

CURIOSITY AT HOME

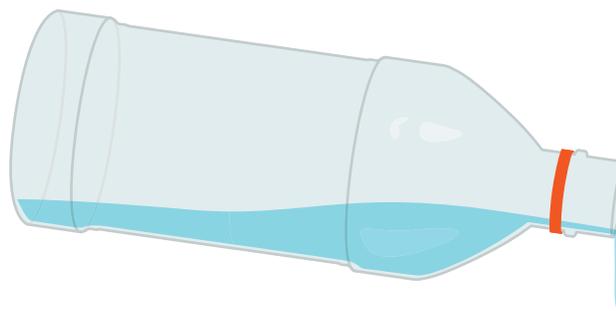
INSTANT ICE



Phase changes between liquids, solids and gases can happen quickly or over time. In this experiment, you will observe a quick phase change as water rapidly goes from a liquid state to a solid state!

MATERIALS

- Plastic water bottles (1–3, disposable or reusable)
- Plastic tray or baking sheet (to catch water)
- Ceramic bowl (glass can work, but it won't work as well)
- Ice cubes (2–3)
- Food dye (optional)
- Ceramic plate (optional)

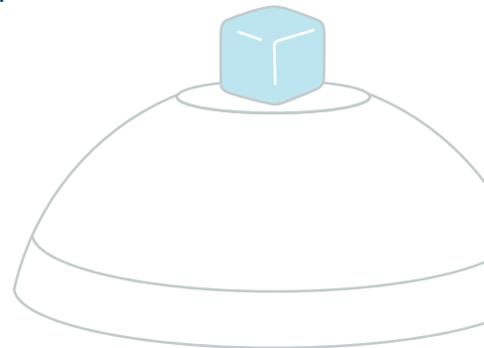


PROCEDURE

- Fill 1–3 water bottles with water and place in the freezer for about two hours. It is great to set a timer so you do not forget and over freeze the water! It is best if you can lay the bottles on their side and try not to dent them if using disposable bottles.

Tip: 1 water bottle may be sufficient, but having a couple extras will save you the two hour freeze time if you want to repeat the experiment or try one of the extension activities.

- While your bottles are freezing, set up your experiment station. Place your plastic tray down and put your bowl face down on top of the tray so that it looks like a dome. The tray is there to catch excess water later.
- Once your timer is up, remove one of your bottles from the freezer right before the water actually freezes. You will know it is at the correct state for this experiment if ice crystals form when you very gently shake the bottles. If this isn't the case, you may need to leave the bottle in the freezer a bit longer. Leave the other bottles in the freezer for now if you'd like to try this experiment multiple times. Make sure they don't freeze completely.
- Place an ice cube on top of the bowl.
- Pour the water SLOWLY over the ice and watch your instant ice form. If you're not noticing results, try leaving the water bottle in the freezer a bit longer, or swap out for one of the extra water bottles that has remained in the freezer.
- What do you notice about the water as you pour over the ice? What do you notice about the original ice cube? Which states of matter (liquid, solid and gas) are you observing?



Experiment continued on next page...



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EXPLORE MORE

- Add food dye to the water before placing in the freezer and repeat the experiment. Does it change the results of your experiment?
- Try freezing the water for different amounts of time and observe how the results change. Record your observations in your science notebook.
- Try doing this again on a ceramic/glass plate instead of a bowl. Can you make a castle or other unique shapes?

WHAT'S HAPPENING?

Matter is everywhere. It is anything that takes up space and can exist in different states, or phases. The matter that water is made up of has 3 phases that we can observe: gas, liquid, and solid. Water in its common form, such as in a river or lake, is a liquid. Water in the form of a gas is known as steam. Water in the form of a solid is called ice. Matter can change between these 3 phases quickly, or slowly.



gas



liquid



solid

As you bring the water temperature down by placing it in the freezer, the water molecules slow down so much they begin to harden into ice crystals. In the first step of liquid water becoming solid ice, the water molecules start arranging themselves into ice crystals, then attach to impurities such as a scratch in the bottle or a speck of dust. Once ice crystals are able to form, we speed up their production by pouring the very cold water onto ice cubes, which are pre-formed ice crystals.

Experiment continued on next page...



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K-2 EXPLORATION

- How high do you think you can pour your tower before it cracks?
- Do you think it would work if you poured the water quickly? Try it out. Then try again pouring slowly. What did you notice?
- Do you think this would work with a different liquid such as milk, sugary water, or salty water? Repeat the experiment with a different liquid to find out.



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3–5 EXPLORATION

Explore the following questions and write your observations in your science notebook.

- Would the results have been the same if you had started with hot water in the bottles before you put them in the freezer for two hours?
- Do you think if the room were warmer or cooler that it would affect the ice tower process? Repeat the experiment outdoors on a particularly hot or cold day to find out.
- Do you think it's possible to use this method to build structures? If you have time, try it out! What shapes can you make with instant ice towers?
- Do you think this would work with a different liquid such as milk, sugary water, or salty water? Repeat the experiment with a different liquid to find out.



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GRADE 6–8 EXPLORATION

Explore the following questions and write your observations in your science notebook.

- Would this experiment work if you poured the water directly onto the bowl instead of ice cubes? What if the bowl was frozen first? Make a prediction of what will happen, then try out these variations of the experiment.
- What if you tried this with salt water? Would the freezing point change and would you need to keep the water cooler for longer or shorter? Write down your predictions, then test it out and make observations of the salt water at different times.
- Do you think it's possible to use this method to build structures? If you have time, try it out! What shapes can you make with instant ice towers?



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