Name: _____ Date: _____

Why Lakes Flip Over Twice a Year

Circle group

In many parts of the world, the water in a deep lake turns over twice a year. No one flips it by hand. The mixing happens because water changes weight when it warms and cools.

In summer, the sun heats the top of the lake. Warm water is light, so it floats above the cold water. The two layers hardly mix. The deep water can run low on oxygen.

In autumn, cool air and wind chill the top of the lake. Cool water is heavy and sinks. It pushes deeper water up. Soon the whole lake is mixed. This is called turnover. It carries oxygen down to the bottom. It lifts nutrients, the food that tiny plants need, up to the light.

Winter brings a surprise. Water is heaviest at about 4 degrees Celsius, not at the freezing point. So the coldest water floats on top and turns to ice. Slightly warmer water stays at the bottom. That is why fish can live under a frozen lake.

In spring, the ice melts. The top water warms to the heaviest point and sinks. The lake mixes a second time.

Questions

1. Why does warm water float above cold water in summer?

_____

_____

2. What is turnover?

_____

_____

3. What does turnover carry to the bottom of the lake?

_____

_____

4. At about what temperature is water heaviest?

_____

_____

5. Why can fish live under a frozen lake?

_____

_____

6. What causes the second turnover in spring?

_____

_____

Words to know

turnover: the mixing of a lake from top to bottom
layers: levels that sit one above another
oxygen: the gas that animals need to breathe
nutrients: substances that living things need to grow
freezing: so cold that water turns to ice

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: _____

Why Lakes Flip Over Twice a Year

Triangle group

In many parts of the world, the water in a deep lake turns over twice a year. Nothing is flipped by hand. The mixing happens because water changes weight as it warms and cools.

In summer, the sun heats the top of a lake. Warm water is lighter, so it floats in a layer above the cold water below. The two layers hardly mix, and the deep water can slowly run low on oxygen.

In autumn, cool air and strong winds chill the surface. Cooler water is heavier and sinks, pushing deeper water upward. Soon the whole lake is stirred together. This is called turnover. It carries oxygen down to the bottom and lifts nutrients, the food that tiny plants need, up toward the light.

Winter brings a surprise. Water is heaviest at about 4 degrees Celsius, not at the freezing point. So the coldest water floats at the top and turns into ice, while slightly warmer water stays at the bottom. That is why fish can survive beneath a frozen lake.

In spring the ice melts, and the surface water warms until it reaches that heaviest point. It sinks, and the lake mixes a second time. Then summer returns, and the layers form once more.

Questions

1. Why does warm water float above cold water in a summer lake?

_____

_____

2. What is turnover?

_____

_____

3. What does autumn turnover carry to the bottom of the lake?

_____

_____

4. At about what temperature is water heaviest?

_____

_____

5. Why can fish survive beneath a frozen lake in winter?

_____

_____

6. What causes the second turnover in spring?

_____

_____

Words to know

turnover: the mixing of a lake from top to bottom
layers: levels that sit one above another
oxygen: the gas that animals need to breathe
nutrients: substances that living things need to grow
freezing: so cold that water turns to ice

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: _____

Why Lakes Flip Over Twice a Year

Square group

In many regions of the world, the water in a deep lake turns over twice each year. Nothing is flipped by hand, of course. The mixing occurs because water changes in weight as it warms and cools.

During summer, the sun heats the upper part of a lake. Warm water is lighter, so it floats in a layer above the colder water below. The two layers scarcely mix, and the deep water can gradually run low on oxygen.

In autumn, cool air and strong winds chill the surface. The cooler water becomes heavier and sinks, pushing deeper water upward, and before long the entire lake is stirred together. This event is known as turnover. It carries oxygen down to the bottom and lifts nutrients, the food that microscopic plants need, up toward the sunlight.

Winter brings a surprising twist. Water is heaviest at about 4 degrees Celsius rather than at the freezing point. Consequently, the very coldest water floats near the top and turns into ice, while slightly warmer water remains at the bottom. That is the reason fish are able to survive beneath a frozen lake.

In spring, the ice melts, and the surface water warms until it reaches that heaviest point. It then sinks, and the lake mixes a second time. Summer soon returns, and the layers form once more.

Questions

1. Why does warm water float in a layer above cold water in a summer lake?

_____

_____

2. What is the name for the stirring of an entire lake?

_____

_____

3. What does autumn turnover carry down to the bottom of the lake?

_____

_____

4. At about what temperature is water at its heaviest?

_____

_____

5. Why are fish able to survive beneath a frozen lake in winter?

_____

_____

6. What brings about the second turnover in spring?

_____

_____

Words to know

turnover: the mixing of a lake from top to bottom
layers: levels that sit one above another
oxygen: the gas that animals need to breathe
nutrients: substances that living things need to grow
freezing: so cold that water turns to ice

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: Why Lakes Flip Over Twice a Year

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

Circle: Why Lakes Flip Over Twice a Year

Easier · 187 words · Flesch-Kincaid grade 2.8

1. Warm water is lighter than cold water.
2. The mixing of a whole lake when top water cools and sinks.
3. Oxygen.
4. About 4 degrees Celsius.
5. The ice stays on top and slightly warmer water stays at the bottom.
6. The top water warms to its heaviest point and sinks.

Triangle: Why Lakes Flip Over Twice a Year

This passage · 205 words · Flesch-Kincaid grade 4.7

1. Warm water is lighter than cold water.
2. The mixing of a whole lake when surface water cools and sinks.
3. Oxygen.
4. About 4 degrees Celsius.
5. The coldest water and the ice stay on top, while slightly warmer water stays at the bottom.
6. The surface water warms to its heaviest point and sinks.

Square: Why Lakes Flip Over Twice a Year

Harder · 221 words · Flesch-Kincaid grade 6.2

1. Warm water is lighter than cold water.
2. Turnover.
3. Oxygen.
4. About 4 degrees Celsius.
5. The coldest water and ice remain on top, while slightly warmer water stays at the bottom.
6. The surface water warms to its heaviest point and sinks.