Name: _____ Date: _____

Salt Squeezed Out of Freezing Seawater

Circle group

When seawater freezes, you might think you get frozen salt water. But something more interesting happens. As ice crystals form, they leave most of the salt behind. The ice is much less salty than the sea. Melted sea ice is far better to drink than seawater, but it is still not perfectly fresh.

The salt does not vanish. It collects in the liquid water between the growing crystals. This water is called brine, and it is saltier than seawater. Salt lowers the temperature at which water freezes. So the brine stays liquid even when the ice around it is cold. It is trapped in tiny channels and pockets inside the ice, like water in a sponge.

Over time, some brine drains out of the bottom of the ice. It is salty and dense, so it sinks into the sea in thin streams. In the polar oceans, this sinking water helps drive currents that carry cold water through the deep ocean.

The channels matter to living things too. Tiny algae and bacteria live in the brine. In spring, the algae grow when sunlight passes through the ice. Small animals graze on them under the ice. This feeds a food chain that reaches seals and seabirds. So sea ice is not a lifeless white sheet. It is a layered home for living things, shaped by the way salt is squeezed out.

Questions

1. What happens to most of the salt when seawater freezes?

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_____

2. What is brine?

_____

_____

3. Why does brine stay liquid in cold ice?

_____

_____

4. Where do tiny algae and bacteria live in sea ice?

_____

_____

5. Why does brine that drains from the ice sink into the sea?

_____

_____

6. Why is sea ice not a lifeless sheet?

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_____

Words to know

crystals: tiny solid pieces with flat sides, like the pieces of ice
brine: very salty water
channels: narrow paths that liquid can flow through
dense: heavy for its size, with its parts packed closely together

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Salt Squeezed Out of Freezing Seawater

Triangle group

When seawater freezes, you might expect to get frozen salt water. Instead, something more interesting happens. As ice crystals form, they leave most of the salt behind. The ice that results is much less salty than the water it came from, which is why melted sea ice is far better to drink than seawater, though it is still not perfectly fresh.

The salt does not vanish. It collects in the liquid water between the growing crystals. This leftover water is called brine, and it is saltier than ordinary seawater. Because salt lowers the temperature at which water freezes, the brine stays liquid even when the ice around it is quite cold. It is trapped in a network of tiny channels and pockets inside the ice, like water in a sponge.

Over time, some of the brine drains out of the bottom of the ice. Because it is salty and dense, it sinks into the sea below in thin streams. In the polar oceans this sinking water helps drive currents that carry cold water through the deep ocean.

The channels also matter to living things. Tiny algae and bacteria live inside the brine, and in spring the algae grow when sunlight passes through the ice. Small animals graze on them along the ice's underside, which feeds a food chain that reaches seals and seabirds. So what looks like a lifeless white sheet is actually a layered habitat, shaped by the way salt is squeezed out when the sea turns to ice.

Questions

1. What happens to most of the salt when seawater freezes?

_____

_____

2. What is brine?

_____

_____

3. Why does the brine stay liquid even in cold ice?

_____

_____

4. Where do tiny algae and bacteria live in sea ice?

_____

_____

5. Why does brine that drains from the ice sink into the sea below?

_____

_____

6. Why is sea ice called a layered habitat instead of a lifeless sheet?

_____

_____

Words to know

crystals: tiny solid pieces with flat sides, like the pieces of ice
brine: very salty water
channels: narrow paths that liquid can flow through
dense: heavy for its size, with its parts packed closely together
habitat: the natural home of a plant or animal

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Salt Squeezed Out of Freezing Seawater

Square group

When seawater freezes, one might reasonably expect the result to be frozen salt water. Instead, something far more interesting occurs. As ice crystals form, they leave the majority of the salt behind. The ice that results is considerably less salty than the water from which it came, which is why melted sea ice is much better to drink than seawater, although it still is not perfectly fresh.

The salt does not simply disappear. It collects in the liquid water lying between the growing crystals. This leftover water is called brine, and it is saltier than ordinary seawater. Because salt lowers the temperature at which water freezes, the brine remains liquid even when the surrounding ice is quite cold. It becomes trapped in a network of tiny channels and pockets within the ice, much like water held in a sponge.

As time passes, some of the brine drains out of the underside of the ice. Because it is both salty and dense, it sinks into the sea below in thin streams. In the polar oceans, this sinking water helps to drive currents that carry cold water through the deep ocean.

The channels are also important to living things. Tiny algae and bacteria make their home inside the brine, and in spring the algae flourish when sunlight passes through the ice. Small animals graze on them along the ice's underside, which supports a food chain that eventually reaches seals and seabirds. What appears to be a lifeless white sheet is therefore a layered habitat, shaped by the manner in which salt is squeezed out when the sea turns to ice.

Questions

1. What happens to most of the salt when seawater freezes?

_____

_____

2. What is brine?

_____

_____

3. Why does the brine remain liquid even in cold ice?

_____

_____

4. Where do tiny algae and bacteria make their home in sea ice?

_____

_____

5. Why does brine that drains out of the ice sink into the sea below?

_____

_____

6. Why is sea ice described as a layered habitat rather than a lifeless sheet?

_____

_____

Words to know

crystals: tiny solid pieces with flat sides, like the pieces of ice
brine: very salty water
channels: narrow paths that liquid can flow through
dense: heavy for its size, with its parts packed closely together
habitat: the natural home of a plant or animal

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: Salt Squeezed Out of Freezing Seawater

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: Salt Squeezed Out of Freezing Seawater

Easier · 229 words · Flesch-Kincaid grade 4.4

1. It is left behind as the ice crystals form.
2. The very salty liquid water trapped between the ice crystals.
3. Salt lowers the temperature at which water freezes.
4. In the brine inside the channels and pockets of the ice.
5. It is saltier and denser than the water below.
6. Algae and bacteria live in it, and small animals graze on them, feeding a food chain up to seals and seabirds.

Triangle: Salt Squeezed Out of Freezing Seawater

This passage · 250 words · Flesch-Kincaid grade 6.9

1. It is left behind as the ice crystals form.
2. The very salty liquid water trapped between the growing ice crystals.
3. Salt lowers the temperature at which water freezes.
4. Inside the brine in the channels and pockets of the ice.
5. It is saltier and denser than the water under the ice.
6. Algae and bacteria live inside it, and small animals graze on them, feeding a food chain up to seals and seabirds.

Square: Salt Squeezed Out of Freezing Seawater

Harder · 268 words · Flesch-Kincaid grade 8.2

1. It is left behind as the ice crystals form.
2. The very salty liquid water trapped between the growing ice crystals.
3. Salt lowers the temperature at which water freezes.
4. Inside the brine in the channels and pockets of the ice.
5. It is saltier and therefore denser than the water beneath the ice.
6. Algae and bacteria live inside it, and small animals graze on them, supporting a food chain that reaches seals and seabirds.