

**GEEK
& CO.
SCIENCE!**



PROJECT KIT **Ages
8+**

GUMMY CANDY LAB



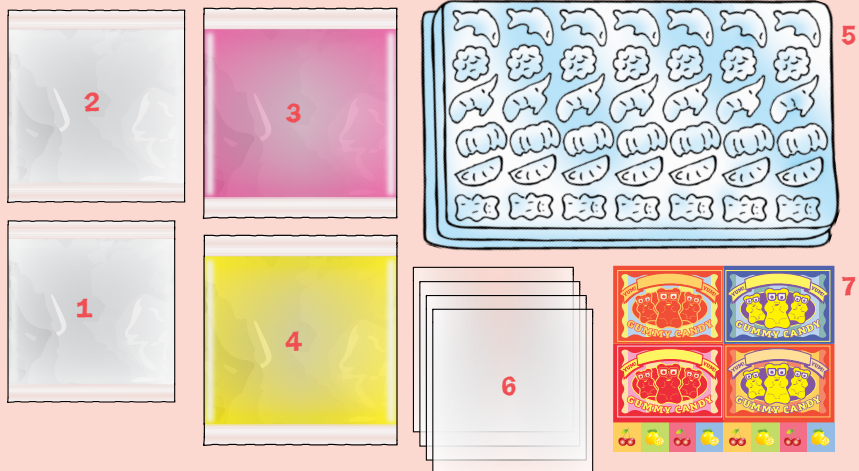
WARNING. Only for use by children 8 years of age or older with continuous adult supervision and assistance. Adult supervision required at all times. Use of a microwave or stove is required. Hot mixtures and stove tops can cause severe burns.

THAMES & KOSMOS



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KIT CONTENTS



- | | |
|---|-------------------------------|
| 1 Sour mixture (Net Wt. 33.6 g/1.18 oz) | 5 Plastic gummy candy mold |
| 2 Seaweed powder (Net Wt. 50 g/1.76 oz) | 6 Plastic storage bags (4) |
| 3 Cherry flavoring and sugar mixture (Net Wt. 80 g/2.82 oz) | 7 Sticker sheet with labels |
| 4 Lemon flavoring and sugar mixture (Net Wt. 80 g/2.82 oz) | |
- For the ingredient lists, see the inside front cover.

TO MAKE THE GUMMIES, YOU WILL ALSO NEED: *Water, measuring spoons, microwave-safe container or cooking pot, spoon, toothpick or fork*

FOR SOME EXPERIMENTS, YOU WILL ALSO NEED: *Drinking glass or jar, measuring cup, food coloring, tablespoon and teaspoon, microwave-safe plates, small red cabbage, knife, cooking pot, strainer, bowl, baking powder, pencil, kitchen string, granulated sugar*

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

Hey Gummy Scientists!

Want to make yummy gummy candy treats and learn some physical science while you're at it? Then let's get started! After you've made your gummy shapes, you can wrap them in a plastic bag and label it with the included labels. Then you can give them to your family and friends! Gumbi the Geeker will be your guide!

Hi! I'm Gumbi!



PART 1

MAKE YOUR OWN GUMMY CANDIES

Follow these instructions to make one batch of gummies in one flavor.

You will need:

Seaweed powder, cherry or lemon flavoring and sugar mixture, plastic gummy candy mold, sour mixture, plastic storage bags, stickers, *scissors*, *measuring spoons*, *water*, *microwave-safe container or cooking pot*, *toothpick or fork*

Here's how:

- 1** Cut a corner off of the seaweed powder packet. Mix half of the seaweed powder (about 2 tablespoons and 2 teaspoons) with a quarter of a cup of water in a microwave-safe container or cooking pot. Stir the mixture well. Don't worry about lumps as they will dissolve when heated.
Microwave: Heat the mixture in a microwave-safe container until it foams up (about 2 minutes at high power).
Stove: Heat the mixture in the cooking pot on medium heat until the mixture foams up, stirring occasionally. Remove from heat.

- 2** Cut a corner off of a flavoring and sugar mixture packet. Stir half of the mixture (about 3 tablespoons) into the hot mixture of seaweed powder and water.

NOTE!

There is enough flavoring and sugar mixture to make either two batches of cherry- or lemon-flavored gummies, or a single batch of each flavor. To make two batches of one flavor at one time, use all of the dry ingredients (80 grams of one of the flavoring and sugar mixtures and 50 grams of seaweed powder) and use twice the amount of water (a half cup). There will be extra flavoring and sugar mixture left over in both cases, which can be used in the rock candy experiment.

! Safety Note:
Caution! High temperatures. There is a risk of burns.

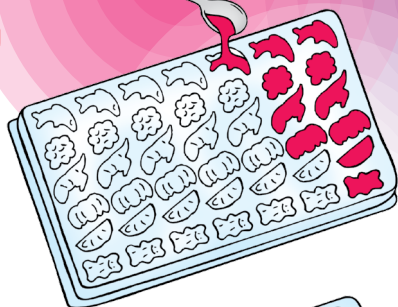


Here's how it continues:

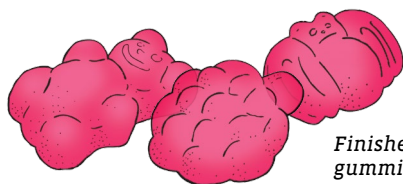
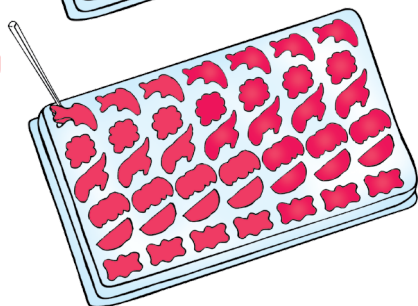
- Put the mixture back onto the heat or in the microwave for about 1 minute, or until it foams up again. Stir the mixture well.
- Pour the mixture into the impressions in the plastic tray. Let the gummies cool in the refrigerator for at least 10 minutes. If the mixture becomes too solid, heat it up again in the microwave for a few seconds.
- After the gummies have solidified, remove them from the mold using a toothpick or fork. Do not bend the plastic tray to remove the gummies.
- If you want to make your gummies into sour gummies, cut the corner off of the sour mixture packet and place the gummies and half of the sour mixture (about 1 tablespoon and $1\frac{1}{2}$ teaspoons) together into a plastic bag. Shake the bag to coat with the sour mixture. If the sour mixture is too sour, add sugar. Save a small amount (about 2–3 grams) of the sour mixture for Experiment 5.
- Place the gummies in a plastic bag. Close the bags using a sticker from the sticker sheet. Store the gummies in the plastic bags in the refrigerator. Consume the gummies within one week.

If you made one batch, now make the second batch with the other flavor!

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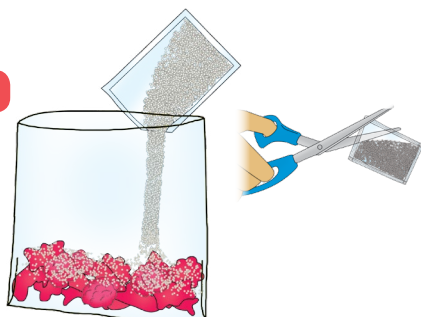


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Finished gummies!

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WHAT MAKES GUMMIES GUMMY?

How is the gummy candy able to melt and then reform into a gummy again? It is because of two ingredients in the seaweed powder: carrageenan and agar-agar. They are what make a gummy candy gummy!

CARRAGEENAN

Carrageenan comes from certain types of red algae and contains long molecules that are made up of many repeating parts, like the links of a chain. Each molecule can also connect to other long molecules, forming a web. These molecules are called **polysaccharides**. One key property of this big tangled web of molecules is its ability to hold a lot of water!



When carrageenan is mixed with water it forms what is called a **gel**, or a gelatinous substance. Gels contain mostly liquids, but behave more like solids. When you heat up a gel, the molecules start moving around more which lets them slide past each other more easily. This causes the gel to become more like a liquid. But when you cool the gel back down again, the molecules re-form their web and become more like a solid.

