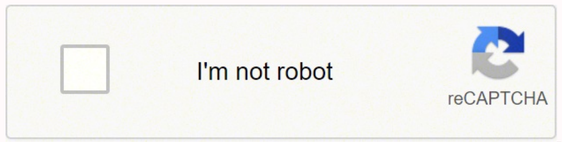

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What's the density of water and ice

Skip to main content Official websites use .gov A .gov website belongs to an official government organization in the United States. Secure .gov websites use HTTPS A lock () or https:// means you've safely connected to the .gov website. Share sensitive information only on official, secure websites. Utroja0/Pixabay How many people a gallon of ice cream serves depends on how much each person eats. If each person eats 1 cup, the gallon will serve 16 people because there are 16 cups in a gallon. If a person eats half a cup, approximately the amount in the average scoop of ice cream, the gallon will serve 32 people. If each person eats three scoops of ice cream, the gallon will serve 10 people with one cup leftover. Many ice cream containers have a recommended serving size listed alongside the nutritional information, although some people may eat more or less than that amount, based on their appetites, ages, number of toppings, if the ice cream is in a cone or served with pie or cake, and other factors. Ice cream is widely available in the United States. Find it in the frozen section at most grocery stores, convenience stores, and anywhere else that sells food. It's also typically available in both fast-food and sit-down restaurants. Some shops and restaurants specialize in ice cream like Dairy Queen, Baskin-Robbins, Cold Stone Creamery, and Bruster's. Some people choose to make their own ice cream at home by purchasing an ice cream maker. Where to Buy Ice Cream Where Did Ice Cream Come FromThe exact origin of ice cream isn't clear, but history suggests that it began with an affinity for icy beverages. Historical figures like King Solomon, Alexander the Great, and Nero Claudius Caesar allegedly enjoyed eating snow flavored with everything from honey to fruit juices. Noble members of the Tang Dynasty enjoyed a frozen snack that included milk and camphor, according to PBS. Throughout medieval times, aristocrats in Europe adapted an icy drink known as sherbet from the Middle East. By the 17th century, a Naples man named Antonio Latini created a sorbet containing milk that many consider the first official ice cream. Ice Cream in the United States Ice cream in the United States dates back to the arrival of European settlers in the 1700s. The first ice cream parlor in the New World opened in 1790 in New York, but it remained a treat for prominent citizens for years. Former presidents, including George Washington, Thomas Jefferson, and Abraham Lincoln all enjoyed ice cream. When ice houses were invented, ice cream became a more mainstream treat sold mostly through soda fountains and ice cream parlors. During World War II, it was a popular treat for the troops. After the war, it became even more mainstream as it was mass-produced and sold in grocery stores. What Is in Ice CreamNot all ice cream has the same ingredients, but cream and sugar are the basic foundation for traditional ice cream. The U.S. requires that any ice cream sold has at least 10% milkfat. The higher the milkfat, the smoother the ice cream is. Many commercially sold ice creams contain stabilizers to improve texture, and some may include sugar substitutes to lower the sugar content. Finally, ingredients, ranging from vanilla to fruit are added to change the ice cream's flavor. How to Make Ice Cream Ingredients are mixed and added to a freezer, but the work doesn't end there when making ice cream. Constant churning prevents the mixture from turning into ice by adding air to create the familiar ice cream texture. When the ice cream is finished, it should be stored in a freezer in an airtight container. Variations on Ice Cream These days there are many variations on traditional ice cream. Soft serve is churned more frequently and kept at lower temperatures while frozen custard ice cream contains egg yolks. Frozen yogurt is yogurt that is churned like ice cream, and gelato is denser and contains more milk than cream. Other Interesting Facts About Ice Cream More ice cream is produced and eaten in the U.S. than any other country in the world, and California produces more than any other state. The average household eats 48 pints per year, and plain vanilla is the most popular flavor. Chocolate syrup is the most popular topping. The first known ice cream cone was sold in 1904 at the World's Fair in St. Louis, Missouri. More ice cream is sold on Sunday than any other day of the week, which is ironic considering that years ago when soda fountains first opened, enjoying an ice cream soda on Sunday was frowned upon. MORE FROM REFERENCE.COM If you're seeing this message, it means we're having trouble loading external resources on our website. If you're behind a web filter, please make sure that the domains *.kastatic.org and *.kasandbox.org are unblocked. Something went wrong. Wait a moment and try again. Troubleshooting problems with an ice machine is often a task that you can handle on your own without calling in a professional. There are several common problems that affect ice machines regardless if you have a Manitowoc USA or Kenmore ice machine. Follow these steps for troubleshooting common problems.Ice Machine Doesn't Make IceOne of the biggest signs that your ice machine isn't working is that it has stopped making ice. First, check to make sure that the control arm is in the proper position. This arm pauses the ice machine when the bin is full, but it can get stuck or accidentally knocked out of position. If the control arm is fine, make sure that the water line isn't clogged or frozen. Next, check the filter to see that it is clean and free of debris. Consult your Manitowoc ice machine manual or the manual for the make and model you have for detailed instructions.Ice Machine Is FrozenAnother common problem with ice machines is that it gets frozen. It is making ice fine one day and, the next day, it's a solid block of ice. You'll have to defrost the ice machine completely to get it working again. Start by unplugging the refrigerator or ice machine if it is a standalone appliance. Remove all of the ice from the bin and place it in the sink. Use a hair dryer to defrost any ice buildup around the water intake hose and surrounding mechanism. Use towels to clean up the water as you go to reduce the risk of shock. Adjust the temperature on the thermostat to a higher level. Plug the machine back in.Ice Machine Leaks WaterA puddle on the floor around your ice machine is usually a sign that it's not sitting perfectly level. Use a level to make sure that it's not higher on one side than the other. Next, check the water supply line to make sure that it's not damaged or loose. Order a new part if it has a hole or crack in it. Lastly, check the fill cup to see if it's aligned correctly. Address any leaking issues immediately, even if it's just a small drip. Water on the floor can quickly cause damage to floors and walls.Ice Machine Won't Turn OffIf the ice machine won't turn off and continues to make ice even when the bin is full, then there's a problem with the control arm or bail wire. Start by removing it and cleaning it thoroughly, then reinstalling it. If the problem persists, replace the part completely.Ice Maker Doesn't Eject IceIf your Manitowoc ice machine or other model has a dispenser that isn't ejecting ice, there's a problem with the motor assembly. You'll need to order a replacement part and follow the instructions for your make and model for replacing it on your make and model ice machine. If the dispenser sounds like it's working but no ice comes out, then the dispenser itself may be clogged. Check to make sure nothing fell into the dispenser or that it's not blocked by a large block of ice. MORE FROM QUESTIONSANSWERED.NET Invite the children to think about what they have learned about ice and water. What state of water is ice? A solid. What has to happen to turn water into ice? It has to freeze. At what temperature does water turn into ice? 32°F or 0°C. Can they think of any examples in their lives when they make ice from water? Some children may share that they have made ice cubes or popsicles in their freezers. What else do they know from their experiences about ice and water? Some children may observe that the ice "grows" or expands in the ice cube tray. Share with the children that you will now freeze one of each group's cups of water overnight or until you see them the next time. What do they think will happen? Why did they cover the cups with the foil? This prevents another state change — the change of liquid water into water vapor through the process of evaporation! Have the children record their ideas and information from their experiments in their Ice Investigator Journals. Facilitator's Note: If you wish, you can extend this activity to examine the process of evaporation by having the children use three cups instead of two. They should prepare the third cup as they have the other two, but leave it uncovered. After a period of time of a few days, they will find that the level of water goes down. Some of the water has evaporated, or changed from liquid to water vapor. Share with the children that there is a difference in density between ice and water. In their experiment, the children had the same amount of material in both cups — the same amount of water - but when they froze the water, the volume changed. The amount of water was "stretched" to make a larger volume of ice. What would the children have had to do to get the ice to fill the cup only to the line when the water froze? Add less water! Ice is less dense than water. If you had the same volume of ice, or ice that only went to the line on the cup, it would contain less material (water) than water of the same volume. Facilitator's Note: Density is mass per unit volume, or the ratio of the amount of matter in an object compared to its volume, or simply put: Mass = the amount of "stuff" Weight = how heavy the "stuff"is (Weight is determined by the amount of gravitational pull on an object, which is a property of the mass of the planet the "stuff" is on. The greater the gravitational pull, the more the "stuff" weighs.) Density = how tightly packed the "stuff" is Volume = the area of space the "stuff" takes up If we apply this information to the cups, the cup of water and the cup of ice have the same mass, i.e. amount of "stuff." Because they had the same amount of "stuff," they have the same weight. The "stuff" (molecules) in water is more tightly packed than in ice, so water has greater density than ice. Don't let the fact that ice is a solid fool you! As water freezes it expands. So, ice has more volume (it takes up more space, but has less density) than water. Share with the children that this is a very special property of water. As most substances get colder, their material (molecules) scrunch closer and closer together, like penguins snuggled together to keep warm. Water molecules, however, don't like to scrunch. They spread out like acrobats in formation to form ice crystals like we see in snowflakes and frost. Facilitator's Note: Water molecules in the liquid state like hanging out together as droplets, but in the solid (frozen) state, they need their space. A water molecule is similar in outline to Mickey Mouse, with two hydrogen atoms placed on one end of an oxygen atom. The oxygen atoms are positively charged and hydrogen atoms negatively charged, so water molecules stick to each other like tiny magnets. The hydrogen "ears" make loose bonds, called hydrogen bonds, with the oxygen "faces" of other water molecules. Each molecule of water is made of two hydrogen atoms (white) and one oxygen atom (red). The hydrogen atoms are not placed on opposite sides of the oxygen atom; they occur at one end. Image modified from: H2O_(water_molecule).jpg. In ice crystals, their hydrogen bonds link them together like acrobats, stacked one on top of the other, with their arms and legs outstretched. This provides more space between the molecules in the crystal structure of ice than the molecules of liquid water. As a result, ice is less dense than the liquid form. Water is the only known non-metallic substance that expands when it freezes; its density decreases and it expands approximately 9% by volume.

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