

Names: _____ Date: _____

Rock Candy Worksheet **Answer Key**

Rock candy is simply large sugar crystals, but can you make different shapes and/or sizes of crystals by incorporating different additives?

Day 1 Predictions: What do you think will happen to the sugar crystals when the following additives are included when making the candy?

Additive	More Growth	Less Growth	Same
Food coloring			
JELL-O			
Kool-Aid powder	Predictions: Answers will vary.		
Cinnamon extract			
Iodized salt			
Powdered sugar			
Brown sugar			
Milk			
Apple juice			

Day 2 Data/Comparison Observations: Record how each additive affected the growth of the sugar crystals compared to one with no additive.

Additive	More Growth	Less Growth	Same
Food coloring			X
JELL-O		X	
Kool-Aid powder		X	
Cinnamon extract			X
Iodized salt			X
Powdered sugar	X		
Brown sugar	X		
Milk		X	
Apple juice		X	

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Days 1 and 2 Measurements and Calculations

Our group's additive: _____ **Answers will vary.**

Dowel Rod Mass (g)	Dowel Rod w/ Crystals (g)	Mason Jar Mass (g)	Mason Jar w/ Crystals (g)
Mass Crystals on Dowel Rod (g)		Mass Crystals in Mason Jar (g)	
Total Mass of Crystals (g)			

Day 2 Summary of Class Data

Additive	Mass of Crystals (g)
Food coloring	
JELL-O	
Kool-Aid powder	Answers will vary.
Cinnamon extract	
Iodized salt	
Powdered sugar	
Brown sugar	
Milk	
Apple juice	

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Day 2: Research and Analysis: Explain why each additive affected crystallization the way it did.

Additive	Reason for crystallization effects
Food coloring	Food coloring is a pigment, natural or synthetic, which includes the following ingredients: color additive, propylparaben, propylene glycol and water. Propylparaben is composed of white powder crystals similar to sugar crystals. The ingredients in food coloring naturally incorporate into sugar crystals.
JELL-O	JELL-O is composed of four ingredients: gelatin, food coloring, water and sugar. The proteins and peptides in gelatin in the JELL-O inhibit crystal growth.
Kool-Aid powder	Kool-Aid includes citric acid, calcium phosphate, salt, maltodextrin, ascorbic acid, butylated hydroxyanisole and lemon juice solids. Adding Kool-Aid powder alters the solubility properties of the sugar, causing crystal growth to not occur.
Cinnamon extract	The ingredients in cinnamon extract are alcohol, glycerin, natural cinnamon oil and water. None of the ingredients are large molecules and easily incorporate into the crystal structure with no effect.
Iodized salt	Iodized salt is composed mainly of sodium chloride with various iodine salt compounds. Sodium chloride makes cubic crystals as well, which causes no effect on the growth of the sugar crystals.
Powdered sugar	Powdered sugar is very fine sugar with a certain amount of anti-caking agent. When powdered sugar is added, the supersaturation of sugar is increased, resulting in more growth.
Brown sugar	Brown sugar is sugar with molasses added into it. Molasses is a byproduct from producing sugar from sugarcane. The molasses and added sugar promotes crystal growth due to supersaturation and the molasses separates readily.
Milk	85% of milk is water, but it also has fat, proteins, lactose and minerals. The fat and proteins inhibit sugar crystallization.
Apple juice	Apple juice ingredients are water, apple juice concentration and ascorbic acid. The apple juice changes the solution properties, causing the degree of supersaturation to decrease to a point at which no crystal growth occurs.