

Crystallization of Maple

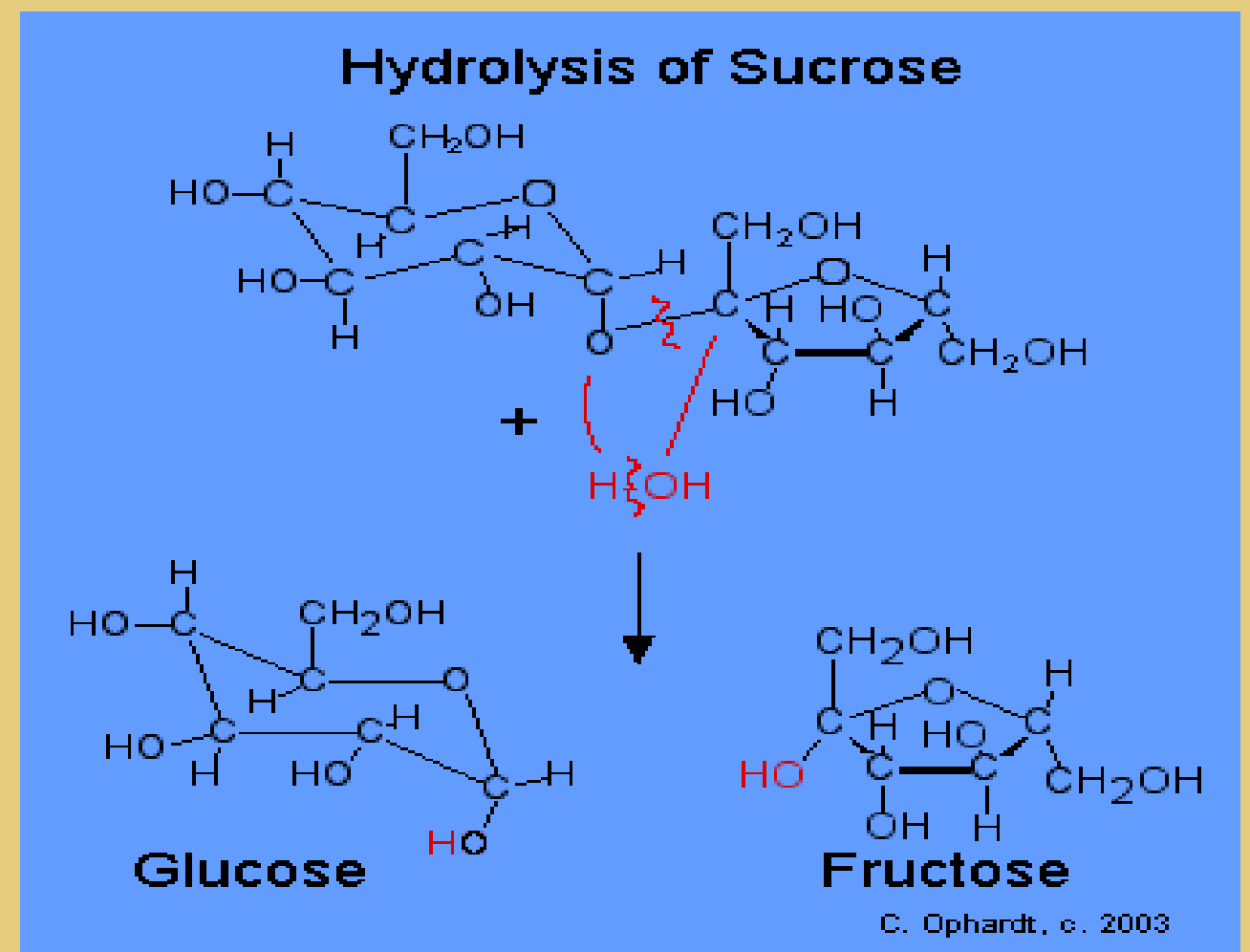
Disaccharide + Water = Monosaccharide + Monosaccharide



Sucrose + Water = Glucose + Fructose

Maple sap is mostly 98% water and 2% sugars. Early season sap has higher concentrations of the disaccharide **sucrose**, while late season sap has more **glucose** and **fructose**, both monosaccharides.

The late season sap, with higher concentrations of **fructose**, has a lower caramelization temperature causing it to darken earlier in the boiling process. While monosaccharides are natural to sap at all times during the season, a heavier concentration of monosaccharides will occur in the warmer parts of the season as bacteria begins a fermentation process and breaks the larger **sucrose** molecules into **glucose** and **fructose**.



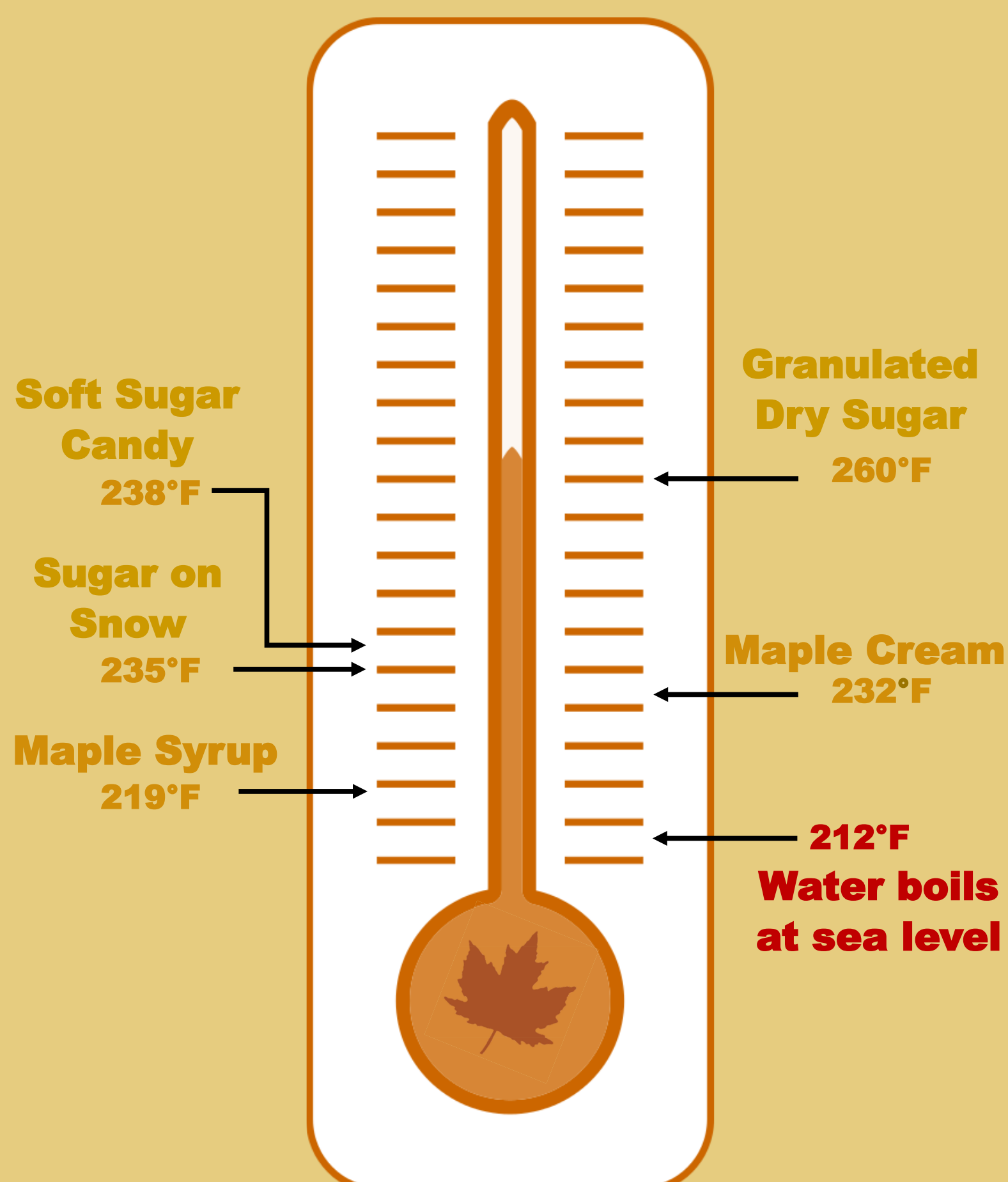
Caramelization Temperatures

Fructose - 230°F

Sucrose - 320°F

Glucose - 320°F

Maple Products Temperature Guide



Different maple products are made by heating maple syrup to a higher boiling temperature. Crystallization of the sugars in maple syrup will begin when enough water (solvent) is removed from the syrup so the larger **sucrose** molecules (solute) can begin to bond together. The more water removed, the tighter the crystallization bonding. Thus experienced sugarmakers can whip up smooth maple cream or rock hard sugar from the same high disaccharide maple syrup by boiling it to different temperatures.

Since monosaccharides are smaller molecules, they will not crystallize as easily as a larger disaccharide. Thus the 19th century syrup grading systems were designed to tell consumers which syrup was likely to crystallize first and therefore be the easiest to preserve as maple sugar for long term use.

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