINA'S

RECIPES

SWEET SCIENCE



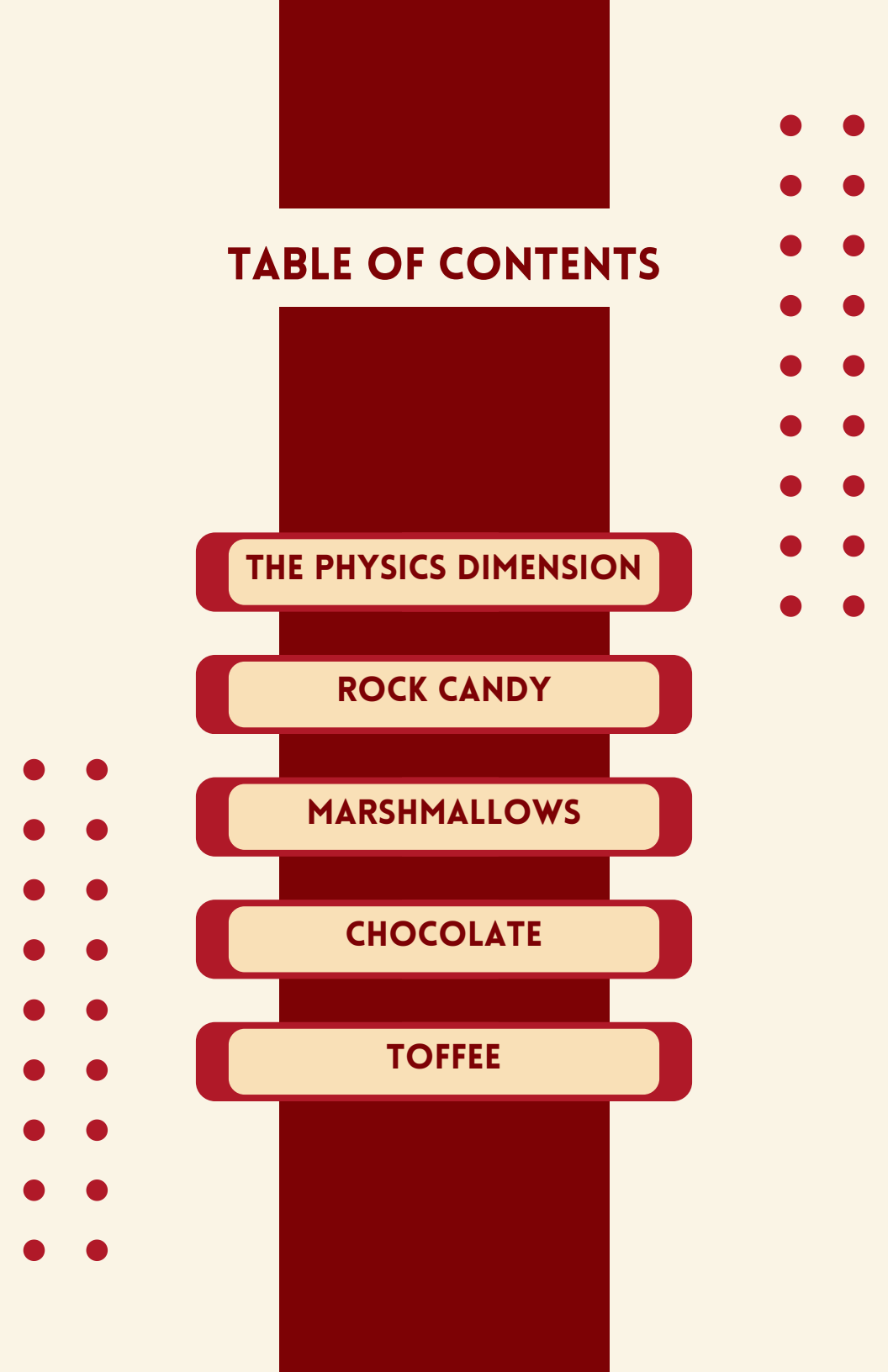


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A NOTE FROM THE PHYSICS DIMENSION



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CHEMISTINA SHOW PRESENTER

Candy is delicious – but it's also science!

In Chemistina's Sweet Science, we explored how the same ingredient – sugar – can behave in completely different ways depending on how we heat it, mix it, dissolve it, or let it cool. This little recipe book lets you try those experiments again at home, with grown-up help.

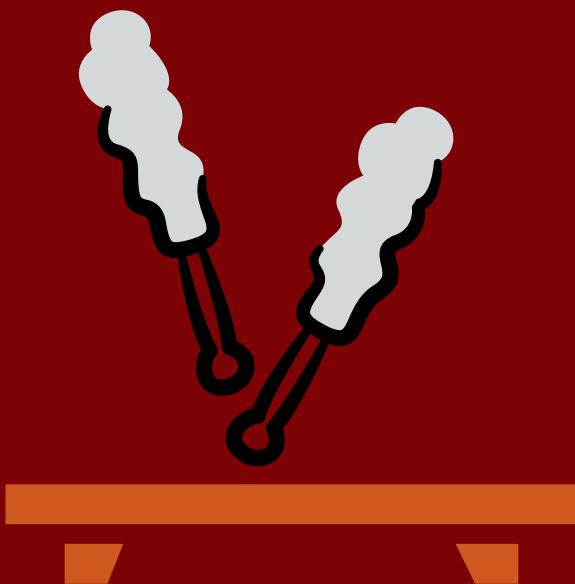
There's no such thing as the perfect candy – but there are lots of sweet ways to learn, experiment, and share with people you love.



ROCK CANDY

Sugar dissolves in water by spreading its molecules evenly. Hot water can be supersaturated - taking on up to FIVE TIMES as much volume of sugar as the original water volume - to form a viscous [thick] syrup with no visible sugar crystals. When the syrup solution cools, the sugar molecules line up in repeating patterns, forming crystals.

A string or stick can offer a great site for the crystals to start locking in that structure. The microscopic order becomes macroscopic candy, but this process takes time and patience! Rock candy forms over days or weeks.



EQUIPMENT & REAGENTS

- Granulated Sugar
- Water
- Heat-safe saucepan
- Heating Element (stove or hot plate)
- A glass jar
- Wooden skewer and string
- An adult to help with hot water
- Optional: food coloring, flavor extract



MANY GEMSTONES FORM THROUGH SIMILAR CRYSTALLIZATION PROCESSES - UNDER MUCH MORE EXTREME CONDITIONS!



"PLAIN" ROCK CANDY IS DELICIOUS, BUT YOU CAN ADD FLAVOR OILS AND FOOD COLORING TO TASTE!

PROCEDURE

1. Measure your water and it to a boil on the stove
2. Stir in twice as much sugar as the water you used and continue heating until it's all dissolved.
3. Add flavor and/or color, if using.
4. Pour the syrup into a clean glass jar.
5. Tie the string to the skewer and rest it across the top so the skewer hangs into the liquid, or let some string hang directly into the syrup solution.
6. Wait several days and watch crystals grow!



PRE-SEED THE SKEWER BY WETTING, ROLLING IN GRANULATED SUGAR, AND ALLOWING TO DRY FOR A COUPLE HOURS. IF YOU USE THIS METHOD, MAKE SURE THE SUGAR SOLUTION COOLS FOR AT LEAST 60 MINUTES BEFORE YOU DIP IT IN!



MARSHMALLOWS

Marshmallows are a stabilized foam: tiny air bubbles trapped inside a flexible sugar-protein network. When gelatin is dissolved in hot sugar syrup and whipped, air becomes incorporated into the mixture. As the gelatin cools, it forms a semi-solid matrix that traps the air in place.

The result? A soft solid that behaves somewhere between a liquid and a solid—a viscoelastic material that stretches, squishes, and slowly rebounds.





EQUIPMENT & REAGENTS

- Granulated sugar
- Corn syrup
- Water
- Unflavored gelatin
- Mixing bowl
- Saucepan
- Candy thermometer
- Stand or hand mixer
- 9x9 pan
- Powdered sugar/cornstarch (for dusting)

INSTRUCTIONS

1. Bloom gelatin in cool water.
2. Heat sugar, corn syrup, and water to -240°F [soft-ball stage].
3. Slowly pour hot syrup into gelatin while mixing.
4. Whip 8-12 minutes until thick, glossy, and tripled in volume.
5. Spread into dusted pan and allow to set 4+ hours before cutting.



THE WHIPPING STAGE DETERMINES
TEXTURE - MORE AIR = LIGHTER
MARSHMALLOWS.

GELATIN IS A PROTEIN DERIVED FROM COLLAGEN. IT FORMS A
TEMPORARY MOLECULAR NETWORK WHEN COOLED.

SCIENCE SPOTLIGHT

CHOCOLATE

Tempering, Polymorphism & Sweet Experiments

Chocolate contains cocoa butter, a fat capable of forming multiple crystal structures (polymorphs). Only one of these crystal forms (Form V) produces glossy, snappy, properly tempered chocolate. Tempering carefully melts and cools chocolate to encourage this stable crystal arrangement.

Improperly cooled chocolate may look dull or develop white streaks called "bloom," caused by fat crystals migrating to the surface.





EXPERIMENTS

Microwave Temper Test

Melt chocolate gently in short bursts. Spread a thin layer on parchment and observe whether it sets glossy (tempered) or dull (untempered).

Snap Test

Properly tempered chocolate breaks cleanly with a sharp snap. Poorly tempered chocolate bends.

EXPLORING CHOCOLATE

Melting Point Exploration

Hold a small piece of chocolate in your fingers and observe how quickly body heat (-98°F) softens cocoa butter.

Density Dip

Dip strawberries, pretzels, or marshmallows into melted chocolate to explore coating thickness and viscosity.

TOFFEE

Toffee showcases the chemistry of caramelization. As sugar heats beyond 320°F, it undergoes complex chemical reactions that create hundreds of new flavor compounds and a rich amber color. When butter is added, fats interfere with crystal formation, producing a smooth, brittle texture rather than a grainy one. Temperature control determines structure. At the hard-crack stage (-300°F), water content is minimal, resulting in a crisp snap.



EQUIPMENT & REAGENTS

- Butter
- Granulated sugar
- Salt
- Saucepan (heavy-bottomed)
- Candy thermometer
- Baking sheet lined with parchment
- Optional: chocolate chips, nuts

PROCEDURE

1. Melt butter and sugar together over medium heat.
2. Stir continuously until mixture reaches $\sim 300^{\circ}\text{F}$ (hard-crack stage).
3. Immediately pour onto prepared baking sheet.
4. Optional: sprinkle chocolate chips on top and spread once melted.
5. Cool completely before breaking into pieces



STIRRING PREVENTS LOCALIZED BURNING.

EVEN 5-10 DEGREES CAN DRASTICALLY CHANGE TEMPERATURE AND COLOR.

HUMID STORAGE CONDITIONS CAN SOFTEN FINISHED TOFFEE



THANK YOU FOR EXPLORING THE SWEET SIDE OF SCIENCE!

Thank you for being part of The Physics Dimension experience. We hope today's show sparked curiosity, laughter, and maybe even a few delicious discoveries.

Our interactive science performances are perfect for:

- Birthday parties
- Libraries and park districts
- School assemblies and STEM nights
- Camps and special events

Each show blends theatrical storytelling with real scientific phenomena—designed to entertain, educate, and inspire.

To explore more show themes and booking information, visit our website and discover how we can bring unforgettable science to your next event.

We can't wait to experiment with you again.

– The Physics Dimension

