



TITANIC

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Learning Objective:

To investigate what an iceberg is and why they float.



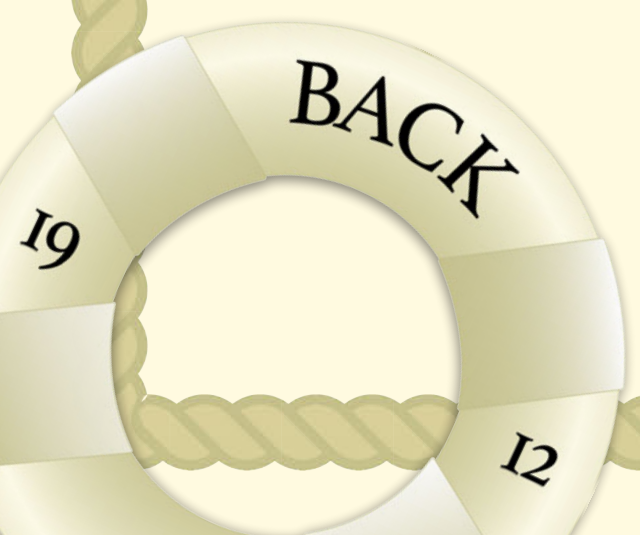
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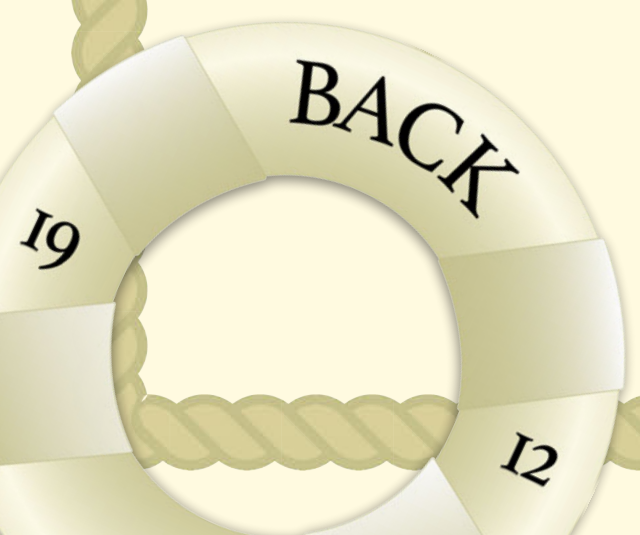
How is ice made?
Can you include some
scientific vocabulary
in your explanation?



Ice is the solid form of water. It is made when the water freezes as it cools down.



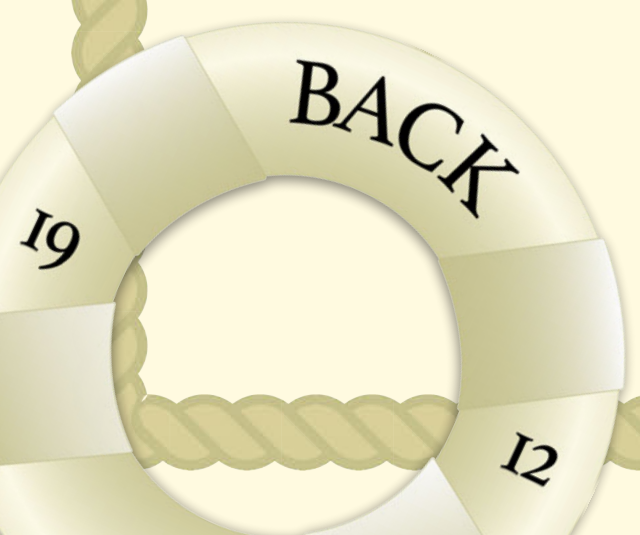
When a liquid reaches a certain temperature and begins to freeze, it is called a freezing point. What is the freezing point of water?



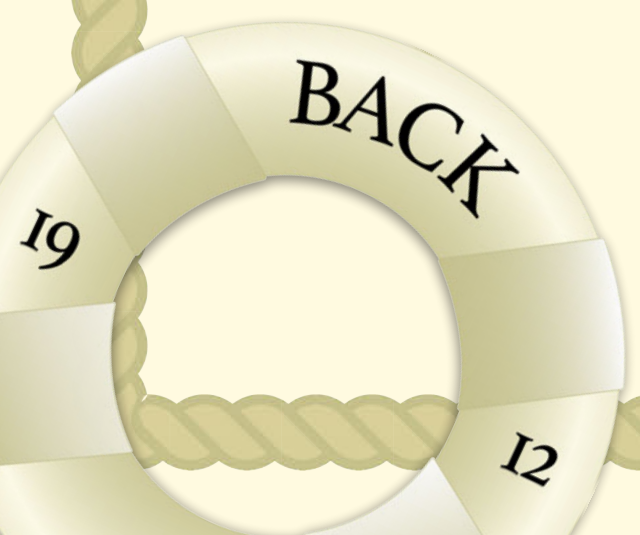
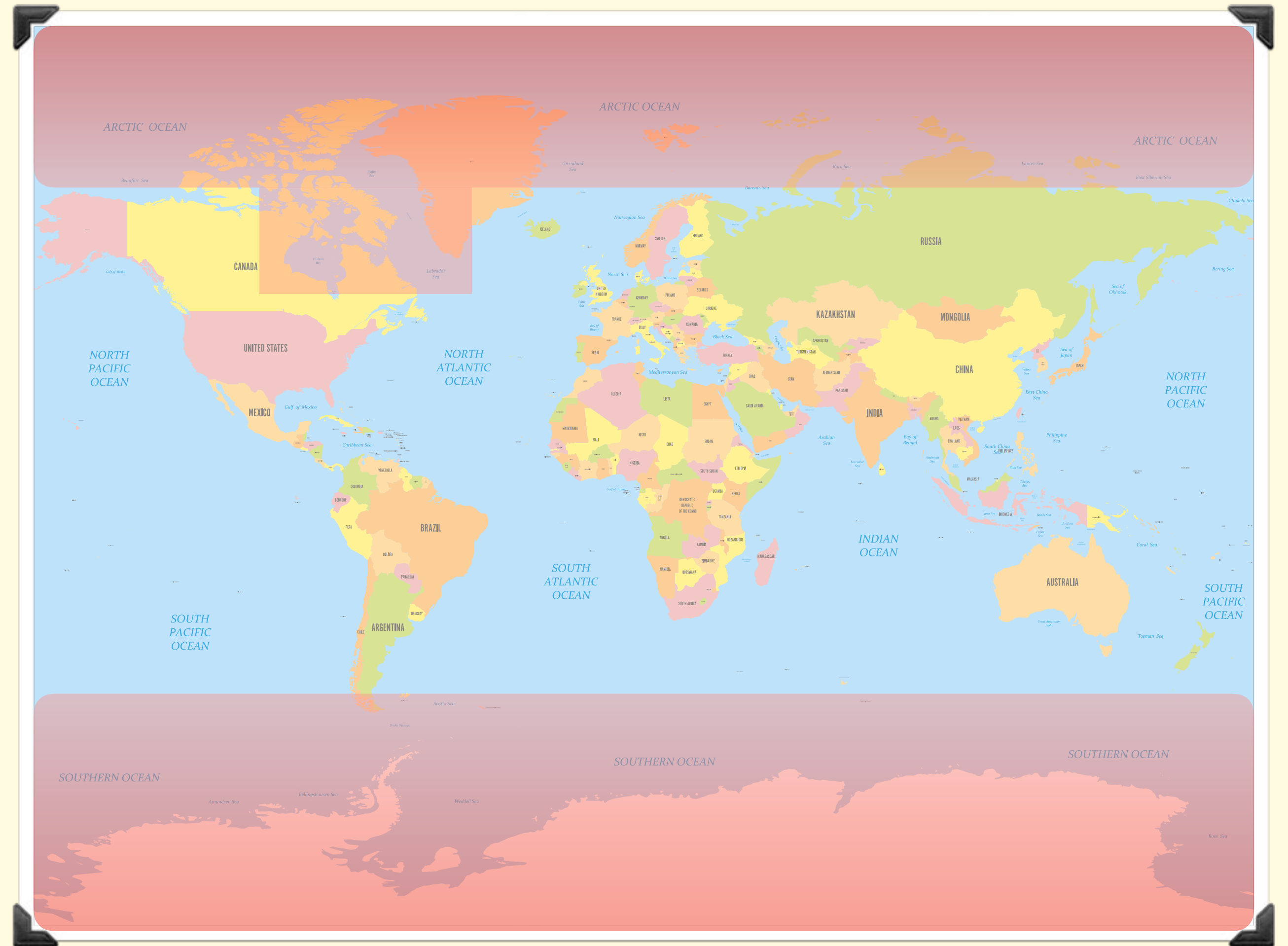
So where do icebergs come from? There isn't a giant freezer in the Arctic making them, so how do they end up in the ocean?

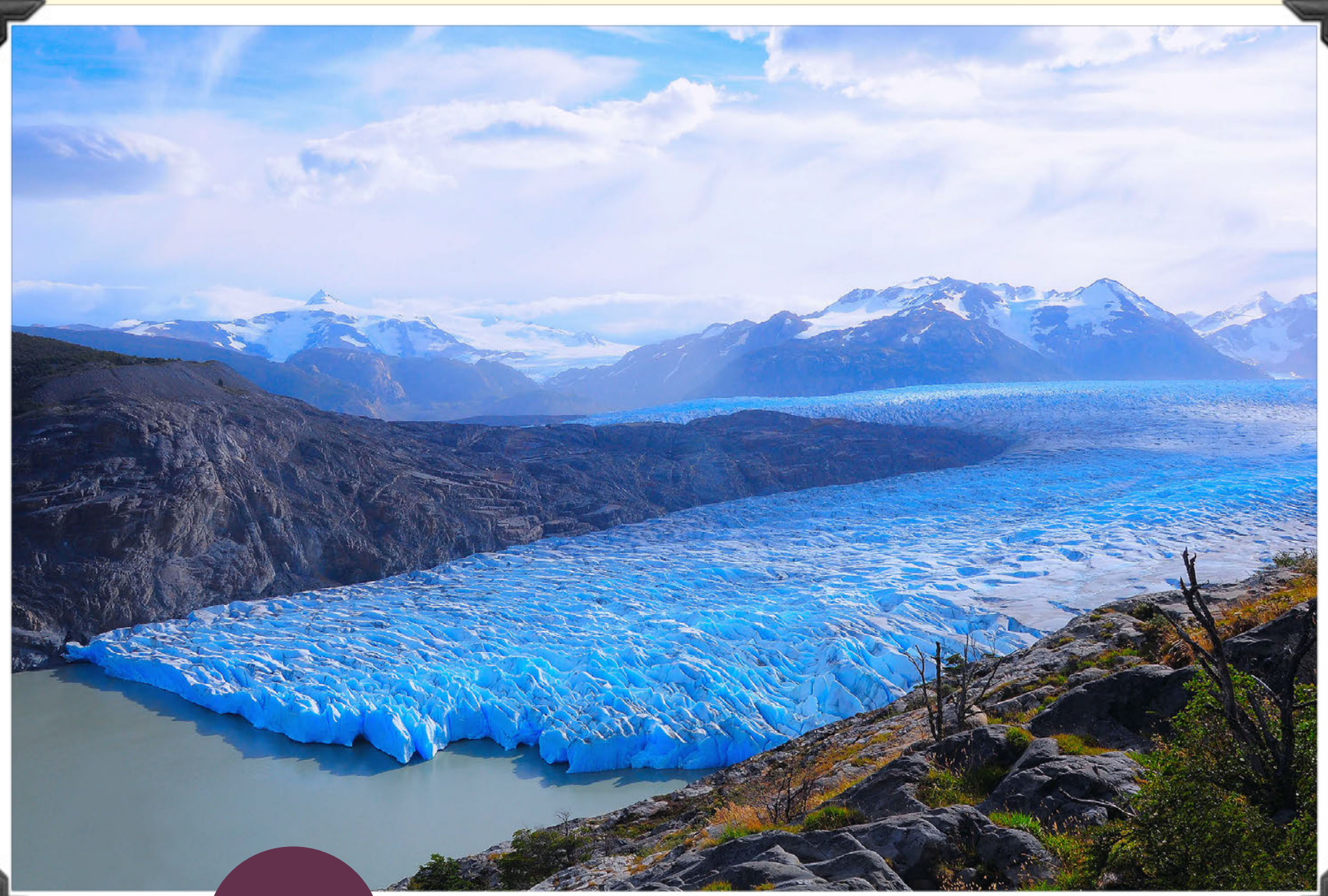


Where do you think icebergs would be commonly found?



Icebergs are found where the temperatures are very cold at the poles of the planet in Antarctica, the Arctic or in the North Atlantic. Temperatures here can reach below -50°C !





Icebergs are usually formed when bits break off (calve) from a glacier when it meets the sea or from huge shelves of ice on the sea's surface.

The icebergs are moved by the ocean's currents, which is how the iceberg which damaged the Titanic ended up in her path.



Glaciers are made of snow which gets compacted into solid ice by the weight of snow which falls on top of it. They move slowly downhill under their own weight (a bit like a very slow river) and can carve huge valleys out of the ground beneath them. Over 10% of the Earth's surface is covered in different types of glaciers.





When you put ice cubes in water, they float. The same thing happens with icebergs on the sea.



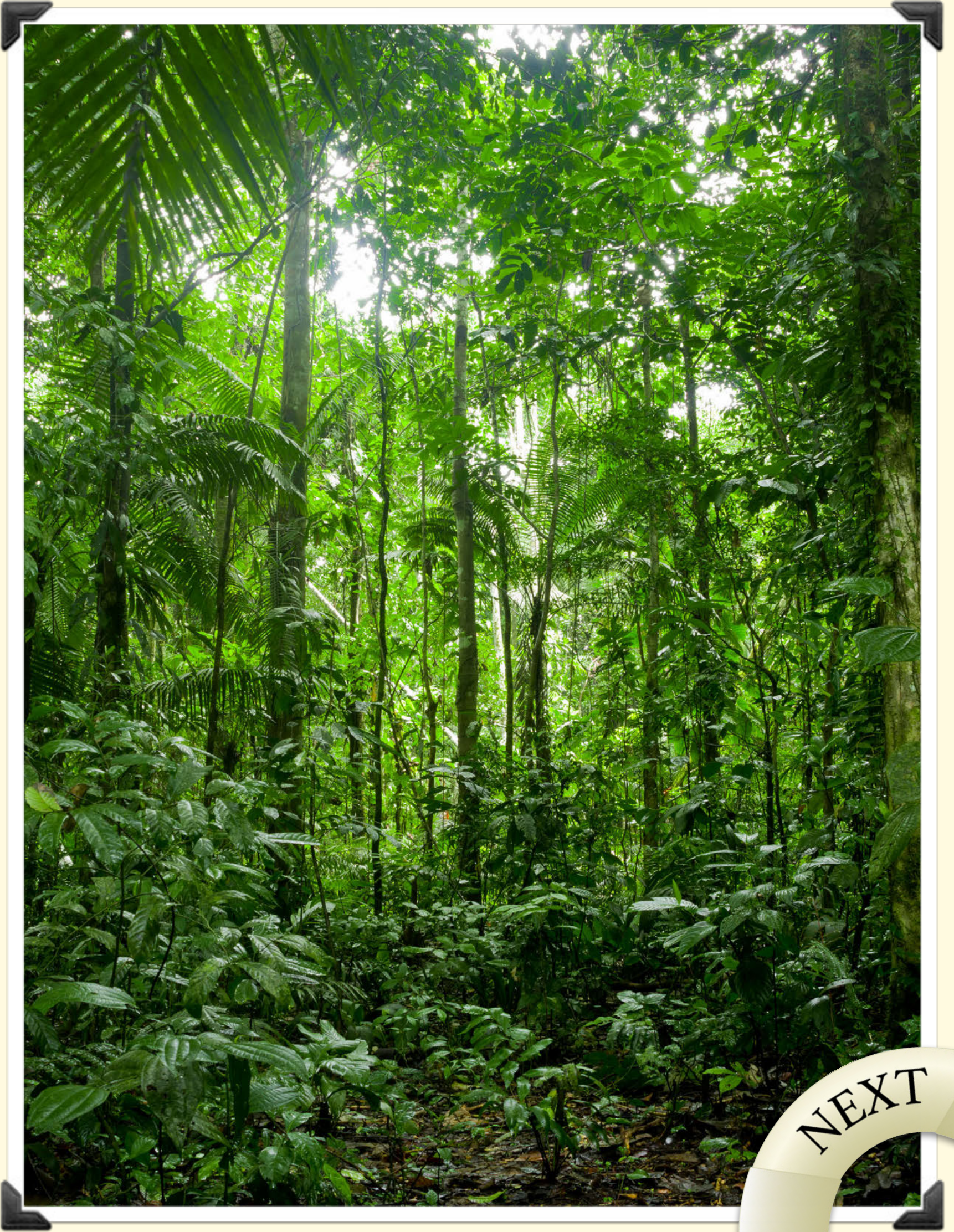
Why does this happen? The ice and the water are made of the same thing, so why does ice float in water?

Ice floats because it has a lower **density** than the water that it is in.



The **density** of an object is determined by two things: how heavy the molecules in the object are, and how tightly packed the atoms are together.

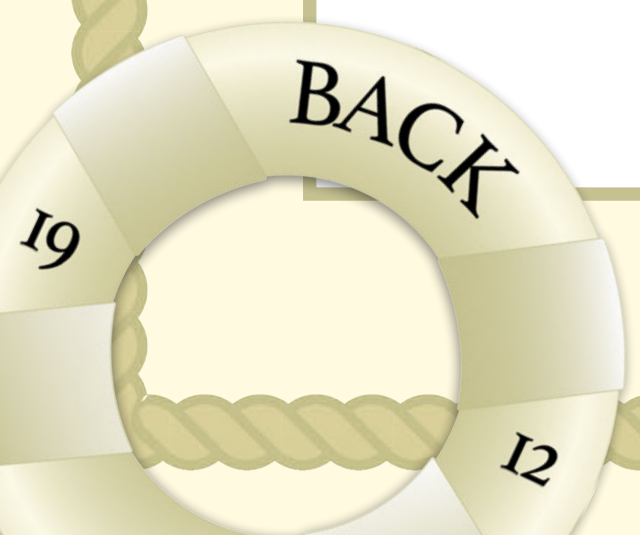
Think of a dense forest; the trees are tightly packed together like the atoms would be in an object with high density.

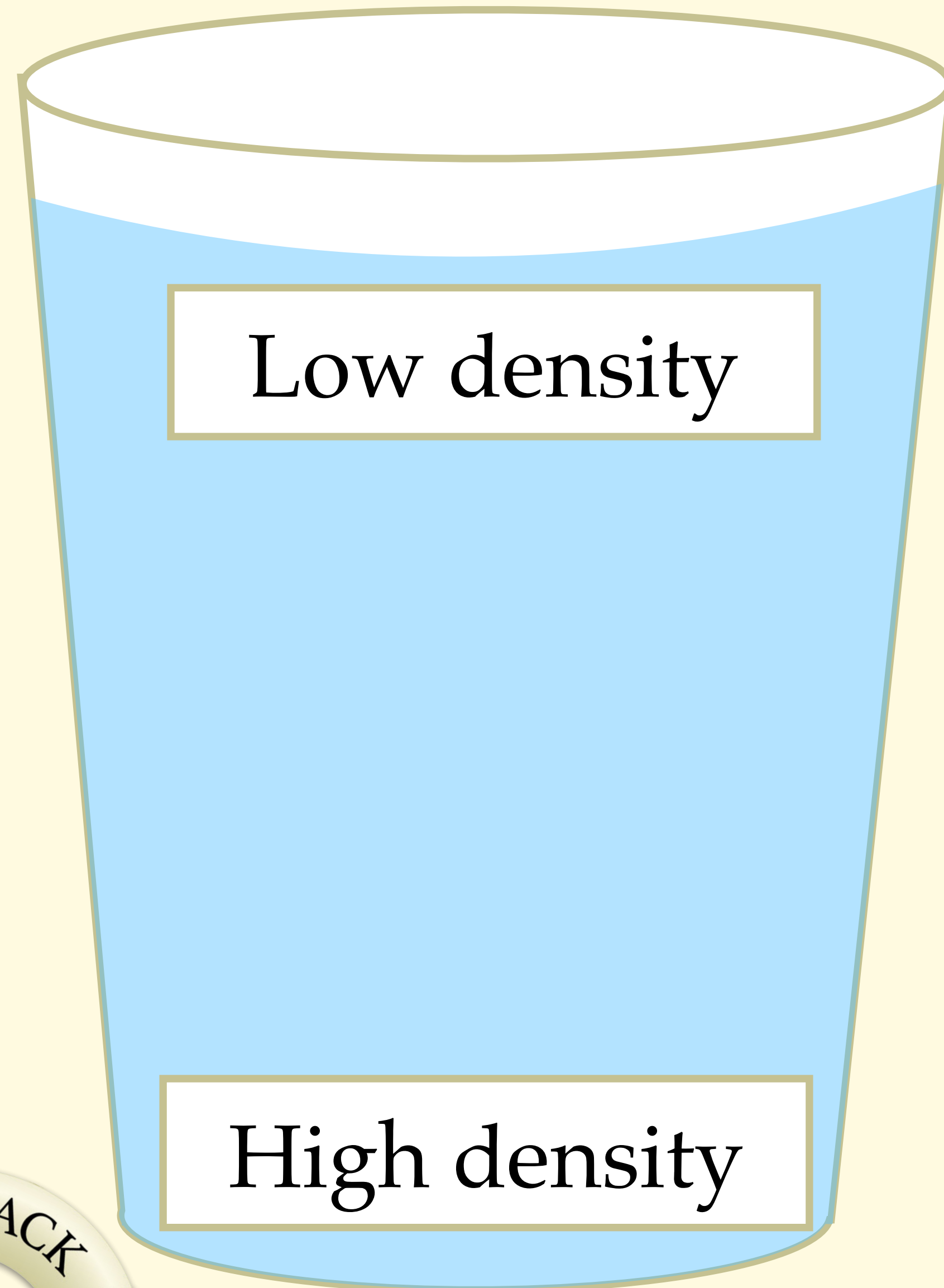


A brick has **high density** because it is made from heavy molecules. The atoms within the molecules are packed closely together.



Styrofoam is **low density**. The molecules in Styrofoam are lighter. The atoms which make the molecules are loosely packed with lots of holes and air between them.



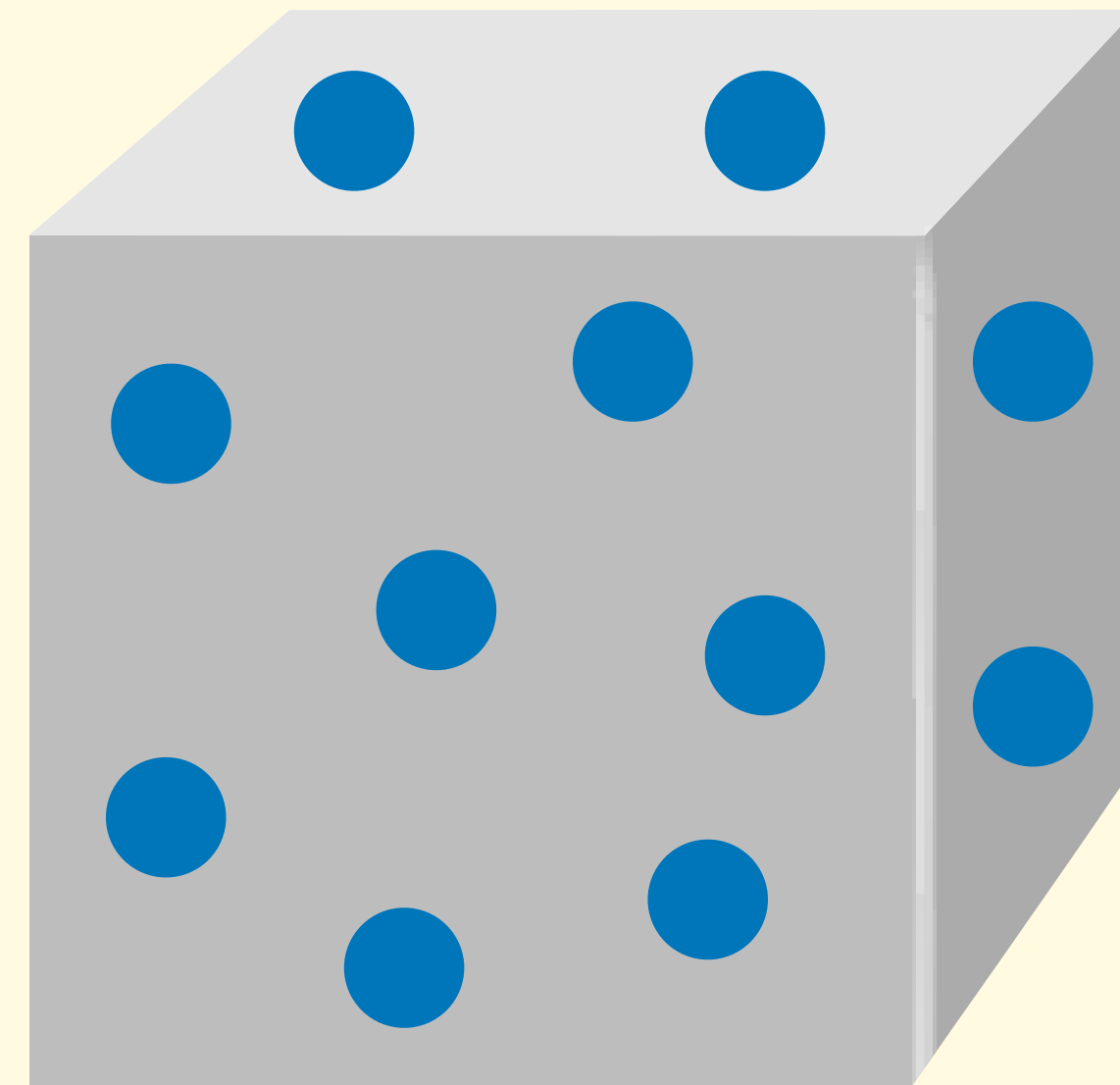
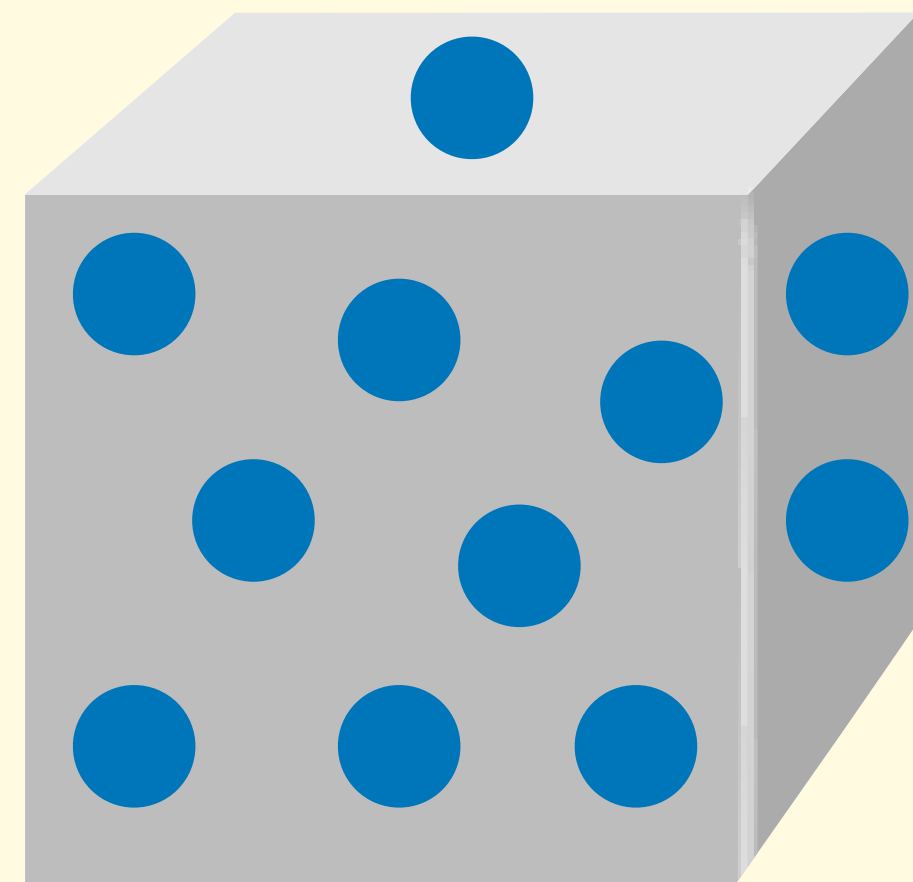


If an object's density is **higher** than the water's density, it will sink. If an object's density is lower than the water's density, it will float!

What does this tell you about the density of an ice cube?



When water freezes, it expands. This means the same amount of atoms are in a slightly larger space and not as tightly packed together.

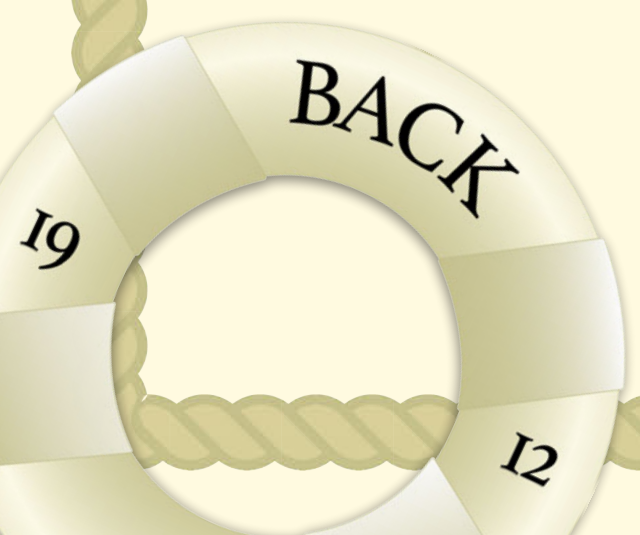



Because the atoms are not as tightly packed, the frozen ice is **less dense** than the liquid water, therefore it floats!





Icebergs also have little pockets of air trapped inside them (like the styrofoam). This makes them even less dense and helps them float.

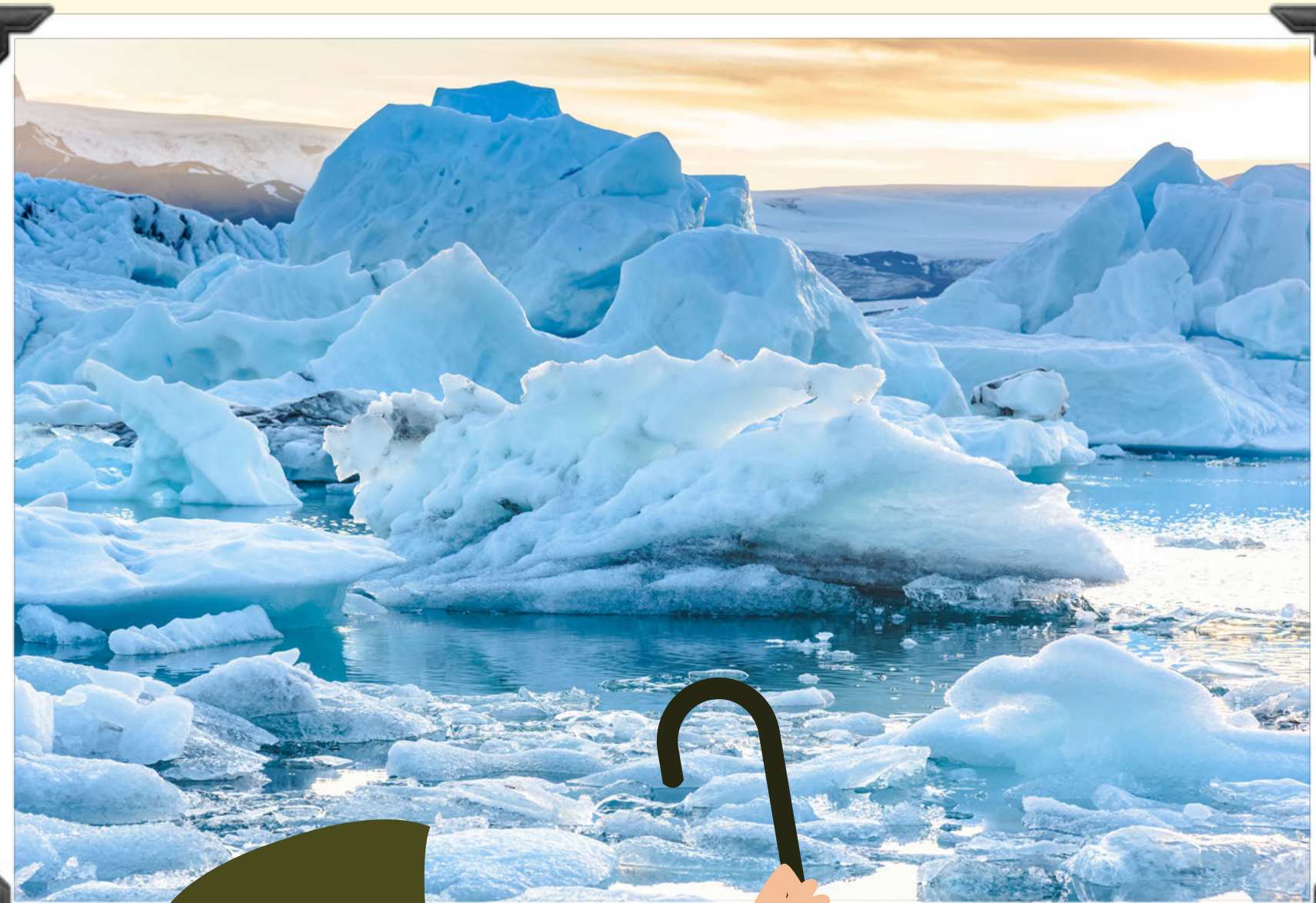


A cartoon illustration of a woman with brown, curly hair, wearing a purple dress with a white collar and puffed sleeves. She is looking upwards and to the right with a slight smile. A speech bubble tail points from her towards the text box on the right.

Another reason that icebergs float is because the water they're made from is slightly different to the seawater they're floating in.

What is the difference between the water found in the ocean and seas to the water in rain, snow, lakes, rivers and the water we drink?





Seawater has salt dissolved into it which makes a solution called salt water. Water found in rain, snow, rivers and lakes is called fresh water. It doesn't have salt dissolved in it. Icebergs are made of fresh water.

Because of the extra mass from the salt, salt water has a higher density than fresh water. If they are mixed, fresh water will rise to the surface over salt water. This is another reason that an iceberg will float in salt water.

This effect of dense seawater can be seen in the Dead Sea in Israel, Jordan and Palestine.



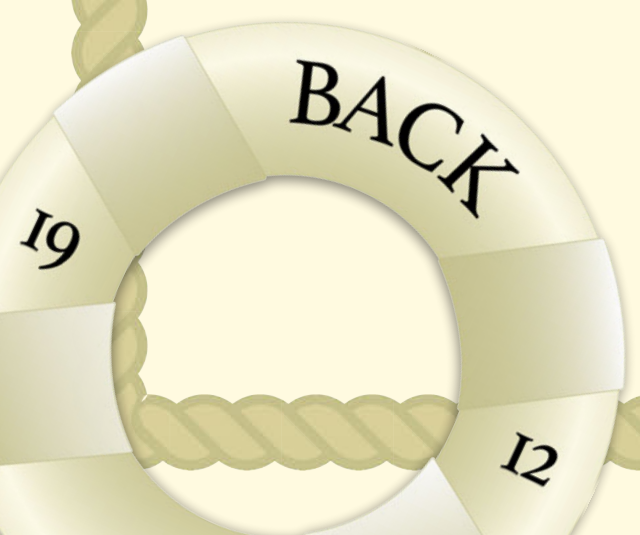
The Dead Sea is one of the saltiest bodies of water in the world and is nine times saltier than the ocean. It's so salty that plants and animals can't live there; hence the name!





Because of the high salt content, the water is much more dense than fresh water or normal seawater.

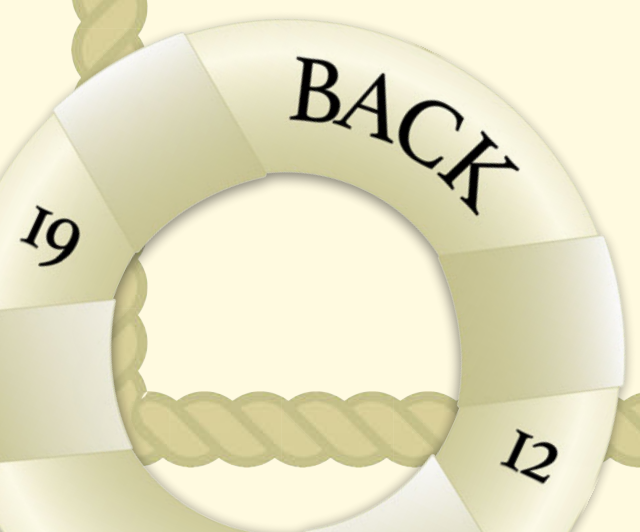
What do you think would happen if you tried to swim in the Dead Sea?





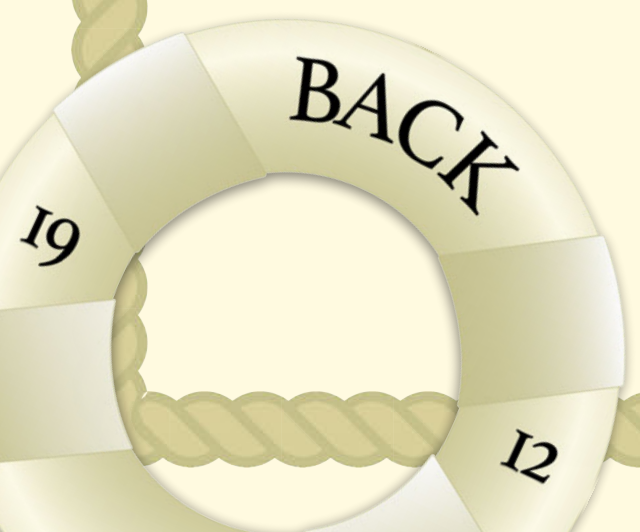
The high salt content means that a human is less dense than the water! It's more like floating than swimming.

You don't have to paddle or tread water to stay afloat. A bit like if you had a foam float underneath you!





Let's experiment
with different water
densities!



Plenary

Can you write a short paragraph to explain why icebergs float?

See if you can use some of these scientific words!



Fresh water

Mass

High density

Salt water

Air pockets

Low density

Atoms

Molecules

