

Ages 8+

Adult supervision is required.

Jam Packed with Tons of Chewy Activities



Instructions and more!

BUBBLE GUM FACTORY

Welcome to the Fascinating World of Food Science.. and Wondrous Fun!

Nobody knows who the first person to chew gum may have been. There's plenty of evidence, though, to suggest that people have been chewing something — lumps of tar, balls of tree sap, chunks of whale blubber — for many, many centuries. Not content to chew on the same old stuff, connoisseurs of chewing gum keep refining their recipes, in the hope of realizing that ultimate dream: the Ultimate Chew!

For some individuals, experimenting with chewing gum and other food items is a full-time job. We call these hard-working people food scientists. Think of them fondly the next time you blow a really big bubble without getting gum all over your face. Often, food scientists work with experts at marketing their products. Without these helpers, we might never learn of the new delights created especially for us.

Luckily, you don't need a laboratory filled with fancy equipment to be a successful food scientist. All the gear that you'll need can be found in this kit, in your kitchen or on the shelves of your local grocery store.

Of course, there's one ingredient that, sometimes, is in short supply. It's called creativity — and only you can provide that!

Are you ready to roll up your sleeves and get started? Good! Let's begin by making some choice chewables.

Guided by the instructions in this booklet, you'll make oodles of scrumptious gum for all the chewers around you. You'll also try your hand at designing a custom-package that will set your gum creations apart from other recognizable brands. The first time through, pay close attention to the recipes. Should you care to try them again, add your own variations and see what happens. You may be pleasantly surprised by the results — just like a real food scientist might.

A FEW WORDS OF CAUTION BEFORE YOU BEGIN:

This kit is intended for children, ages eight and older. Adult supervision is required — ask a grownup friend or relative to assist you with these experiments.

Do not sample the kit's raw ingredients — they must be combined and made into gum before they are eaten.

Keep this kit away from small children and pets.

Use caution when removing your gum from the microwave oven, and always wear an oven mitt to avoid being burned.

If corn syrup is crystalized and unable to pour, submerge capped bottle in hot water for 3-5 minutes until able to pour.

Food Science's First Rule: Keep It Clean

Food scientists follow a set of rules to ensure their experiment will be conducted safely and achieve the desired results. The most important rule involves sanitation — keeping everything squeaky clean:

- Wash your hands with soap and water before making gum.

- Make sure all tools are clean and suitable for touching food.
- Wear an apron or clean T-shirt (one that you don't care about) and, if wearing a long-sleeved shirt or blouse, roll up its sleeves. Tie back long hair so it doesn't block your view or get caught in your concoctions.
- Clean everything between batches of gum to avoid unintentionally mixing your flavors!
- Reseal each ingredient package after use, keeping the contents clean and fresh. You might want to use zip lock bags.

What You'll Find in Your Kit

Citric acid packet
 Corn syrup bottle
 Confectioner sugar
 Gum base
 Watermelon flavoring
 Blueberry flavoring
 Mint flavoring
 Note cards
 Activity guide
 Resealable bag

What You'll need to get

Microwave oven	New (or very clean), small paintbrush
Disposable, microwavable cups	Red and blue food coloring (<i>optional</i>)
Oven mitt	Non-stick cooking spray
Measuring spoons	Granulated sugar (<i>white</i>)
Rolling pin	Waxed paper
Scissors	Microwave or double boiler
Paper	Medium saucepan or double boiler
Dri-markers	Drinking glass or glass jar
Tape or Elmer's glue	Cornstarch (<i>optional</i>)
Butter knife	Powdered sugar
Aluminum foil	Plastic spoon or stir stick
Water	Candy or deep-fry thermometer (<i>optional but useful</i>)

The Science of Chewing

Our mouths contain teeth specifically for chewing our food. These teeth are called molars and premolars. In an adult human's mouth, there are a total of 20 of these teeth.

Chewing is a very important part of digestion. We've all been cautioned by our parents to chew at least 30 times before swallowing. Good thing our jaws have the some of the strongest muscles in our bodies. Otherwise, we might tire before finishing a Thanksgiving meal.

As we chew, glands in the mouth secrete enzyme-laden saliva. The enzymes in saliva help to soften the food, readying it for its journey from mouth to stomach. The saliva itself serves as a lubricant and also helps activate the taste buds on the tongue, which can only distinguish dissolved substances. See? Saliva is a lot more than spit.

A Brief history of gum

Black lumps of prehistoric tar with human tooth impressions

SOMETHING TO CHEW ON:

In the early 1900s, a nutrition expert named Horace Fletcher proposed that, prior to passing our food to the stomach, we should chew each bite until it is tasteless. For Fletcher, this meant an average of 50 chews per mouthful of food. In one instance, he reported, it took Fletcher 722 chews to process a bite of a strong-tasting onion.

tell us that children have been chewing gum for hundreds of thousands of years. In ancient Greece, people took pleasure in chewing the pale yellow resin from the mastic tree. That's where "mastication," a fancy word for chewing, comes from.

North American Indians enjoyed chewing the resin of an evergreen tree. In the 1650s, John Curtis of Bangor, Maine, produced the first commercial chewing gum, known as State of Maine Spruce Gum.

The Modern Era of chewing gum was ushered in by Antonio Lopez de Santa Anna — the same man who, in 1836, led the assault on the Alamo in Texas. In 1845, when Santa Anna left Mexico and settled in New York, he brought with him a large lump of latex sap from the sapodilla tree. Unfamiliar to New Yorkers, this material (called chicle) had been a favorite among Mexicans for thousands of years. A local inventor, Thomas Adams, seized on chicle's pleasing properties. It wasn't long before small flavorless balls of chicle were being sold as Adams New York Gum for a penny apiece.

After World War II, food scientists began making artificial gum bases. The most widely used today is polyvinyl acetate — a tasteless, odorless chemical compound with a rather unappetizing name. Americans purchase an estimated 10 million pounds of this polymer per year. In some brands of gum, there's barely any chicle at all.

Today's store-bought chewing gum has five basic ingredients:

A gum base (usually a mix of natural and synthetic gums)

Softeners (for example, vegetable oil)

Flavors (like the ones in your kit)

Sweeteners (sugar or sugar-free sweeteners such as sorbitol or xylitol)

Com syrup

As you chew a stick of gum, the saliva in your mouth gradually dissolves nearly everything, leaving only the gum base. At the point where the taste disappears, people often reach for a second piece of gum.

SOMETHING TO CHEW ON:

The Philadelphia-based Bowman Gum Company is credited with creating the baseball card industry as we know it today. In 1956, Bowman was bought by The Topps Company, Inc., which is now the world leader in sports-themed trading cards.

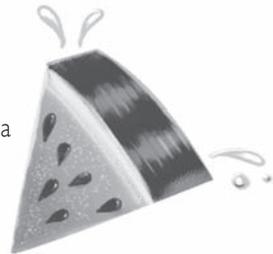
Fantastic Flavor Combinations

With the four flavors contained in your Bubble Gum kit, you can make any number of flavor combinations! We've tested a bunch in our gum lab that we think you'll enjoy. Once you've mastered the basics, you'll be a qualified gum chef and can make up your own unique combinations. You might even create a fabulous secret recipe!

SOMETHING TO CHEW ON:

In North America, kids spend half a billion dollars on bubble gum each year! Now aren't you glad you can make your own?

Are you ready to create some flavor sensations? Choose one of the following recipes, gather the ingredients and then follow the Basic Gum Recipe later in this booklet.



Basic gum Recipe

Use the ingredient list from the recipe of your choice. Be prepared by carefully measuring your dry ingredients in advance. You can store them in disposable, microwaveable cups until they are needed.



Juicy Watermelon

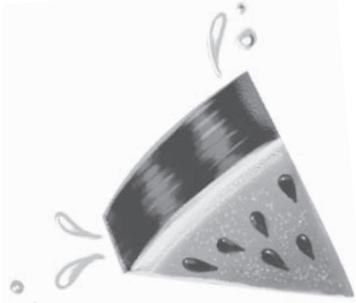
- 1 Tbsp gum base
- 1 tsp corn syrup
- 1/2 tsp watermelon flavor
- 2 Tbsp powdered sugar

Berry Blueberry

- 1 Tbsp gum base
- 1 tsp corn syrup
- 1/2 tsp blueberry flavor
- 2 Tbsp powdered sugar

Cool Candy Kiss

- 1 Tbsp gum base
- 1 tsp corn syrup
- 1/2 tsp watermelon flavor
- 1/4 tsp mint flavor
- 2 Tbsp powdered sugar



Frosty Blueberry Blast

- 1 Tbsp gum base
- 1 tsp corn syrup
- 1/2 tsp blueberry flavor
- 1/4 tsp mint flavor
- 2 Tbsp powdered sugar

Watermelon Wham

- 1 Tbsp gum base
- 1 tsp corn syrup
- 1/2 tsp watermelon flavor
- 1/8 tsp citric acid
- 2 Tbsp powdered sugar

Tangy Blueberry Tart

- 1 Tbsp gum base
- 1 tsp corn syrup
- 1/2 tsp blueberry flavor
- 1/2 tsp citric acid
- 2 Tbsp powdered sugar



Sour Fruit Cocktail

- 1 Tbsp gum base
- 1 tsp corn syrup
- 1/4 tsp watermelon flavor
- 1/4 tsp blueberry flavor
- 1/4 tsp citric acid
- 2 Tbsp powdered sugar

Junkyard Gum

- 1 Tbsp gum base
- 1 tsp corn syrup
- 1/4 tsp blueberry flavor
- 1/4 tsp watermelon flavor
- 1/4 tsp mint flavor
- 1/4 tsp citric acid
- 2 Tbsp powdered sugar

Extreme Mint

- 1 Tbsp gum base
- 1 tsp corn syrup
- 3/4 tsp mint flavor
- 2 Tbsp powdered sugar

STEP ONE: MIX IT!

1. Add 1 tablespoon of gum base to a disposable, microwaveable cup. Cover the gum base with water and heat it in the microwave for 15-20 seconds. Using an oven mitt, remove the cup and pour out the water into another cup, keeping the gum base in the original cup.
2. Stir the gum base with a stir stick or plastic spoon until it is smooth. If it isn't soft enough to stir, pour some of the water back into the cup with the gum and heat it in the microwave again for 5-10 seconds. Remove the water and stir.
3. Add 1 teaspoon of corn syrup to the gum base and stir it until smooth. If it becomes too hard to stir, you can heat it in the microwave for 5-10 seconds.
4. If your recipe calls for food coloring, adding it now will give your gum a solid color. You can wait to add color until the Finish it! section to make sweet swirls, or check out the Wacky Creations! section for other great ideas!
5. Add the flavor powders in the amounts needed for your recipe. Add 1 tablespoon of powdered sugar (the other tablespoon is used later). Stir the mixture with a plastic spoon until it becomes very stiff.

STEP TWO: KNEAD IT!

1. Wait until the gum base mixture cools. Use your hands to knead the mixture, much like you'd knead bread dough. Add powdered sugar, a little bit at a time, whenever the dough gets sticky. If the dough gets too stiff while you're kneading it, work in a few drops of warm water.

2. While kneading, break off a piece of gum and pop it in your mouth. How does it taste? You can make the gum taste more flavorful by adding more flavor powder. You can adjust the gum's sourness or sweetness by adding citric acid or more powdered sugar. Be careful not to add too much at once — 1/8 of a teaspoon or a light sprinkle might be all you'll need.
3. Continue kneading until the gum is smooth and stiff. After 10 or 15 minutes, most of the powdered sugar should be used up. The more you knead the gum, the better it will be! A lot of kneading will make your gum extra-chewy. If you get tired of kneading, ask a helper to wash their hands and take over for a few minutes.

SOMETHING TO CHEW ON:

WALLS covered with "ABC" (already been chewed) gum wads are gross BUT popular attractions in Seattle, Washington, San Luis Obispo, California, and several other U.S. cities



STEP THREE: FINISH IT!

1. When you are happy with the gum's taste and chew-ability, you're ready for the finishing touches. Think about your chosen recipe and how you want it to look and taste when first chewed.
2. Roll the gum into a long cylinder. Twist and break off small pieces. Then roll them into balls. Roll them in a dry ingredient that you used in your recipe, such as powdered sugar or citric acid. This will keep them dry and also provide a punch of flavor when first chewed. Remember that sugar will make it sweeter and citric acid will make it more sour.
3. Place your gum in the resealable bag provided in this kit. Your gum should stay fresh and flavorful for one to two weeks. Yum! (Note: You can also make foil wrappers to store your gum. Use scissors to cut some strips of foil from your kitchen supply.)

It's true! gum Chewing is good for You

The recently created Wrigley Science Institute™ is committed to advancing and sharing scientific research that explores the benefits of chewing gum. Its international panel of experts cites several good reasons to glom onto gum:

- Gum chewing can aid concentration and provide relief from life's little stresses;
- Chewing sugar-free gum can keep your mouth clean, lessening the risk of cavities and whitening the teeth by reducing stains;
- As a substitute for high-calorie snacks, chewing gum can help you watch your weight.

Wacky Creations!

Now that you've become a seasoned gum chef, it's time to get creative. Try some of these ideas and amaze your friends with your artistry!

Double gum twist

Make your taste buds think twice before settling down!

What You need from your kit:

The ingredients for Sour Fruit Cocktail and Berry Blueberry gum recipes

What You need to get:

Rolling pin
Aluminum foil
Butter knife



**SOMETHING
TO CHEW ON:**
Double Bubble chewing
gum was included in ration
kits for American soldiers
during World War II.

1. Make a batch of Sour Fruit Cocktail gum and a batch of Berry Blueberry gum. When you get to the Finish It! section for each recipe, come back to this page.
 2. Once you are satisfied with the taste and chewiness of your gum, roll each batch into a long, thin cylinder.
 3. Now, coil the two cylinders around each other, forming a twist. Cut the twist into pieces and wrap each in a piece of aluminum foil.
- Give it a try. Are your taste buds doing the twist?

Swirling Shapes

Your eyes may cross at the swirling colors, but your taste buds will cheer!

What You need from your kit:

The ingredients for your favorite recipe in this booklet
Note card

What You need To get:

Scissors
Butter knife
Rolling pin
Food coloring
Aluminum foil

1. Make a batch of your favorite gum recipe. Do not add food coloring yet to make it solid-colored — remember, you're going to swirl! When you get to the Finish It! section of the Basic Gum Recipe, come back to this page.
2. Using a rolling pin, roll out the mixture until flat.
3. Put a drop of food coloring in the middle and fold it over; pulling and twisting the mixture until it swirls. What do you think will happen to your colors?
4. Roll the mixture flat again.
5. Take your cardstock and cut out small shapes with scissors. You may decide to cut out a star or maybe a cactus. How about your best friend's face?
6. Place your new stencil on the flattened gum and cut around it with a butter knife.
7. Wrap each swirling shape in foil.

marketing Your gum

OK, so you've made some scrumptious gum. How will your gum-chewing friends know it's available? Here's how to make your gum stand out in the crowd.

What You need from your kit:

Batch of your favorite Gum Recipe

What You need To get:

Markers
Paper
Scissors
Tape or glue

1. Think about your gum's flavor and appearance. What words come to mind? Try to name the way you feel when you taste your gum.
2. Brainstorm a catchy name and logo for your product. How about "Chew-Chew Train" or "Super-Salivary Sweetness"?
3. Draw your new logo on to the paper. What colors will you use to catch your customer's eye? How will you design your custom logo?
4. Cut out your custom logo in an interesting shape and tape or glue it to the foil you wrap your gum in.
5. Sell the newest brand of gum to your friends and family!

three Cheers for these Chewing gum Champions:

William Wrigley Jr. of Chicago, creator of Juicy Fruit® and Spearmint® gum flavors;

Frank H. Fleeer of Philadelphia, father of Chiclets® and modern-day gumballs;

Walter Diemar, the Fleeer chemist who, in 1928, perfected the formula for bubble gum.

get Unstuck

Sometimes chewing gum gets out of hand. If your delicious creations end up in your hair, on your clothing or stuck to your pet dog or cat, try these methods to remove it (have an adult help you):

Clothing or carpet - Scraping the gum off with a dull knife, then rub the area with ice until the remaining gum rolls off into a ball.

Skin or hair - Smear in a little peanut butter and work it out. Then wash with soap, as usual.

A Sticky Situation

Gumfitti is a relatively new word that refers to gum that's discarded in public places. The government of Singapore takes this form of pollution so seriously that, in 1992, it outlawed chewing gum entirely. Twelve years later, it relaxed the law to allow medicinal uses of chewing gum. In other parts of the world, cities are combating gumfitti with fancy gum-removal devices. These hi-tech machines use liquid nitrogen and strong chemicals to rid streets and sidewalks of the sticky menace.

What's next? Where Do I go from here?

Congratulations! You've just completed what might have been your first foray into food science — and you've invented your own magnificent product line of custom-flavored gum.

If you enjoyed the experience, you may choose to try other experiments with food and food making. **Ice Cream, Soda Pop, Sour Candy Factory** and **Tasty Science Activity Kits** are fun ways to exercise your mind while refining your kitchen skills.

Who knows? Maybe someday you'll be sharing your original recipes for the World's Best Chewing Gum with us— and taking your place, along with Fleeer, Curtis, Wrigley and other industry giants, in the Chewing Gum Hall of Fame!

SOMETHING TO CHEW ON:

Gary Duschl of Virginia Beach, Virginia, holds the record for the longest gum wrapper chain. As of November 2007, the chain is 10 miles long and contains 1,240,000 wrappers — and, says Duschl, it's growing longer every day!

SOMETHING TO CHEW ON:

Why does gum chewing on an airplane keep your ears from popping? Chewing gum stimulates your salivary glands, making them produce more saliva. This makes you swallow more often, balancing the pressure inside and outside your head.

SOMETHING TO CHEW ON:

According to the Guinness Book of World Records, the biggest bubble gum bubble ever blown was 23 inches in diameter, roughly the size of an extra-large pizza. To set this record, Susan Montgomery Williams of Fresno, California, used three pieces of gum.

LAP notes

LAB NOTES

LAB NOTES



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