"I don't get why it's not working, because, like, it's crystallizing again."

It seems like every year on the British Baking Show, we see people struggling to make caramel. On this episode, we're going to show you a foolproof way to make it — and the science behind it.

So, what is the trick to cooking sugar? It's all about the crystals.

Crystal structures are found in many foods. We know that sugar and salt make crystals, but crystals are also found in butter, chocolate, and even starch, like bread and pasta. Crystals form when food molecules cling together and create orderly, three-dimensional structures.

Sometimes we want to create crystals in food, and sometimes we want to avoid them. When we bake bread, water and heat break up the crystals in the starch, making a nice soft chew. And when the bread goes stale and hard, that's the crystals reforming.

The basic procedure for cooking sugar is to mix the sugar with water, dissolve the sugar, and then boil off most or all of the water.

So, there are two keys to successfully cooking sugar.

One: ensure that all the sugar is completely dissolved before too much of the water has boiled off. If the sugar mixture's too thick and there are still some undissolved crystals of sugar, then they can act as what we call "seeds," causing new and larger crystals to form.

And two: don't ever stir the mixture. Stirring encourages crystals to form. And that's it!

So, now that we know the basics, here are the details.

First, start with the right amount of water. When you cook sugar, you can start with almost any amount of water. But too little water makes it more likely that your sugar will crystallize before it has a chance to fully dissolve. Too much water is not a problem. But since you have to boil off most or all of the water, depending on what you're making, it just makes the process take a lot longer than necessary.

I like to start with a ratio of about three parts sugar to one part water. So, if your recipe calls for 300 grams of sugar, use 100 grams of water. If your recipe calls for a cup of sugar, use a third a cup of water. (I know a cup of water does not weigh the same as a cup of sugar, but is close enough for cooking sugar. And it saves you the trouble of doing the math just to save a few grams of water.)

All right. Second, put the water in first, and then carefully put the sugar into the center of the pot and then use the patented "Chef Michael Poking System" to wet the sugar. This helps it dissolve faster.

(In baking school, they may tell you to wash the sides of the pot with a pastry brush, but that's unnecessary using this method.)

And third, cook the sugar. It's best to cook the sugar on an induction burner or a traditional coil burner. But if you have a gas range, just keep the flames as close to the center of the pot as possible and avoid the flames going up the sides of the pot. Turn your burner on to medium-low until all the sugar has dissolved and don't stir it. And that's it!

Now you just need to cook it to the temperature in the recipe. That's likely to be 240 degrees (F) for things like Italian meringue. But if you're making caramel, you don't need to worry about the temperature because you'll be cooking to the color that you're after. Just keep in mind that when you cook sugar, it will continue cooking even after you take it off the heat.

So, if you're caramelizing the sugar, you should pull it a little before it gets to the color that you're after. (Unless you're making my caramel ice cream, which we'll learn in the next video.)

And here are some final tips.

A smaller part can be easier if you're cooking a smaller amount of sugar. Copper pots are excellent for cooking sugar since they heat quickly and evenly. But they're expensive. A stainless steel pot works well, and it's a little easier to see the color of your caramel. If you do use a copper pot, you can increase the heat a little bit because of the evenness in cooking in copper.

Just keep your eye on the sugar. Usually when you cook sugar, the temperature will increase steadily until it reaches about 210 to 220 degrees (F), and then the temperature seems to stop rising.

This is because of the cooling effect of evaporation. When the heat going in from your burner is the same as the heat coming out from evaporation, the temperature can't rise until enough of the water has boiled off to slow the rate of evaporation, and then the temperature will start to climb again.

After this happens, the temperature can rise quickly. So keep your eye on the sugar or it's likely to get too high for your recipe. And if you're caramelizing the sugar, it can quickly burn.

You may notice that the amount of steam significantly decreases once the sugar reaches around 300 degrees Fahrenheit, which is a point where almost all the water is gone, and you're left with mostly sugar. As it gets near this point, you'll also notice that the bubbles will be notably more viscous and thick.

Once you've done this a few times, you'll be able to judge where you're at just by looking at the steam, the size of the bubbles, and the thickness of the syrup.

And that's how to cook sugar perfectly every time.

If this video is helpful, please like and subscribe so other people can find your content more easily. If you have any questions, please leave them in the comments below and we'll do our best to answer them quickly.

And if you want to learn more about sugar, we have a complete module on sugars and starches in our food science course at FoodScience.org. And like all of our content, it's free for everyone.