

# Polymers and Gummy Bears

Source: [https://leftbraincraftbrain.com/polymer-science-homemade-fruit-gummies/#\\_a5y\\_p=2109725](https://leftbraincraftbrain.com/polymer-science-homemade-fruit-gummies/#_a5y_p=2109725)

Did you know that fruit gummies are made of polymers? They're made with gelatin, which consists of nature's most common polymer, protein.

A polymer is a compound formed of many molecules strung into long chains. Each of these molecules is called a Monomer (mono meaning one...). When they string together into a chain they become a Polymer (poly meaning many...). Polymers take up different physical characteristics depending upon what molecules they are made of and how they link together. They can be gummy, stretchy, hard, clear, cloudy, etc. Think of all the plastics you see (or are trying to minimize using to save the earth) in your daily life (milk jugs, Ziplocs, coat hangers, car bumpers, shampoo bottles, toys, toys, toys...). Polymers like DNA are critical to the human body and the world around us as well.

So how does it work? Gelatin's proteins form a triple helix (i.e. spiral) polymer chain which allows the food to gel once the molecules in the juice intersperse within the gelatin's helix. Picture it getting bigger like a slinky you've stuffed with tennis balls. The degree of gelling or expansion of the helix, as well as the physical characteristics of the gummies depends upon what the gelatin is mixed with. I found the juice gummies to be a little more like a Jello jigglers while the fruit puree ones are a little chewier, especially if you leave the seeds in.



## Juicy Fruit Gummies

- 2 cups fruit juice
- 4 packets Knox Gelatin (other brands are fine, check package size if using a different brand)
- Honey to taste

### **Instructions:**

1. Pour 1 1/2 cups of juice into a small sauce pan. Heat over medium heat until it reaches a gentle boil.
2. While juice heats, pour remaining 1/2 cup of the juice into a small bowl. Add gelatin and let bloom for five minutes.
3. Add gelatin to heated juice and stir until fully dissolved.
4. Take a quick taste of the juice mixture. Is it sweet enough for you? Add honey and stir until it is.



5. Pour mixture into silicone candy or ice molds or a 9×9 metal baking pan. Round shapes like hearts work better than pointy shapes like stars.
6. Chill for 1-2 hours and remove from pans / trays. If gummies don't come out easily, chill for another half hour. If you used the 9×9 pan, pull out gummy in one piece by running a knife along edges. Then place on a cutting board and cut into squares of desired size.
7. Store in refrigerator for up to 3-4 days.

## **Fresh Fruit Gummies**

- 4 cups fresh fruit such as strawberries, blueberries, or peaches (or a blend of fruits)
- 1/2 cup fruit juice (pick flavor to match fruit)
- 3 packets Knox Gelatin (other brands are fine, check package size if using a different brand)
- Honey to taste

### **Instructions:**

1. Place fruit in blender or food processor and blend until smooth. Strain the puree through a sieve if you want to remove seeds.
2. Pour puree into a small sauce pan. Heat over medium heat until it reaches a gentle boil.
3. While puree heats, pour 1/2 cup juice into a small bowl. Add gelatin and let bloom for five minutes. Add gelatin to heated puree and stir until fully dissolved.
4. Take a quick taste of the fruit mixture. Is it sweet enough for you? Add honey and stir until it is.
5. Pour mixture into silicone candy or ice molds or a 9×9 metal baking pan. Round shapes like hearts work better than pointy shapes like stars.
6. Chill for 1-2 hours and remove from pans / trays. If gummies don't come out easily, chill for another half hour. If you used the 9×9 pan, pull out gummy in one piece by running a knife along edges. Then place on a cutting board and cut into squares of desired size.
7. Store in refrigerator for up to 3-4 days.



## Wine Gummy Bears

Source: <https://kirbiecravings.com/wine-gummy-bears/>

PREP TIME: 15 MINUTES

COOK TIME: 15 MINUTES

TOTAL TIME: 30 MINUTES

COURSE: SNACKS

CUISINE: AMERICAN

SERVINGS: 100 MINI BEARS

*Easy homemade wine flavored gummy bears made with red, white and rose wines.*

*They can be made ahead of time and are great for gifting or a party.*

### **Ingredients:**

- 1/2 cup wine of your choice red, white, rose
- 2 1/2 tbsp unflavored gelatin
- 1/4 cup granulated sugar

### **Directions:**

1. In a small saucepan, pour in wine. Sprinkle gelatin over wine. Stir the gelatin to dissolve into wine. The gelatin will cause the wine to thicken up, to a slurry-like consistency. Continue to stir or whisk until all the white gelatin powder has been dissolved into the wine and no gelatin clumps remain.
2. Bring saucepan to low heat, careful not to let mixture boil, stirring continuously until wine melts back down to a liquid consistency. Make sure you stir continuously as the wine is melting back down because you don't want any gelatin to clump up. If you find any undissolved gelatin in the wine, use the back of the spoon and press the gelatin clump against the side of the saucepan to help break it down and dissolve it.
3. Once wine is in a liquid state again, add the sugar. Stir continuously until dissolved. Turn off heat but leave saucepan on stove to keep mixture warm. Depending on the type of wine used, some wines like the rose, will have a white bubbly foam on top. That is okay.
4. Working quickly, use eyedropper tool provided with gummy bear molds to fill molds with mixture in the saucepan. If your wine mixture has developed a layer of foam, make sure to push your eyedropper underneath the layer of foam so that you only get the liquid and try to avoid air bubbles (The foam layer is edible but it is very sticky and will affect the clarity of your gummy bears. I usually just keep using the liquid below the foam and then rinse the foam out when washing the pan.) Make sure you use up all of the mixture before it cools down because then it will become extremely thick and sticky. Place molds briefly in fridge for about 10-15 minutes to firm up. Gummy bears can be eaten straight from the fridge or left to warm back up to room temperature before eating. They will be slightly firmer straight out of the fridge and softer left at room temperature, but are chewy both ways. Store any uneaten ones in a sealed container in the fridge for up to 1 week.



# BEER GUMMY BEARS RECIPE

Source: <https://cookingwithjanica.com/beer-gummy-bears-recipe/#tasty-recipes-6651>

- PREP TIME:5 mins
- COOK TIME:5 mins
- TOTAL TIME:10 mins
- YIELD:10

## INGREDIENTS

- 1 Cup Beer
- 1/4 Cup Sugar
- 3 Tablespoons Unflavored Gelatin

## INSTRUCTIONS

1. Pour the beer into a saucepan over medium heat.
2. Add the sugar and gelatin, begin stirring immediately. Stir continuously until sugar and gelatin are completely dissolved. (If you want to keep the maximum amount of alcohol in, make sure the liquid stays well under 170°).
3. Pour the beer gelatin mixture over your gummy bear molds (you will need 3). Use a spatula to fill all the bear cavities and scrape off the excess.
4. Refrigerate for at least two hours.
5. Pop each beer bear out of the mold and enjoy! (Keep leftovers in an airtight container in the refrigerator)

## NUTRITION

CALORIES: 29



# More Gummy Bear Flavors

Source: <https://www.buzzfeed.com/joannaborns/diy-homemade-gummy-bears-recipe>

## Birthday Cake Gummy Bears

### Ingredients:

- 1/2 cup water
- 1 teaspoon vanilla
- 3 tablespoons sugar
- Rainbow sprinkles
- 3 packets of gelatin (3/4 ounce)

### Special equipment:

- Two 50-bear gummy bear molds with dropper

Sprinkle rainbow sprinkles inside the empty gummy bear molds. Mix water, sugar, and vanilla. Pour half of the mixture into a small saucepan and heat until simmering. Mix gelatin into the remaining half of the mixture. Add simmering liquid to the gelatin mixture and stir until the gelatin is dissolved. Fill the gummy bear molds with the liquid using the dropper and refrigerate for two hours or until set. Remove the bears from the molds. Makes about 100 bears.

## Rosé Gummy Bears

### Ingredients:

- 1/2 cup rosé wine
- 2 tablespoons sugar
- 3 packets of gelatin (3/4 ounce)

### Special equipment:

- Two 50-bear gummy bear molds with dropper

Mix rosé and sugar. Pour half of mixture into a small saucepan and heat until simmering. Mix gelatin into the remaining rosé and sugar mixture. Add simmering rosé mixture to the gelatin mixture and stir until the gelatin is dissolved. Fill the gummy bear molds with the liquid using the dropper and refrigerate for two hours or until set. Remove the bears from the molds. Makes about 100 bears.

Notes: As you can see, these bears look mostly clear. The pink color fades from the wine. To keep them pink, try to find a darker rosé or add food coloring.

## Manhattan Gummy Bears

### Ingredients:

- 1/2 cup whiskey
- 2 tablespoons maraschino cherry syrup
- 3 dashes bitters
- 2 tablespoons sugar
- 3 packets of gelatin (3/4 ounce)

### Special equipment:

- Two 50-bear gummy bear molds with dropper

Mix whiskey, cherry syrup, bitters, and sugar. Pour half of the mixture into a small saucepan and heat until simmering. Mix gelatin into the remaining half of the mixture. Add simmering liquid to the gelatin mixture and stir until the gelatin is dissolved. Fill the gummy bear molds with the liquid using the dropper and refrigerate for two hours or until set. Remove the bears from the molds. Makes about 100 bears.

<p><b>Strawberry Gummy Bears</b></p> <p><b>Ingredients:</b></p> <ul style="list-style-type: none"> <li>• 1 cup strawberries</li> <li>• Juice of 1/2 lemon</li> <li>• 2 tablespoons sugar</li> <li>• 3 packets of gelatin (3/4 ounce)</li> </ul> <p><b>Special equipment:</b></p> <ul style="list-style-type: none"> <li>• Two 50-bear gummy bear molds with dropper</li> <li>• Fine mesh strainer</li> <li>• Blender</li> </ul>	<p>Blend strawberries in a blender. Strain the blended strawberries through a mesh strainer to remove seeds. Add lemon juice and sugar to the strained strawberry mixture. Pour half of the mixture into a small saucepan and heat until simmering. Mix gelatin into the remaining half of the mixture. Add simmering liquid to the gelatin mixture and stir until the gelatin is dissolved. Fill the gummy bear molds with the liquid using the dropper and refrigerate for two hours or until set. Remove the bears from the molds. Makes about 100 bears.</p>
<p><b>Apple Cider Gummy Bears</b></p> <p><b>Ingredients:</b></p> <ul style="list-style-type: none"> <li>• 1/2 cup apple cider</li> <li>• Juice of 1/2 lemon</li> <li>• 2 tablespoons sugar</li> <li>• 3 packets of gelatin (3/4 ounce)</li> </ul> <p><b>Special equipment:</b></p> <ul style="list-style-type: none"> <li>• Two 50-bear gummy bear molds with dropper</li> </ul>	<p>Mix apple cider, sugar, and lemon juice. Pour half of the mixture into a small saucepan and heat until simmering. Mix gelatin into the remaining half of the mixture. Add simmering liquid to the gelatin mixture and stir until the gelatin is dissolved. Fill the gummy bear molds with the liquid using the dropper and refrigerate for two hours or until set. Remove the bears from the molds. Makes about 100 bears.</p>
<p><b>Creamsicle Gummy Bears</b></p> <p><b>Ingredients:</b></p> <ul style="list-style-type: none"> <li>• 1/2 cup fresh squeezed orange juice</li> <li>• 2 tablespoons coconut milk</li> <li>• 1 teaspoon vanilla extract</li> <li>• 2 tablespoons sugar</li> <li>• 3 packets of gelatin (3/4 ounce)</li> </ul> <p><b>Special equipment:</b></p> <ul style="list-style-type: none"> <li>• Two 50-bear gummy bear molds with dropper</li> </ul>	<p>Mix orange juice, coconut milk, sugar, and vanilla. Pour half of the mixture into a small saucepan and heat until simmering. Mix gelatin into the remaining half of the mixture. Add simmering liquid to the gelatin mixture and stir until the gelatin is dissolved. Fill the gummy bear molds with the liquid using the dropper and refrigerate for two hours or until set. Remove the bears from the molds. Makes about 100 bears.</p>
<p><b>Matcha Gummy Bears</b></p> <p><b>Ingredients:</b></p> <ul style="list-style-type: none"> <li>• 1 tablespoon matcha powder</li> <li>• 1/2 cup coconut milk</li> <li>• 2 tablespoons sugar</li> <li>• 3 packets of gelatin (3/4 ounce)</li> </ul> <p><b>Special equipment:</b></p> <ul style="list-style-type: none"> <li>• Two 50-bear gummy bear molds with dropper</li> <li>• Blender</li> </ul>	<p>Blend coconut milk, matcha powder, and sugar in a blender until smooth. Pour half of the mixture into a small saucepan and heat until simmering. Mix gelatin into the remaining half of the mixture. Add simmering liquid to the gelatin mixture and stir until the gelatin is dissolved. Fill the gummy bear molds with the liquid using the dropper and refrigerate for two hours or until set. Remove the bears from the molds. Makes about 100 bears.</p>

<p><b>Kale Gummy Bears</b></p> <p>Ingredients:</p> <ul style="list-style-type: none"> <li>• 3 handfuls of kale</li> <li>• 1/2 cup water</li> <li>• juice of one lime</li> <li>• juice from one green apple</li> <li>• 1 tablespoon sugar</li> <li>• 3 packets of gelatin (3/4 ounce)</li> </ul> <p><b>Special equipment:</b></p> <ul style="list-style-type: none"> <li>• Two 50-bear gummy bear molds with dropper</li> <li>• Fine mesh strainer</li> <li>• Blender</li> </ul>	<p>Blend water and kale in a blender until smooth. Strain the kale mixture through a mesh strainer. Mix strained kale juice with lime juice, apple juice, and sugar. Pour half of the mixture into a small saucepan and heat until simmering. Mix gelatin into the remaining half of the mixture. Add simmering liquid to the gelatin mixture and stir until the gelatin is dissolved. Fill the gummy bear molds with the liquid using the dropper and refrigerate for two hours or until set. Remove the bears from the molds. Makes about 100 bears.</p>
<p><b>Blueberry Gummy Bears</b></p> <p>Ingredients:</p> <ul style="list-style-type: none"> <li>• 6 ounces blueberries</li> <li>• Juice of one lemon</li> <li>• 2 tablespoons sugar</li> <li>• 3 packets of gelatin (3/4 ounce)</li> </ul> <p><b>Special equipment:</b></p> <ul style="list-style-type: none"> <li>• Two 50-bear gummy bear molds with dropper</li> <li>• Blender</li> <li>• Fine mesh strainer</li> </ul>	<p>Blend blueberries and lemon juice in a blender until smooth. Strain blueberry mixture through a mesh strainer. Mix the strained blueberry juice and sugar. Pour half of the mixture into a small saucepan and heat until simmering. Mix gelatin into the remaining half of the mixture. Add simmering liquid to the gelatin mixture and stir until the gelatin is dissolved. Fill the gummy bear molds with the liquid using the dropper and refrigerate for two hours or until set. Remove the bears from the molds. Makes about 100 bears.</p>
<p><b>Coffee Gummy Bears</b></p> <p>Ingredients:</p> <ul style="list-style-type: none"> <li>• 1/2 cup strong coffee</li> <li>• 2 tablespoons sugar</li> <li>• 3 packets of gelatin (3/4 ounce)</li> </ul> <p><b>Special equipment:</b></p> <ul style="list-style-type: none"> <li>• Two 50-bear gummy bear molds with dropper</li> </ul>	<p>Mix coffee and sugar. Pour half of the mixture into a small saucepan and heat until simmering. Mix gelatin into the remaining half of the mixture. Add simmering liquid to the gelatin mixture and stir until the gelatin is dissolved. Fill the gummy bear molds with the liquid using the dropper and refrigerate for two hours or until set. Remove the bears from the molds. Makes about 100 bears.</p>
<p><b>Latte Gummy Bears</b></p> <p>Ingredients:</p> <ul style="list-style-type: none"> <li>• 1/2 cup strong coffee</li> <li>• 4 tablespoons coconut milk</li> <li>• 2 tablespoons sugar</li> <li>• 3 packets of gelatin (3/4 ounce)</li> </ul> <p><b>Special equipment:</b></p> <ul style="list-style-type: none"> <li>• Two 50-bear gummy bear molds with dropper</li> </ul>	<p>Mix coffee, sugar, and coconut milk. Pour half of the mixture into a small saucepan and heat until simmering. Mix gelatin into the remaining half of the mixture. Add simmering liquid to the gelatin mixture and stir until the gelatin is dissolved. Fill the gummy bear molds with the liquid using the dropper and refrigerate for two hours or until set. Remove the bears from the molds. Makes about 100 bears.</p>

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## Margarita Gummy Bears

### Ingredients:

- 1/4 cup tequila
- 1/4 cup lime juice
- 1 pinch salt
- 2 tablespoons sugar
- 3 packets of gelatin (3/4 ounce)

### Special equipment:

- Two 50-bear gummy bear molds with dropper

Mix tequila, lime juice, sugar, and salt. Pour half of the mixture into a small saucepan and heat until simmering. Mix gelatin into the remaining half of the mixture. Add simmering liquid to the gelatin mixture and stir until the gelatin is dissolved. Fill the gummy bear molds with the liquid using the dropper and refrigerate for two hours or until set. Remove the bears from the molds. Makes about 100 bears.

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### Tips for making gummy bears

- Place the gummy bear molds on a baking sheet before you fill them.
- It's OK to have a few undissolved gelatin clumps in your liquid mixture. You can avoid them if you use the dropper that comes with some molds.
- When removing the bears from the mold, push them out feet first. The feet tend to get stuck if you push them out last.
- The flavor of your gummy bears will fade as they solidify. Try to make the flavor stronger than you think you'll need. If you're making a fruit flavor, adding lemon juice can help boost the flavor.
- When your bears are completed, you can give them a chewier texture by letting them sit out exposed to air for about eight hours. Standing them upright as they dry will make them even chewier.
- Adding sugar helps the bears set better. (Sorry if you were trying to be healthy.)
- I recommend storing in an air-tight container in the fridge.
- If you want to create your own new gummy bear flavor, you need about 1/2 cup of liquid (of whatever you want\*) and three gelatin packets (3/4 ounce gelatin), which will fill two 50-bear molds. (Use the gelatin as its directions suggest and refrigerate for several hours or until it sets.)

\*There are some things that probably won't work, but there's a lot of room to experiment.

# Edible Slime Using Gummy Bears

Source: <https://littlebinsforlittlehands.com/gummy-bear-edible-slime-recipe/>

Stretchy and fun, edible gummy bear slime is a real treat for the kids. I stick to the basic classic slime recipes, but a friend made this one for me. She loves making homemade edible slime recipes, so I knew she was the lady to go to!

## WHY WOULD YOU WANT TO KNOW HOW TO MAKE EDIBLE SLIME RECIPES?

Maybe you need a [completely borax free slime](#) for one reason or another! All of the basic slime activators including borax powder, saline or contact solutions, eye drops, and liquid starch all contain borons. These ingredients will be listed as borax, sodium borate, and boric acid. Maybe you just don't want to use or can't use these ingredients!

Kids love the feel of slime. The texture and the consistency make slime a blast for kids to try! If you can't use any of our [basic slime recipes](#) or simply want to try something a little different for [cool sensory play](#), try an edible slime recipe like this one!

## TASTE SAFE SLIME OR EDIBLE SLIME?

These words are used interchangeably, but here are my thoughts. This gummy bear edible slime recipe is non-toxic, but I never suggest eating edible slimes as snacks.

You can certainly have a taste or two here and there, and this is especially important if you have a kid who likes to put everything in his or her mouth! I like to call these kinds of slime recipes taste safe.

## GUMMY BEAR SLIME SUPPLIES

- 1 Cup Gummy Bears (try to match like colors)
- 2 Tablespoons Cornstarch
- 1 Tablespoon Icing Sugar (Powdered Sugar)
- 1/2 Tablespoon Oil (as needed)

## GUMMY BEAR EDIBLE SLIME RECIPE STEPS

1. Adult supervision is needed for this slime as the mixture will be hot!
2. Place the gummy bears in a microwave-safe bowl and heat for 30 seconds.
3. Stir well and reheat as needed to make the mixture completely smooth (no lumps or bear parts left).
4. Make sure to stir well to help the mixture cool down. HOT, HOT , HOT!
5. Combine cornstarch and icing sugar together and place half on a cutting board or clean surface (like your counter).
6. Pour the gummy bear mixture onto the cornstarch mixture and when cool enough to touch, knead in the remaining cornstarch mixture.
7. It will be sticky at first, but continue to knead and it will get less sticky.
8. Once all of the cornstarch is incorporated, knead in a bit of oil to help make the slime more stretchy and elastic. You will probably not need the full amount of oil
9. This slime can be reheated once more for a second play but it is intended to be a one-time use recipe.

# Growing Gummy Bears

Source: <https://www.playdoughtoplato.com/growing-gummy-bear-science/>

## The Science Behind Growing Gummy Bears

To make gummy bears, sugar, gelatin, and flavor are dissolved in a warm water solution. As the solution cools, water leaves the gelatin solution, and the bears become firm but chewy. Not all the water leaves the gelatin however, otherwise the gummy bears would be rock hard.

It's this little bit of water that makes the gummy bears act as a solution of water, one with a lot of sugar dissolved in it. The plain water in the bowl, however, had very little dissolved in it. We've learned from our egg experiment {the one with the dissolved shell} that different solutions of water will want to balance each other. The plain water, with very little dissolved in it will move toward the solution of water with a lot dissolved in it, the gummy bear. This movement of a solvent from one of lower concentration to higher concentration is called osmosis. The force behind that movement of water is called osmotic pressure.

In the bowl with the salt water, we tried to balance the amount of stuff {salt} dissolved in the water with the amount of sugar dissolved in the gummy bear. Since our gummy bear placed in the salt water solution did expand a little bit, we knew our salt water solution did have a lot dissolved in it but not quite as much as the gummy bear did. So a little water moved into the gummy bear to balance the two solutions.

# Polymer science ([https://en.wikipedia.org/wiki/Polymer\\_science](https://en.wikipedia.org/wiki/Polymer_science))

**Polymer science** or **macromolecular science** is a subfield of [materials science](#) concerned with [polymers](#), primarily synthetic polymers such as [plastics](#) and [elastomers](#). The field of polymer science includes researchers in multiple disciplines including [chemistry](#), [physics](#), and [engineering](#).

## History of polymer science<sup>[edit]</sup>

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The first modern example of polymer science is [Henri Braconnot](#)'s work in the 1830s. Henri, along with [Christian Schönbein](#) and others, developed derivatives of the natural polymer [cellulose](#), producing new, semi-synthetic materials, such as [celluloid](#) and [cellulose acetate](#). The term "polymer" was coined in 1833 by [Jöns Jakob Berzelius](#), though Berzelius did little that would be considered polymer science in the modern sense. In the 1840s, [Friedrich Ludersdorf](#) and [Nathaniel Hayward](#) independently [discovered](#) that adding sulfur to raw natural [rubber](#) ([polyisoprene](#)) helped prevent the material from becoming sticky. In 1844 [Charles Goodyear](#) received a U.S. patent for [vulcanizing](#) natural rubber with [sulfur](#) and heat. [Thomas Hancock](#) had received a patent for the same process in the UK the year before. This process strengthened natural rubber and prevented it from melting with heat without losing flexibility. This made practical products such as waterproofed articles possible. It also facilitated practical manufacture of such rubberized materials. Vulcanized rubber represents the first commercially successful product of polymer research. In 1884 [Hilaire de Chardonnet](#) started the first artificial [fiber](#) plant based on regenerated [cellulose](#), or [viscose rayon](#), as a substitute for [silk](#), but it was very flammable.<sup>[1]</sup> In 1907 [Leo Baekeland](#) invented the first [synthetic plastic](#), a [thermosetting phenol–formaldehyde](#) resin called [Bakelite](#).<sup>[2]</sup>

Despite significant advances in polymer synthesis, the molecular nature of polymers was not understood until the work of [Hermann Staudinger](#) in 1922.<sup>[3]</sup> Prior to Staudinger's work, polymers were understood in terms of the [association theory](#) or aggregate theory, which originated with [Thomas Graham](#) in 1861. Graham proposed that cellulose and other polymers were [colloids](#), aggregates of molecules having small molecular mass connected by an unknown intermolecular force. [Hermann Staudinger](#) was the first to propose that polymers consisted of long chains of [atoms](#) held together by [covalent bonds](#). It took over a decade for Staudinger's work to gain wide acceptance in the scientific community, work for which he was awarded the [Nobel Prize](#) in 1953.

The World War II era marked the emergence of a strong commercial polymer industry. The limited or restricted supply of natural materials such as [silk](#) and [rubber](#) necessitated the increased production of synthetic substitutes, such as [nylon](#)<sup>[4]</sup> and [synthetic rubber](#).<sup>[5]</sup> In the intervening years, the development of advanced polymers such as [Kevlar](#) and [Teflon](#) have continued to fuel a strong and growing polymer industry.

The growth in industrial applications was mirrored by the establishment of strong academic programs and research institute. In 1946, [Herman Mark](#) established the Polymer Research Institute at [Brooklyn Polytechnic](#), the first research facility in the United States dedicated to polymer research. Mark is also recognized as a pioneer in establishing curriculum and pedagogy for the field of polymer science.<sup>[6]</sup> In 1950, the POLY division of the [American Chemical Society](#) was formed, and has since grown to the second-largest division in this association with nearly 8,000 members. Fred W. Billmeyer, Jr., a Professor of Analytical Chemistry had once said that "although the scarcity of education in polymer science is slowly diminishing but it is still evident in many areas. What is most unfortunate is that it appears to exist, not because of a lack of awareness but, rather, a lack of interest."<sup>[7]</sup>

## Nobel prizes related to polymer science<sup>[edit]</sup>

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**2005** (Chemistry) [Robert Grubbs](#), [Richard Schrock](#), [Yves Chauvin](#) for olefin metathesis.<sup>[8]</sup>

**2002** (Chemistry) [John Bennett Fenn](#), [Koichi Tanaka](#), and [Kurt Wüthrich](#) for the development of methods for identification and structure analyses of [biological macromolecules](#).<sup>[9]</sup>

**2000** (Chemistry) [Alan G. MacDiarmid](#), [Alan J. Heeger](#), and [Hideki Shirakawa](#) for work on [conductive polymers](#), contributing to the advent of [molecular electronics](#).<sup>[10]</sup>

**1991** (Physics) [Pierre-Gilles de Gennes](#) for developing a generalized theory of phase transitions with particular applications to describing ordering and phase transitions in polymers.<sup>[11]</sup>

**1974** (Chemistry) [Paul J. Flory](#) for contributions to theoretical polymer chemistry.<sup>[12]</sup>

**1963** (Chemistry) [Giulio Natta](#) and [Karl Ziegler](#) for contributions in polymer synthesis. ([Ziegler-Natta catalysis](#)).<sup>[13]</sup>

**1953** (Chemistry) [Hermann Staudinger](#) for contributions to the understanding of macromolecular chemistry.<sup>[14]</sup>