Name: _____ Date: _____

Winter Comes When Earth Is Closest to the Sun

Circle group

Many people think summer is when Earth is close to the sun. They think winter is when Earth is far away. That sounds right, but it is not true. For people in the Northern Hemisphere, Earth is closest to the sun in early January. That is the middle of winter.

Earth's orbit is only a little bit oval. So the change in distance matters very little. The real cause of the seasons is the tilt of Earth's axis. Earth spins like a top that leans to one side. It leans the same way all year as it goes around the sun.

For part of the year, the Northern Hemisphere leans toward the sun. Sunlight hits the ground at a steep angle. The light is packed onto a small area. Days are long, so the ground has more time to warm. That is summer.

Half a year later, the Northern Hemisphere leans away. Sunlight hits at a low slant. It spreads over a bigger area. Each patch of ground gets less heat. Days are short, too. That is winter.

Try it with a flashlight in a dark room. Shine the beam straight down on a table. You see a small, bright circle. Tilt the flashlight. The same light stretches into a bigger, dimmer oval.

The seasons are opposite in the two halves of the world. When it is summer in Canada, it is winter in Australia.

Questions

1. When is Earth closest to the sun for people in the Northern Hemisphere?

_____

_____

2. What is the real cause of the seasons?

_____

_____

3. Why is Earth's distance from the sun not the cause?

_____

_____

4. What happens to sunlight when the Northern Hemisphere leans toward the sun?

_____

_____

5. What does the flashlight test show?

_____

_____

6. If it is summer in Canada, what season is it in Australia?

_____

_____

Words to know

hemisphere: one half of Earth
axis: the imaginary line Earth spins around
tilt: a lean to one side
slant: a slope or slanted angle

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: _____

Winter Comes When Earth Is Closest to the Sun

Triangle group

Many people picture summer as the time when Earth swings close to the sun and winter as the time when it moves far away. That sounds sensible, but it is not true. For people in the Northern Hemisphere, Earth is actually closest to the sun in early January, in the middle of winter.

Earth's orbit is only a little bit oval, so the change in distance matters very little. The real cause of the seasons is the tilt of Earth's axis. Earth spins like a top that leans to one side. It keeps leaning the same way as it travels around the sun.

For part of the year, the Northern Hemisphere leans toward the sun. Sunlight strikes the ground at a steep angle, and the light is concentrated on a small area. Days are long, so there is more time for the ground to warm. That is summer.

Half a year later, the Northern Hemisphere leans away. Sunlight arrives at a low slant and spreads over a larger area, so each patch of ground gets less heat. Days are short too. That is winter.

You can see the effect with a flashlight in a dark room. Shine the beam straight down on a table, and you will see a bright, small circle. Tilt the flashlight, and the same light stretches into a larger, dimmer oval.

The seasons are opposite in the two halves of the world. When it is summer in Canada, it is winter in Australia.

Questions

1. When is Earth closest to the sun for people in the Northern Hemisphere?

_____

_____

2. What is the real cause of the seasons?

_____

_____

3. Why is Earth's distance from the sun not the cause?

_____

_____

4. What happens to sunlight when the Northern Hemisphere leans toward the sun?

_____

_____

5. What does the flashlight test show?

_____

_____

6. If it is summer in Canada, what season is it in Australia?

_____

_____

Words to know

hemisphere: one half of Earth
axis: the imaginary line Earth spins around
tilt: a lean to one side
concentrated: gathered into a small space
slant: a slope or slanted angle

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: _____

Winter Comes When Earth Is Closest to the Sun

Square group

Many people picture summer as the season when Earth swings close to the sun and winter as the season when it retreats far away. That notion sounds perfectly reasonable, yet it is incorrect. For people in the Northern Hemisphere, Earth is actually nearest to the sun in early January, right in the middle of winter.

Earth's orbit is only slightly oval, so the variation in distance has a very small effect. The genuine cause of the seasons is the tilt of Earth's axis. Earth spins like a top that leans to one side, and it continues to lean in the same direction while it travels around the sun.

During one part of the year, the Northern Hemisphere leans toward the sun. Sunlight strikes the ground at a steep angle, so the light is concentrated on a small area. The days are long, which gives the ground more time to warm up. That is summer.

Half a year later, the Northern Hemisphere leans away. Sunlight arrives at a low slant and spreads across a much larger area, so every patch of ground receives less heat. The days are short as well. That is winter.

You can observe the effect using a flashlight in a darkened room. Shine the beam straight down onto a table, and you will see a small, bright circle. Tilt the flashlight, and the very same light stretches into a larger, dimmer oval.

The seasons are reversed in the two halves of the world. When it is summer in Canada, it is winter in Australia.

Questions

1. When is Earth nearest to the sun for people in the Northern Hemisphere?

_____

_____

2. What is the genuine cause of the seasons?

_____

_____

3. Why is Earth's distance from the sun not the cause?

_____

_____

4. What happens to sunlight when the Northern Hemisphere leans toward the sun?

_____

_____

5. What does the flashlight experiment demonstrate?

_____

_____

6. If it is summer in Canada, which season is it in Australia?

_____

_____

Words to know

hemisphere: one half of Earth
axis: the imaginary line Earth spins around
tilt: a lean to one side
concentrated: gathered into a small space
slant: a slope or slanted angle

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: Winter Comes When Earth Is Closest to the Sun

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

Circle: Winter Comes When Earth Is Closest to the Sun

Easier · 235 words · Flesch-Kincaid grade 2.9

1. In early January, in the middle of winter.
2. The tilt of Earth's axis.
3. Earth's orbit is only a little oval, so the distance changes very little.
4. It hits at a steep angle and is packed onto a small area.
5. A straight beam makes a small bright circle, and a tilted beam makes a bigger, dimmer oval.
6. Winter.

Triangle: Winter Comes When Earth Is Closest to the Sun

This passage · 247 words · Flesch-Kincaid grade 4.8

1. In early January, in the middle of winter.
2. The tilt of Earth's axis.
3. Earth's orbit is only a little oval, so the change in distance matters very little.
4. It strikes at a steep angle and is concentrated on a small area.
5. A straight beam makes a small bright circle, and a tilted beam spreads into a larger, dimmer oval.
6. Winter.

Square: Winter Comes When Earth Is Closest to the Sun

Harder · 257 words · Flesch-Kincaid grade 6.2

1. In early January, right in the middle of winter.
2. The tilt of Earth's axis.
3. Earth's orbit is only slightly oval, so the variation in distance has a very small effect.
4. It strikes the ground at a steep angle and is concentrated on a small area.
5. A straight beam makes a small bright circle, and a tilted beam stretches into a larger, dimmer oval.
6. Winter.