Strawberry Gummy Shapes

INSTRUCTIONS

SAFETY INFORMATION

- Activities must be performed under the close supervision of an adult.
- Steps that require the use of a stove/hotplate or a microwave oven must be carried out by the adult supervisor.
- Wash the beaker and any other included equipment in warm soapy water before use. Do not wash in a dishwasher.

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KIT CONTENTS

Gummy mix (8g/0.28 oz.), molding tray, beaker

YOU WILL ALSO NEED

Water, microwave, refrigerator, spoon, oven mitt

HERE'S HOW

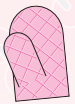
1. Add 10 ml of cold water to the beaker.

2. Add the packet of ingredients and stir.

3. Let the solution sit for five minutes.

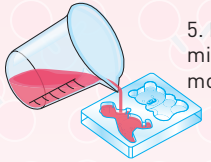
CAUTION!

Hot water can cause burns. An adult must help you heat the water in the microwave and carry the hot water to your work area. Use oven mitts or potholders.



5 – 10 seconds at a time

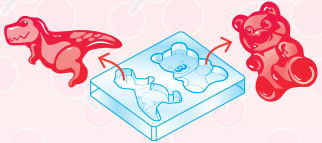
4. Heat the beaker in a microwave on HIGH in five-second to ten-second bursts, stirring between bursts, until the mixture is steaming hot.



5. Pour the mixture into molds.

6. Refrigerate until set.

7. Remove the gummies from the mold and consume within two days.



NOTE: The product yields 20 ml of mixture, which is greater than the volume of the mold. With the extra mixture, you can either:

a) Pour the remaining mixture into a container from home and refrigerate until set. Consume within two days.

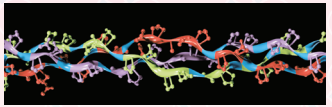
b) Leave the mixture in the beaker and refrigerate until set. Then eat the gummy from the beaker.

c) Leave the mixture in the beaker and refrigerate. Then, after you have removed the first batch of gummies from the mold, repeat steps 4 – 7. Double your gummies!

Important: You can only reheat the mixture one time.

What makes the gummies gummy?

The mixture in the packet contains gelatin, which is made from the bones and connective tissue of animals. This animal protein has the ability to swell up in cold water and to be dissolved when heated. As soon as it is cooled off again, it forms a "reversible" gel. That means that it can return to a liquid state if it is reheated, which is why the gummy melts in your mouth.



A computer rendering of the long twisted chains of collagen molecules.

Gelatin consists of many long chains of collagen molecules, which gives your gummy its firm structure. The collagen molecules have hydrogen atoms attached to their sides, which can weakly bond with water molecules, allowing gelatin to absorb five to ten times its weight in water as it forms a gel.

WATERMELON JUICE BEADS

INSTRUCTIONS

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KIT CONTENTS

Watermelon juice mix (8g/0.28 oz.), calcium lactate powder (5g/0.18 oz.), small spoon, beaker

YOU WILL ALSO NEED

Water, medium-sized bowl, small spoon, cup, slotted spoon

HERE'S HOW

1. Use the beaker to measure 100 ml of cold water and pour it into a bowl. Repeat two more times, so that you have a total

of 300 ml of water in the bowl. Put the bowl to the side.

2. Add 80 ml of water to the beaker.

3. Add the watermelon juice mix packet to the beaker and stir for 60 seconds, breaking up the gooey clumps as much as possible.

4. To the bowl of water, add the calcium lactate powder packet and stir until the powder has dissolved.

5. Fill a cup with fresh water to use for rinsing the spoon after the next step.

6. Fill the spoon with the alginate solution from the beaker and lower

the spoon into the bowl of calcium lactate solution, tipping out the alginate solution to form a ball.

7. Rinse the spoon in the cup of water before repeating Step 6.

It is important to avoid contaminating the alginate solution with calcium lactate.

8. Try filling the spoon with alginate solution, holding the spoon above the calcium lactate solution,

and dripping alginate solution into the bowl to make smaller balls.

9. Try adding the alginate quickly in a sideways motion to make longer shapes.

10. Use a slotted spoon to lift the juice beads out of the calcium lactate solution. Rinse them in fresh water before tasting.

Eat the beads immediately. They cannot be stored.

What chemical process makes the juice beads form?

When the sodium alginate solution comes into contact with calcium lactate, the liquid turns into a jelly-like solid ball. In **molecular gastronomy**, or scientific cooking, this technique is called **spherification**.

Modern chefs combine sodium alginate and calcium to create fancy bites that burst in your mouth.

When calcium ions come into contact with the alginate solution, they insert themselves between the individual alginate strands, forming a massive molecular complex. The bead's shell consists entirely of this compound. You have thus created a giant molecule!

Sodium alginate, the key ingredient in the watermelon juice mix packet, is derived from brown algae found in the ocean.

GRAPE COLOR-CHANGING EDIBLE SLIME

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KIT CONTENTS

Grape edible slime mix (13.5g/0.48 oz.), sour mix (5.5g/0.19 oz.), beaker

YOU WILL ALSO NEED

Water, metal spoon, microwave, oven mitt

HERE'S HOW

1. Add 20 ml of water to the beaker.

2. Add the grape edible slime mix and stir with a metal spoon, noting the color of the mixture.

3. Add the sour mix and stir, noting the color change from blue to pink. There may also be some fizzing!

4. Take the spoon out of the beaker and heat the mixture in a microwave for ten seconds on high.


10 seconds

5. Use an oven mitt to transfer the beaker of hot slime from the microwave oven to the work area and stir carefully with the metal spoon for 30 seconds.


30 sec.


5 seconds at a time

6. Repeat steps 4 and 5, heating the slime for five seconds at a time, then stirring for 30 seconds, until the mixture is thick and there is no runny liquid in the beaker.

7. The slime must cool down before it can be handled. Add cold

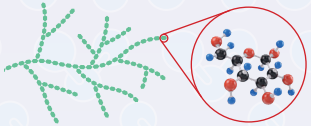
water to the beaker of hot slime to help it cool down faster.

8. Take the cold slime out of the beaker and mix it by hand on a plate until smooth. If it becomes too sticky, place the slime in a bowl of cold water.

9. To taste the edible slime, break off a small piece before eating.

Only taste the slime immediately after making it. Do not eat slime that has been stored.

What makes the slime slimy?
The grape edible slime mix packet contains tapioca flour, which is a starch. Starch particles are **polysaccharides**, chains of glucose molecules joined together. When these particles

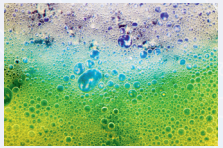


An illustration of a starch particle (left), which is made up of long chains of glucose molecules (right), made up of six carbon atoms (black), twelve hydrogen atoms (blue) and six oxygen atoms (red).

are mixed with cold water, they disperse and float around in the water. When you heat up the mixture, the starch molecules break apart. The smaller pieces then form new connections that are able to hold water. When this solution cools, it feels more like a gel.

How do chemical indicators work?
When you poured the sour mix into the beaker, you noticed that the color of your mixture changed from blue to purple. This color

change is a **chemical indicator**, a visible sign of a **chemical reaction** happening between the sodium bicarbonate, which is basic, and the citric acid, which is acidic. The fizz is another indicator that a chemical reaction has occurred. Those bubbles are made of carbon dioxide, which is one product of the reaction.



Color change and bubbles are chemical indicators, or signs that a chemical reaction is happening.

LIME CRYSTAL RING LOLLIPOP

INSTRUCTIONS

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KIT CONTENTS
Lime rock candy mix (6g/0.21 oz.), molding tray, ring base, beaker

YOU WILL ALSO NEED
Tape, 2/3 cup of granulated sugar, small saucepan, stove or hotplate, metal spoon, paper towels or clean dish towel

Please note that making this ring lollipop takes at least two days.

HERE'S HOW

1. Use the beaker to measure 30 ml of granulated sugar.

2. Add approximately half of the contents of the packet to the sugar in the beaker and mix with a spoon.

Tape the packet closed for now.

3. Add half of a teaspoon of cold tap water to the mixture in the beaker and stir until thoroughly mixed. The wet sugar should hold its shape, a bit like wet sand.

4. Fill the hexagonal mold with the wet sugar and use the back of a spoon to push the sugar into the mold so it is tightly packed.

5. Push the ring base down into the sugar. Press firmly.

6. With one hand holding the ring base, slowly turn over the mold. Tap the mold gently until the sugar comes out of the mold. You may need to gently push down on the top of the mold to get the sugar out of the mold.

If the molding process does not work the first time, return the sugar mixture to the beaker and repeat steps 4–6.

7. Place the ring on a clean plate to dry for one day.

There will be some leftover sugar mixture. This can be pressed into the mold, turned out, and left to dry for several days to create a candy that is similar to a sugar cube.

After one day:

8. Use the beaker to measure 50 ml of cold tap water and pour the water into a small saucepan.

9. Dry the beaker and use it to measure 70 ml of granulated sugar and add it to the saucepan.

10. Add the other half of the ingredient pack to the saucepan.

11. Heat the water and sugar mixture in the saucepan over medium heat on a stove or hotplate. Use a metal spoon to stir the sugar and water until the sugar has dissolved.

12. Measure another 50 ml of white sugar and add it to the saucepan. Continue heating and stirring until all of the sugar has dissolved.

13. Turn off the heat and leave the sugar syrup to cool for 30 minutes.

14. Wash and dry the beaker and then fill it with the cooled sugar syrup.

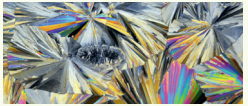
15. Turn the ring base upside down and float it on top of the sugar syrup for at least one day. Look at the crystals after one day and put it back in the syrup if you want to grow bigger crystals.

16. Take the ring out of the sugar syrup and leave it on a clean plate to dry. Store in an airtight container.

Why do rock candy crystals form?

Each grain of sugar is a tiny crystal made of an orderly arrangement of sucrose molecules. When you pour the sugar into hot water, the sucrose molecules break apart

because they are attracted to the water molecules. As you keep adding sugar to the water, at a certain point, the solution becomes **saturated**, meaning no more sugar will dissolve. When you cool this saturated solution, the water molecules slow down and the solution becomes **supersaturated**. In this state, the lonely sucrose molecules will seek to join other sucrose molecules, forming larger crystals.



Sucrose crystals under a microscope.

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KIT CONTENTS

Lemon fizzing drink mix (10g/0.35 oz.), sour mix (7g/0.25 oz.), beaker, small spoon

YOU WILL ALSO NEED

Water, paper towels or clean dish towel, small cup, tape, zipper storage bag or container

HERE'S HOW

1. Add 80 ml of cold water to the beaker.

2. Use the clean, dry spoon to add seven

level spoonfuls of the lemon fizzing drink mix packet into the beaker.

3. Stir to dissolve the powder.

4. Clean the spoon using a paper towel or clean dish towel.

5. Into a separate cup, add three and a half level spoonfuls of the sour mix packet.

6. Add the contents of the cup to the beaker and watch it fizz.

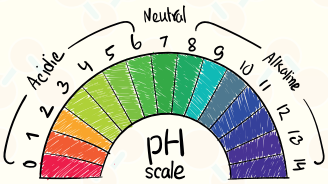
7. Stir the mixture with the spoon until the ingredients are completely dissolved.

8. Drink immediately.

Lemony Fizzing Soda Pop is not suitable for storage.

9. For the leftover ingredients, tape closed each pack and store

in an airtight container or zipper storage bag until you are ready to make another fizzy drink.



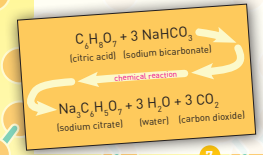
In chemistry, the pH scale is used to measure how acidic or basic a solution is. The scale actually measures the concentration of hydrogen ions in a solution. More hydrogen ions means a lower pH number and a more acidic solution.

What is the chemical reaction happening here?

In the sour mix packet you have citric acid, which is of course an acid, and in the lemon fizzing drink mix you have sodium bicarbonate, which is a base. When you mix these two chemicals in a solution of water, what do you see? A chemical reaction!

The bubbles you see when your lemony drink fizzes are made from carbon dioxide, a common molecule made from one carbon and two oxygen atoms. Humans and other animals exhale CO_2 with every breath.

In a chemical reaction, **reactants**, which are the chemicals you start with, change into **products**, which are the new chemical substances you have after the reaction. During this process, bonds between atoms break, and new bonds are formed. In the case of this chemical reaction, one of the products is carbon dioxide, which appears as gas bubbles. Cheers!



A chemical equation represents all of the reactants and products in a chemical reaction.

Ever wondered what makes campfires so mesmerizing to watch? What you're seeing is a chemical reaction in action! The reactants are oxygen, heat, and wood, which is primarily made of carbon. The products are smoke (made of hydrogen, carbon and oxygen), ash, and heat. As carbon atoms from the wood heat up, they release light in the form of a flame. None of the atoms that start in the wood are destroyed. In fact, most are actually released into the air.