

# Make Your Own Cleaners

Baking soda and vinegar aren't just for volcanoes anymore! See how you can use these two ingredients (plus a few more) to get a great clean\* without the toxins. After discovering the power of these homemade cleaners, you'll leave the store-bought ones on the shelf.

\*Yes, we know that cleaning might not be the most fun thing to do, but this isn't your normal kind of cleaning. It's cleaning with science!

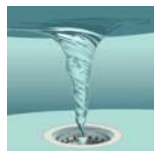


**Get your camera ready! If making these cleaners is your favourite part of this Mission, take a picture of them in action and submit it at [earthrangers.com/toxic-takedown](http://earthrangers.com/toxic-takedown)**



## Use vinegar and baking soda to clean up...

**Greasy messes on hard surfaces:** sprinkle baking soda on the greasy area. Next, spray the baking soda with white vinegar and wipe it up with a cloth or sponge. Just remember, cleaning up this greasy mess might take another kind of grease – elbow grease!



**Clogged drains:** Have an adult pour some boiling water in the sink. Next, pour in about ½ cup of baking soda then about 1 cup of vinegar. Once the reaction stops, have an adult pour in some more boiling water. This should help loosen the clog and your sink should be as good as new.



**Stuck-on food from your stainless steel pots and pans:** Make a paste by mixing together 3 parts baking soda and 1 part water (you can add more water if you want the paste to be thinner). Rub the paste on your pan and let it sit for a few minutes. Next, spray white vinegar onto the paste and lightly scrub. You should have a clean pan in no time!

## How does it work?

What happened when you mixed the vinegar and the baking soda together? It started to foam. Cool, right? Here's why: vinegar is a weak acid and baking soda is a weak base. When the two are mixed, they create a reaction that releases a gas called carbon dioxide, which escapes from the thick liquid in the form of bubbles. The acid in the vinegar helps to break down grease, the baking soda's grit helps to scrub off the gunk and while the bubbles help lift off dirt.



**Although baking soda and vinegar create a cool reaction when mixed together, they're also really powerful on their own! Check out these other cleaning ideas:**

- Wipe your counters down with vinegar to kill bacteria
- Soak clothing in vinegar and water to help get rid of stains
- Spray vinegar on windows and mirrors, then wipe up to make them clean and shiny
- Leave baking soda in the fridge to help get rid of bad smells
- Sprinkle baking soda on your carpet and vacuum to remove smells
- Spray vinegar and water on carpets to help remove stains
- Polish copper, silver and stainless steel with baking soda and water
- Tell a grown-up to pour baking soda in your toilet and let it sit. Then scrub with a toilet brush to remove stains.



# Make Your Own Plastic

What happens when you mix vinegar and milk together? You get a kind of plastic! Here, we'll teach you how to make your own eco-friendly plastic that you can use to make really cool things.



Get your camera ready! If making plastic is your favourite part of this Mission, take a picture of your creations and submit it at [earthrangers.com/toxic-takedown](http://earthrangers.com/toxic-takedown)

## Here's what you need:

### Ingredients:

- Milk (1 cup)
- White Vinegar (4 tsp.)

### Tools:

- A spoon
- A bowl or other microwave-safe container
- A microwave
- Paper towel

### Optional:

- A strainer
- A cookie cutter or other shapes to help mold your plastic
- Things to decorate your plastic, like paint
- Rolling pin



## Here's how you make it:

### Step 1:

Heat milk in the microwave. It should be about the same temperature you'd use to make hot cocoa. We set our microwave to 50% and warmed the milk for 5 minutes, and made sure to keep an eye on it. All microwaves are different so you might need to adjust the time and power level.



**CAUTION:** Get help from an adult to remove the milk from the microwave. It will be hot.



### Step 2:

Carefully add vinegar to the warm milk and stir slowly. White clumps (or curds) should start to form. Keep stirring until no more curds form.

### Step 3:

Now you'll need to take the curds out of the liquid. There are two ways to do this:

- 1) Lay down four or five sheets of paper towel and spoon out as many of the curds as you can, leaving the liquid behind.
- 2) Line the bottom of a strainer with one or two sheets of paper towel. Slowly pour the liquid into the strainer, making sure not to rip the paper towel. The liquid should filter through, leaving the curds on the paper towel.



### Step 4:

Wrap the curds in several layers of paper towel and squeeze out the remaining liquid. Keep doing this until you've removed as much liquid as you can.





# Make Your Own Plastic, continued...



## Step 5:

Squish and squeeze the curds together, kneading them until they form a dough. Keep kneading until it's smooth. This will make it easier to mold and will help your homemade plastic keep its shape.

## Step 6:

Congrats, you've just made your very own natural plastic! Now you can start molding! Be as creative as you'd like.

**Tip:** Use a rolling pin to flatten the dough and use a cookie cutter to shape it.

**Tip:** Want to make a bead? Don't forget to poke a hole in it. We suggest using a toothpick.



## Step 7:

When you've finished, set your plastic aside to dry for about 48 hours. The longer you wait, the harder the plastic will be. Once the 48 hours are up, your plastic is ready to be decorated.

**Here are some examples of what you can make...**



A die



Beads



A medallion



Pollinator figurines



A bracelet



A toy pizza slice

**Tip:** You might notice a small amount of liquid coming off your plastic pieces for the first little while. Over time, this will stop, but until then, make sure to store them in or on something that won't get damaged by liquid.



## How does it work?

Milk has a protein in it called casein. When you add an acidic liquid (like vinegar) to the milk, it causes the casein to separate out and form clumps. These clumps are actually long chains of the casein protein molecules, and these long chains are called polymers – the same building blocks as plastic, just without the toxins!



# Make Your Own Bath Bombs

Leave the microbeads behind with these awesome bath bombs! They'll add a new kind of fizziness to your bath and they make great gifts too!



Get your camera ready! If making bath bombs is your favourite part of this Mission, take a picture of your finished bath bombs and submit it at [earthrangers.com/toxic-takedown](http://earthrangers.com/toxic-takedown)

## Here's what you need:

### Ingredients:

- Citric acid (you can find this at your local grocery or bulk food store) (1  $\frac{1}{3}$  tbsp.)
- Baking soda (2  $\frac{2}{3}$  tbsp.)
- Cornstarch (2 tbsp.)
- Water (1 tsp.)
- Vegetable oil (1 tsp.)

### Tools:

- A spoon
- Two bowls
- Something to mold your bath bombs - a muffin tray, ice cube tray, little bowls, etc.
- Paper towel
- A bathtub to drop the bath bombs in once they're dry!

### Optional:

- Food colouring (2 drops)
- Epsom salt (2 tbsp.)
- Fragrance (essential oils, not perfumes) (15 drops)

## Here's how you make it:

### Step 1:

Combine your dry ingredients in bowl #1 by mixing citric acid, baking soda and cornstarch together. If you are using Epsom salt, add it to the mixture too.

### Step 2:

In bowl #2, combine your wet ingredients by mixing the vegetable oil and water together. Add food colouring to give your bath bomb some colour, and add fragrance for a lovely smell.

### Step 3:

Using a spoon, add a few drops of the wet mixture from bowl #2 to the dry mixture in bowl #1. You'll notice that it starts to fizz. Quickly press down on the wet spot to stop the fizzing and then mix it in with the rest of the mixture. Continue adding drops until bowl #2 is empty.



**Tip:** Make sure you only add a few drops of liquid at a time. If you add too many at one time, the bath bomb will fizz too much and you won't get to see the reaction later.





# Make Your Own Bath Bombs, continued...



## Step 4:

Use a paper towel to spread a little bit of vegetable oil in the container you're using to form your bath bombs so it's easier to get them out when they are finished. Start using a spoon to fill the container(s) with your mixture.

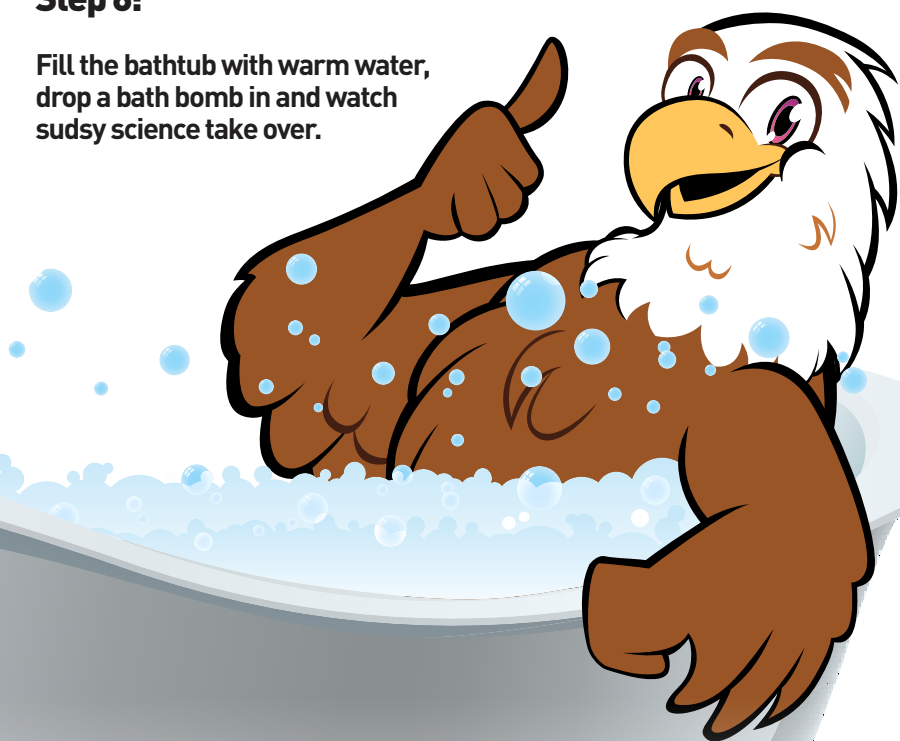
**Tip: Make sure you press down on the mixture between spoonfuls so the mixture is solid.**

## Step 5:

Set the bath bombs aside to dry overnight. Once dry your bath bombs should easily pop out of their molds.

## Step 6:

Fill the bathtub with warm water, drop a bath bomb in and watch sudsy science take over.



## How does it work?

This is the same type of reaction you get when you mix vinegar with baking soda. The citric acid is an acid (duh!!) and the baking soda is a base. The cornstarch keeps the acid and base from reacting, which is why nothing happens until you add water (cornstarch is the "inhibitor").

In water, the cornstarch starts to dissolve, causing the acid and base to mix and the reaction to begin. This reaction creates carbon dioxide bubbles, just like we saw when we mixed the vinegar and baking soda. The bubbles rush to the surface of the water, causing the water to become fizzy!

