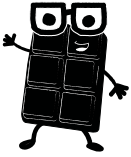


**GEEK
& CO.
SCIENCE!**



PROJECT KIT

Ages
8+

CHoCoLaTE SCIENCE LAB



THAMES & KOSMOS



WARNING. Only for use by children 8 years of age or older with continuous adult supervision and assistance. Components in this kit may be sharp, breakable, or have sharp edges. Some experiments require the use of a stove and high temperatures.

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- 2 | Tree box die-cut sheets
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- 6 | Chocolate shapes mold

- 7 | Chocolate egg mold
- 8 | Baking cups (30)
- 9 | Pick tool
- 10 | Dipping fork tool
- 11 | Lollipop sticks (15)

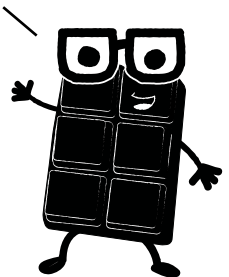
YOU WILL ALSO NEED: Ceramic mug, chocolate chips, kettle, spoons, desk lamp, napkin, metal cooking pot, metal bowl, kitchen thermometer, measuring spoons, spatula, water, couverture chocolate (recommended) or coating/molding chocolate, baking rack, chocolate filling ingredients, glue stick, tape, scissors, yarn or string

KITCHEN EQUIPMENT: You will need a stove, sink, and a regularly well-equipped kitchen. Read through each experiment to make sure you have everything you need for the experiment.

Hey Choco-Scientists!

Want to make some sweet chocolate treats and learn some physical science while you're at it? Then let's get started! After you've made your chocolate shapes, you can wrap them in foils and plastic wrappers, and make some cool gift boxes for them. Then you can give them to your family and friends for the holidays! Coco the Geeker will be your guide!

Hi! I'm Coco!



FREEZING AND MELTING

When a liquid **freezes**, it turns to a solid. The temperature at which this happens is called the **freezing point**.

When a solid **melts**, it turns into a liquid. This is the opposite of freezing. The temperature at which this happens is the **melting point**. The melting point and freezing point of a substance are often the same.

Water freezes and ice melts at the same temperature, 0 °C or 32 °F. But in your chocolate molding experiments, you saw that chocolate behaves a little differently. Chocolate is a mixture of different ingredients, not just one compound like water. Because of this, different types of chocolate will have different melting points.

Dark chocolate that has been tempered has a melting point around 95 °F.

Tempering is a process by which chocolate is heated up to specific temperatures and then cooled in a controlled way to yield uniform crystals. Yes, chocolate contains crystals of cocoa butter!

Chocolate that has not been tempered has a lower melting point, as low as 63 °F. Tempered chocolate has a glossier sheen, a crisper bite, and molds into firmer shapes.

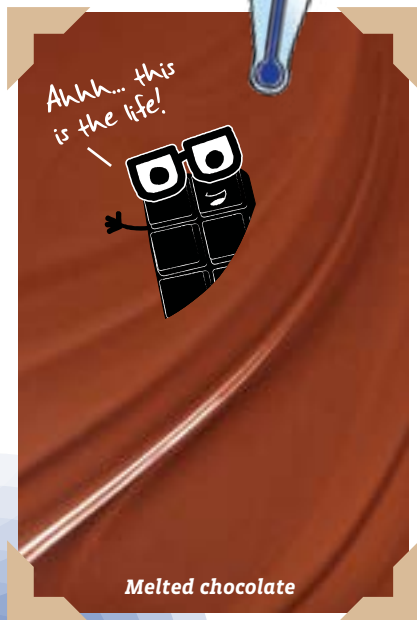


BOILING AND CONDENSATION

When a liquid **boils**, it changes to a gas. The temperature at which this happens is called the **boiling point**. Scientists also refer to boiling as **vaporization**.

When a gas changes to a liquid, it **condenses**. The temperature at which this happens is called the **condensation point**.

Water boils at 100 °C or 212 °F. Chocolate on the other hand does not have a specific boiling point: Its various ingredients will all vaporize at different temperatures, much higher than 212 °F.



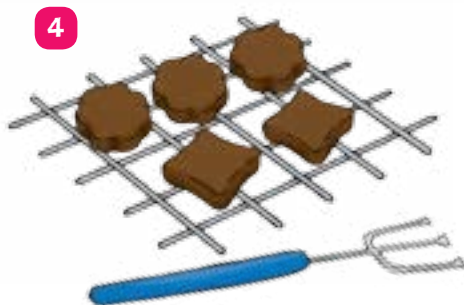
Chocolate coatings

You will need:

Everything from the “Chocolate Shapes” experiment, dipping fork, pick tool, baking rack, fillings to coat such as caramel, nougat, nuts, marshmallows, wafers, cookies, or flavored fondants

Here's how:

- 1 Melt and temper the chocolate in the double boiler. Keep it melted.
- 2 Take the filling you want to coat in chocolate and rest it on the dipping fork.
- 3 Lower the dipping fork holding the filling into the chocolate. Carefully remove the coated filling and place it on a baking rack. Use the pick tool to decorate the tops before they dry.
- 4 Let the coated chocolates cool and harden.
- 5 Place the hardened, coated chocolates into baking cups and then into gift boxes.



**GEEK
OUT!**

What is cocoa butter?

Most fats are mixtures of many different fat molecules. **Cocoa butter** is special because it contains relatively few types of fat molecules arranged in an orderly way. Because of this, cocoa butter melts uniformly at a specific temperature, while other fats melt gradually over a range of temperatures. This unique property is what gives chocolate its wonderful texture.