

# Water

## Academic Content Standards

- Learn that water can exist in three states.
- Observe that water freezes to ice when cooled and ice melts to water when heated, as well as recognize the difference between ice and water.
- Observe the weight and volume changes in water when it freezes and melts.
- Observe what happens when water evaporates and find examples of evaporation of water in our daily life.
- Observe what happens when water boils and steam condenses and find examples of this phenomenon in our daily life.
- Explain the water cycle.



Name: \_\_\_\_\_

Student Number: \_\_\_\_\_

Homeroom: \_\_\_\_\_



# What happens to the size and weight of water as it becomes ice?



Write and/or draw pictures to show what you already know about this question.



1. Fill a plastic cup almost to the top with water. Use a pen to mark the point it reaches. Measure its weight.
2. Put aluminum foil on top of the cup like a lid. Put it in the freezer and wait for it to freeze.
3. After it freezes, take it out. Has it gotten bigger or smaller? How much does it weigh now?
4. Now wait for it to melt into water again. Check the size and weight again.



Take notes of what you saw. Draw pictures to help show your observations.

	Water Sample Stage	Weight (g)	Size
1	Original Water		
2	Frozen Water (Ice)		



Share Your Results.

Discuss your ideas and findings with your classmates. Were there any interesting observations?



Water is a liquid when the temperature is above  $0^{\circ}\text{C}$  and below  $100^{\circ}\text{C}$ . When water is a liquid, it means it has a definite volume, but it flows and changes shape to fill its container. The particles, or things that make up water, are fairly close together.

Below  $0^{\circ}\text{C}$ , water freezes and becomes ice. Ice is the solid form of water. This means that it has a definite volume and shape. Usually when a substance becomes a solid, the size gets smaller, but the particles in ice spread out more so its size becomes larger. This is why they say you should not freeze drinks in glass containers, because the ice will expand, or get bigger, and crack the glass.

Even though the size (volume) of liquid water and frozen water is different, if you weighed the liquid beforehand, you should find that it has the same weight as when it becomes ice. However, since the particles that make up the ice are further apart, it is less dense than water, so it will float.

If you leave the ice in temperatures above  $0^{\circ}\text{C}$ , the ice will begin to melt and become a liquid again. The hotter the temperature, the faster the ice will melt. Its volume, or size, becomes smaller, but if you weigh it again, it should still weigh the same amount.

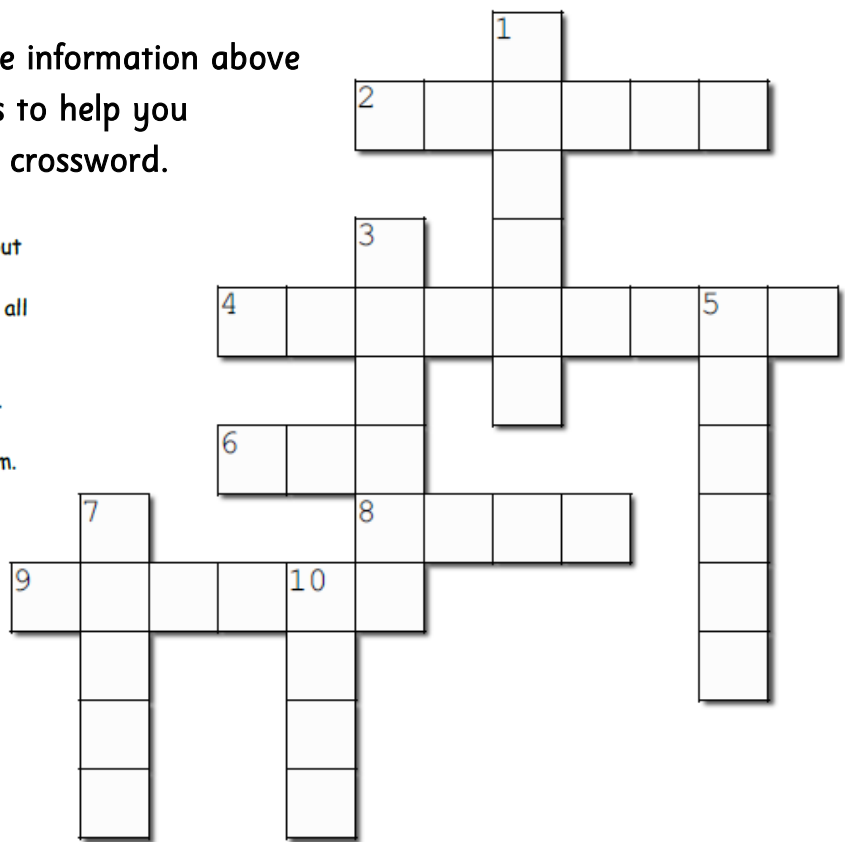
Use the information above  
and the clues to help you  
complete the crossword.

**Across**

- The volume will change when water freezes, but the \_\_\_\_\_ will stay the same.
- The very small things that make up water and all other things.
- This is what we call frozen water.
- The temperature at which water becomes ice.  
(Write the word)
- The \_\_\_\_\_ of ice is bigger than its liquid form.

**Down**

- This has a definite volume, but its shape changes to fill its container.
- When you put water in a cold place, it will \_\_\_\_\_.
- Water will \_\_\_\_\_ when it becomes ice.
- This has a definite volume and shape.
- If you leave ice in temperatures above  $0$  degrees Celsius, it will start to \_\_\_\_\_.



What happens to the size and weight of water as it becomes ice?

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# What happens when you heat up water?



Write and/or draw pictures to show what you already know about this question.



## Part 1

1. Pour some water on two shallow plates. Mark a line just above the water. Leave one in a sunny place. Leave the other in a shady place. Check them every few days.

## Part 2

2. Fill a beaker  $\frac{3}{4}$  full of water. Use a pen to mark the point it reaches.
3. Put the beaker on a heat source and watch what happens.
4. After a few minutes, turn the heat source off and look at the line you made before.

DON'T TOUCH THE BEAKER AFTER IT HAS BEEN ON THE HEAT SOURCE. IT WILL BE VERY HOT!



Take notes of what you saw. Draw pictures to help show your observations.



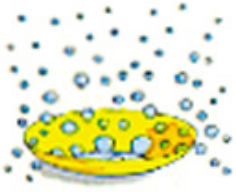
Share Your Results.

Discuss your ideas and findings with your classmates. Were there any interesting observations?



Water is a liquid between the temperatures of 0°C and 100°C. Water freezes and becomes a solid below 0°C. This solid is called ice.

How can you turn water into a gas? A gas has no definite volume, and it quickly spreads out to fill its container.



Water starts to boil at 100°C. You should see bubbles in the water when it reaches this temperature. This is because the water is turning into a gas and the particles that make up the water have a lot of energy. The gas form of water is called water vapor. Since the water vapor is hot, it is very light and will rise into the air.

After it rains, there are often puddles left on the ground. Have you ever wondered where this water goes? Some soaks into the ground, but some evaporates. Evaporation means that the liquid water turns into a gas, called water vapor. Even though the temperature has not reached 100°C, some particles in the water gain enough energy to turn into a gas. It can be a slow process, but sunny conditions help it happen faster. This is why your clothes dry quickly on a hot, sunny day too!

Use the information above and the clues to help you complete the wordsearch.

1. This is a very common liquid.
2. This is what we call solid water.
3. Water \_\_\_\_ is water in its gaseous form.
4. Water \_\_\_\_ at 100°C.
5. Water particles that turn into a gas have a lot of \_\_\_\_.
6. This is the process of water turning into a gas.
7. Water vapor is \_\_\_\_ and rises into the air.
8. These form on the ground after it rains, but they quickly disappear too.
9. BONUS: Can you find the 3 states of matter?

F Z E F S F A A X E G U J K Z P D G E G  
 T Y P B M J F T B L C A F X W F Q V H I  
 P H G J F K Y Z U A V M B N V Z L P G O  
 X U E J H K W K D A F S Z H C Z A R Q W  
 E F V C M N S I P Q K F I I P F G B J Z  
 G F R X W Q C C F Q N U I P D I V B Y A  
 H S E Z X J P E M Z E C X X E V M F Q E  
 P J T F Y E Q M G B K M S N Z S E C O M  
 E V A P O R A T I O N L G A B U L Q J N  
 B C W A V N S Q Q F T I C V B M I Q E T  
 R M M D C Z W D I L O S X O O P Q W N S  
 W O T R F D H P C I G T H G I L U F E B  
 Z F P T O X T X J L B J E W L P I L R F  
 E A U A I Y Z L A U P O R J S M D V G S  
 F F L Y V B H C Y F R B I K N D D P Y M  
 M N J K G F Y F B F Z W Z X U X Q I G W  
 P Q K Z Q H Q M V F R N V P L J S L A B  
 C X A H N T S H G P A J C O Y A B F G Z  
 A B C R G Y X N M D M H S H G V Q Y B T  
 C W H U P D E X Z X Y K N O J Q X I Q R



What happens when you heat up water?

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# What happens to the water vapor in the air?



Write and/or draw pictures to show what you already know about this question.



1. Put warm water in a bowl to a depth of about 5cm. Add 10 drops of food coloring and 3 teaspoons of salt. Mix it well.
2. Put a heavy glass in the center of the bowl.
3. Put a loose covering of plastic cling wrap on top of the bowl so that air can't go in or out.
4. Put a heavy magnet in the center of the cling wrap.
5. Put the bowl on a flat surface in a warm place and leave it there for about 30 minutes. Do you notice anything on the cling wrap? What about in the glass cup?



Take notes of what you saw. Draw pictures to help show your observations.



Share Your Results.

Discuss your ideas and findings with your classmates. Were there any interesting observations?



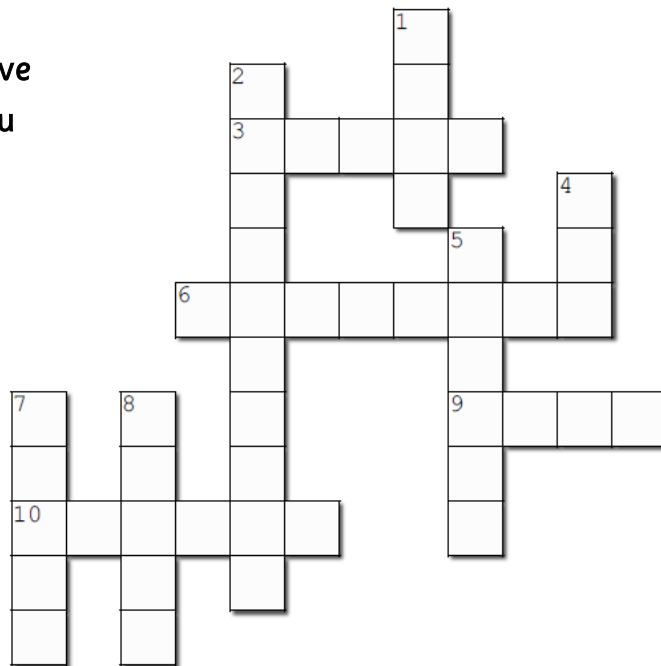


There is so much water on Earth! The oceans are full of it. However, we learnt that water evaporates, which means that water turns into a gas called water vapor and rises into the air. If this keeps happening, why do we still have water on Earth?

Water stays as a gas when its particles have a lot of energy. They have lots of energy when they are hot. However, when the water vapor rises high into the sky, it starts to get cooler. The water particles start to lose their energy and they condense. This means that the water vapor changes back into a liquid. When lots of liquid joins together, it forms a cloud. Eventually, the cloud gets too heavy, and the water falls back to the ground as rain. If it is really cold in the sky, the water could turn into ice and fall down as hail or snow.

The process of water evaporating, becoming tiny droplets of water in the air, and falling back to the ground again is called the water cycle.

Use the information above and the clues to help you complete the crossword.



**Across**

- 3. Water \_\_\_ is what we call water when it's a gas.
- 6. Water vapor will \_\_\_ back into water in the air.
- 9. This falls to the ground when a cloud gets too heavy.
- 10. The higher the water vapor goes, the \_\_\_ it becomes.

**Down**

- 1. This falls from the sky when it is very cold.
- 2. Water does this when it changes from a liquid into a gas.
- 4. Water will become this if it is very cold.
- 5. The particles in water lose their \_\_\_ when they get cooler.
- 7. The process of water evaporating, condensing, and falling back to the ground in called the water \_\_\_.
- 8. This is made when lots of water droplets join together in the sky.



What happens to the water vapor in the air?

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# What is the water cycle?



Write and/or draw pictures to show what you already know about this question.



1. Cut a pet bottle into two parts. In the bottom part, add a thin row of rocks. On top of that, add some charcoal. On top of that, add some shells. Then put in some soil and plants.
2. Give the leaves a quick spray with water. Then tape the top part of the bottle back on. Make sure it is airtight. You have just made an ecosystem that will allow you to see the water cycle in action!



Take notes of what you saw. Draw pictures to help show your observations.



Share Your Results.

Discuss your ideas and findings with your classmates. Were there any interesting observations?





The Earth's water is continually being recycled between the Earth, the atmosphere (air), and living things. This is called the water cycle.

The water in the oceans, rivers, and lakes evaporates. This means it turns into a gas and rises into the air. This gas is called water vapor. Water vapor also comes from the leaves of plants. This is called transpiration. All this water vapor rises into the air.



As the water vapor rises into the air, it becomes cooler and turns back into liquid water. This is called condensation. The liquid water joins with dust in the sky to make clouds.

As more water vapor condenses, the water in the clouds become too heavy. The water then falls back to the Earth as rain, hail, or snow. This is called precipitation. This process keeps going:



Create a poster that shows the water cycle. You can practice below. Get your teacher to check and approve it before doing your good copy.



What is the water cycle?

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# Main Ideas – Review Questions



After completing this unit, you should be able to answer these questions. Write your answers in complete sentences.

1) What happens to the size and weight of water as it becomes ice?

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2) What happens when you heat water up?

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3) What happens to the water vapor in the air?

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4) What is the water cycle? Please draw and label a picture.

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