

**GEEK
& CO.
SCIENCE!**



PROJECT KIT **Ages
8+**

CHEWING GUM 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



Franch-Kosmos Verlags-GmbH & Co. KG, Pfizerstr. 5-7, 70184 Stuttgart, Germany | +49 (0) 711 2191-0 | www.kosmos.de
Thames & Kosmos, 301 Friendship St., Providence, RI, 02903, USA | 1-800-587-2872 | www.thamesandkosmos.com
Thames & Kosmos UK Ltd, Goudhurst, Kent, TN17 2QZ, United Kingdom | 01580 212000 | www.thamesandkosmos.co.uk

KIT CONTENTS



- | | | | |
|---|---|---|----------------------------|
| 1 | Gum base (Net Wt. 56 g/1.97 oz) | 6 | Metal tin |
| 2 | Powdered sugar (Net Wt. 70 g/2.47 oz) | 7 | Wax paper sheets (15) |
| 3 | Corn syrup (Net Wt. 60 g/2.12 oz) | 8 | Sticker sheets for gum (2) |
| 4 | Natural cherry flavor (Net Wt. 6 g/0.21 oz) | 9 | Sticker sheet for tin |
| 5 | Natural grape flavor (Net Wt. 6 g/0.21 oz) | | |

For the ingredient lists,
see the inside front cover.

TO MAKE THE GUM, YOU WILL ALSO NEED: *Scissors, microwave-safe container, water, cup or bowl, cutting board or flat work surface, spoon, scissors or knife*

FOR SOME EXPERIMENTS, YOU WILL ALSO NEED: *Two glass jars or drinking glasses, paper, pen, tape, tissue paper or paper towels, kitchen scale, clean rubber band*

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 Gum Makers!

Want to make delicious chewing gum and learn some physical science while you're at it? Then let's get started! After you've made your gum pieces, you can wrap them in wax paper wrappers and pack them in a metal tin. Decorate the wrapped gum and tin with sticker labels. Then you can give them to your family and friends! Candy the Geeker will be your guide!

Hi! I'm Candy!



PART 1

MAKE YOUR OWN CHEWING GUM

Mixing the gum

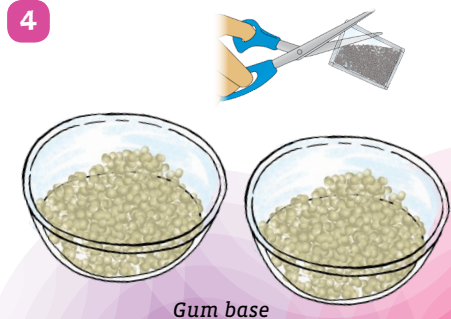
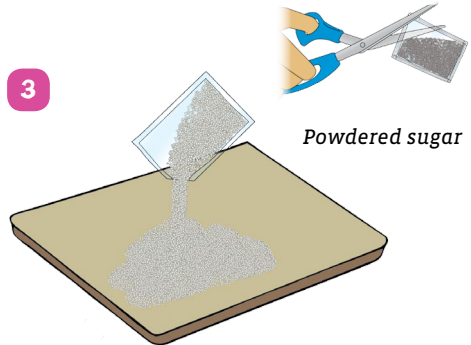
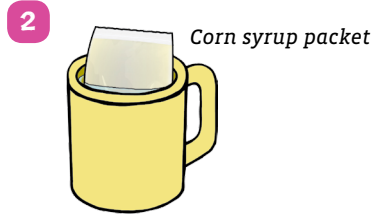
You will need:

Gum base, powdered sugar, corn syrup, flavor packet, scissors, microwave safe container, water, cup or bowl, cutting board or flat work surface, spoon, scissors or knife

Here's how:

- 1 An adult should supervise this activity, especially when hot water and sharp knives are involved.
- 2 Soften the corn syrup by placing the packet of corn syrup into a cup or bowl and covering it with boiling water. Handle the boiling water with caution.
- 3 Cut a corner off of the powdered sugar packet. Dust a cutting board or flat work surface with a small amount of the powdered sugar. This will make handling the gum easier later.
- 4 Cut open the packet of gum base. Divide the gum base into equal halves (28 grams each). One half will be used for each flavor.

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



Here's how it continues:

5 Heat half of the gum base in a microwave-safe container. The sticky gum base will leave a residue that will be difficult to clean out of the container, so you may want to use a disposable container if you do not want to spend the time cleaning it. Start with one and a half minutes (90 seconds) at high power and then check to see if the gum base has softened. Continue to microwave the gum base in 30 second increments until the gum base has melted into a thick goey liquid. This may take up to five minutes in the microwave. Be careful removing the tray from the microwave as it is hot.

6 Cut the corner off of one of the flavor packets. Pour all of the flavor powder and about half of the powdered sugar onto the melted gum base.

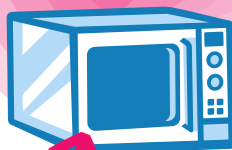
7 Cut the corner off of the corn syrup packet. Pour half of the corn syrup onto the melted gum base.

8 Mix everything together with the spoon. The mixture will become very sticky. As it cools, the gum base will also become more solid.

TIP!

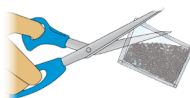
To clean the spoon and container after the experiment, use hot water to melt the gum base again.

5

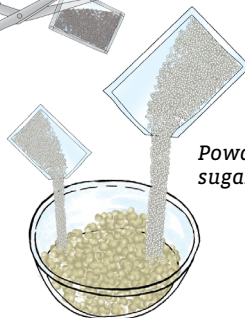


90 seconds
+ 30 second increments
until softened

6

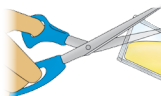


Flavor



Powdered sugar

7



Corn syrup

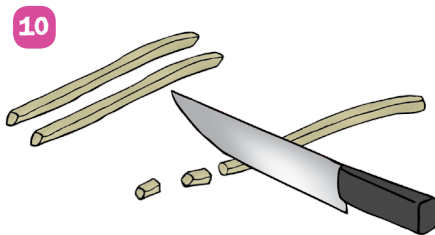
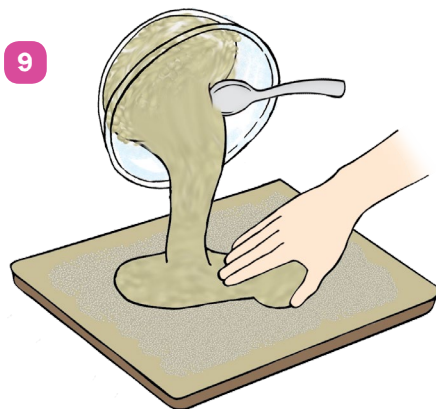
8



Here's how it continues:

- 9 Spoon the mixture onto your prepared work surface. Knead the gum for a few minutes by stretching it and flattening it out, and then folding it over, repeatedly.
- 10 Roll the gum between your hands into a six- to eight-inch-long and half-inch-thick cylinder. (The longer and thinner the cylinder, the smaller the pieces of gum will be.) Use scissors or a knife to cut the gum into small pieces.

Repeat steps 5-10 to make the second flavor of gum. Continue to the next page for instructions on wrapping and labeling your gum.



WHAT'S HAPPENING?

The gum base is a solid at room temperature. It is made of long molecular chains called polymers that are all intertwined like a bowl of noodles. When you heat up the gum base, you add energy to these molecules. With more energy, the molecules start to vibrate around more. This vibration allows the long chains to untangle from each other a little, and move around more freely. This is how the gum softens up and becomes fluid like a liquid. In this liquid state, it is easier to mix in the other ingredients that sweeten and flavor the gum. When the gum hardens again, the sweetener and flavoring is now mixed throughout the gum.



Mmm... plastic spaghetti!

