

Science: Icy Orbs!

Ages: 5 - 13

Hello everyone. This is Bill from the Okanagan Regional Library System. Welcome to the fun and inventive world of making STEAM projects in your own home. Each week, I will share a fun and interesting project that you can make using materials commonly found in your own home.

Even though we can't be together right now, we can still learn how to make exciting projects each week!

This week's project: How to Make your own Icy Orbs.

Icy Orbs



It would be easy to mistake these multicoloured, patterned balls for precious jewels, mysterious deep-sea creatures, or even alien worlds from outer space. But, actually, they're just balls of coloured ice. No two ice balls look the same because the food colouring that is added spreads differently through the melted ice of each ball. Remember, they won't last forever, so you might want to photograph your colourful creations before they melt.

These colourful balls are made by freezing water in a balloon. Sprinkling salt on top of the ice makes sections of ice melt, creating rivulets of water that run down the ice ball's sides. Add food colouring to the mixture and watch it dissolve in the liquid water, making the rivers run green, blue, and any other colour you add, to make pretty patterns.

This simple, but effective experiment creates spectacular results. Simply make a ball of ice, add salt and food colouring, and watch fabulous patterns paint the ice. You need to be careful, though, because adding salt to the ice will make it even colder. So, make sure you don't touch the ice once the salt has been sprinkled on it.

Materials Needed:

- Food Colouring
- Balloons
- Large Bowl
- Baking Tray
- Salt
- Scissors
- Flashlight



Time: 10 minutes plus freezing time.

Steps:

1. Place your balloon's opening over the end of a cold-water tap. Turn the water on to a trickle and fill the balloon half way. Remove the balloon from the tap and tie off. Put the balloon in the freezer and leave it overnight. Do this for as many icy orbs you would like to make. Note: If there is space in your freezer, put the water-filled balloon in a bowl, so it keeps its round shape.



2. The next day, remove the balloons from the freezer. They should feel hard because the liquid water has turned into solid ice. Cut the off the end each balloon, and peel off the rubber. Note: If the ice feels too cold for your hands, wear some gloves.



3. Put your icy orbs in a bowl or on a baking tray. Sprinkle a little salt on top of each ball. Watch the ice melt where the salt grains land, peppering the icy surface with lots of little holes.



4. Drip some food colouring onto the ice. The colouring will mostly sit on top of the solid ice, but it will quickly dissolve in the melted ice to make coloured rivers that stream down the side.



5. To make your icy creation look even more beautiful, add different food colourings. And if you shine a flashlight or lamp under one of your icy creations, you can get a really spectacular effect!



The Science behind your Icy Orbs

Salt grains are crystals, and are made of two types of particle – sodium ions and chlorine ions – joined together. When salt is sprinkled on an icy orb, the ions breakup the regular arrangement of water molecules in the ice. Once the water molecules are broken apart, the ice becomes liquid. Since sodium and chlorine ions attach to the water molecules, the water molecules cannot bond together unless the temperature becomes very low again.

Real World Science – De-icing Roads



In freezing temperatures, specially designed trucks spread salt mixtures on roads and sidewalks to prevent accidents. The salt melts any snow or ice that is already on these surfaces, and also prevents water from turning into ice. This is because added salt lowers the freezing point of water.

STEAM

This activity includes everything you need for a comprehensive STEAM project.

Science: Understanding how the ions found in salt affect frozen ice.

Technology: Understanding how salt can be used as a real world solution to getting rid of ice.

Engineering and Art: Constructing and decorating the icy orbs.

Math: Measuring the quantities needed to create your icy orbs.