



## Chemistry of Cake

### PLAN

- Do you know a baker who can help your Troop with this Adventure?
- This Adventure requires an oven. Do you want to bake the cakes in a conventional oven, on a camp stove, in a cardboard oven or over a campfire?
- Scouts or youth should bake a control cake with all of the ingredients. The control is the benchmark to which all cakes missing an ingredient will be compared. This can be done beforehand or during the meeting.

### SOME BACKGROUND INFORMATION ON THE CHEMISTRY OF CAKE

- Flour contains proteins that react with water, making a web of gluten molecules that holds everything together. Gluten adds structure and support to the structure of the baked goods.
- Fats coat the gluten molecules, preventing them from combining into a web, reducing the structural integrity of the baked good.
- Baking powder and baking soda, when combined with other ingredients, release bubbles of carbon dioxide, which get trapped inside the gluten molecules. When the cake batter is placed in the oven, the carbon dioxide gas expands due to the heat and the cake rises.
- Sugar is added for taste, browning and texture. Sugar molecules bonds with water molecules in the ingredients and keeps the cake moist. Taking water away from the flour proteins limiting how much structure they can build, giving the cake a more tender texture.
- Liquids (like milk or water) help disperse flavour throughout the dough and support the formation of gluten bonds. During baking, liquids evaporate, causing the cake to rise.
- Some ingredients—such as vanilla and cocoa powder—are optional; their only purpose is to add flavour.

### SUGGESTED TIMING

- Introducing the problem – 10 minutes
- Mixing the batter – 15 minutes
- Baking the cake – 30-35 minutes
- Comparing the results – 20 minutes
- Review – 15 minutes

### SAFETY TIP

- Never leave a hot oven unattended.
- Take proper precautions to prevent burns. Roll up sleeves, tie back long hair and use oven mitts.
- Familiarize yourself with burn treatment.
- Make sure you know where to find a fire extinguisher.

