Name: _____ Date: _____

Why the Clock Jumps on a Flight East

Circle group

Dev gets on a plane at 9:00 in the morning. The flight goes east and lasts five hours. When he lands, his watch says 2:00. The clock on the airport wall says 4:00. No one made a mistake. Dev is in a new time zone.

Earth spins once in about 24 hours. A full turn is 360 degrees. Divide 360 by 24 and you get 15. So the sun seems to move 15 degrees each hour. Mapmakers use this to make time zones. Each zone is about 15 degrees wide. Going east into the next zone adds an hour to the clock. Going west takes an hour away.

Real zones are not so neat. Their borders often follow state lines, rivers, and country borders. This lets neighbors share the same time. So some zones are wider than others.

Dev's new city is two hours ahead of home. He adds 5 hours of flying to 9:00. Then he adds 2 hours. That makes 16, or 4:00 in the afternoon. The time that really passed is still five hours.

Questions

1. What time did the airport wall clock show?

_____

_____

2. How many degrees does the sun seem to move each hour?

_____

_____

3. What happens to the clock when you go east into the next zone?

_____

_____

4. Why are some time zones wider than others?

_____

_____

5. Why did Dev's watch and the airport clock not match?

_____

_____

6. How long did the trip really take?

_____

_____

Words to know

zone: an area of the world that shares the same clock time
degrees: units used to measure parts of a circle
borders: the lines that separate one place from another

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 the Clock Jumps on a Flight East

Triangle group

Dev boards a plane at 9:00 in the morning for a five hour flight to the east. When the plane finally lands, his watch still shows 2:00 in the afternoon, but the clock on the airport wall says 4:00, and nobody has made an error, because Dev has crossed into a new time zone.

Earth spins once about every 24 hours, and one full turn is 360 degrees. Dividing 360 by 24 gives 15, so the sun appears to move across 15 degrees of sky each hour, and mapmakers use this fact to divide the world into time zones that are each roughly 15 degrees wide. Traveling east from one zone into the next adds an hour to the clock, while traveling west takes an hour away.

Real zones are not perfectly neat. Their borders often follow state lines, rivers, and country borders so that neighbors can share the same time. Because of this, some zones are much wider than others.

Back to Dev. The clocks in his new city run two hours ahead of the clocks at home. To find the local arrival time, he adds the 5 hours of flying to the 9:00 start, then adds the 2 hours of difference. Nine plus five plus two makes 16, which is 4:00 in the afternoon. The elapsed time, meaning the time that really passed, is still just five hours. Only the clock changed.

Questions

1. What time did the airport wall clock show when Dev landed?

_____

_____

2. How many degrees does the sun appear to cross each hour?

_____

_____

3. What happens to the clock when you travel east into the next zone?

_____

_____

4. Why are some time zones wider than others?

_____

_____

5. Why did Dev's watch and the airport clock disagree?

_____

_____

6. How long did Dev's trip really take in elapsed time?

_____

_____

Words to know

zone: an area of the world that shares the same clock time
degrees: units used to measure parts of a circle
elapsed: having passed, as in time that goes by
borders: the lines that separate one place from another
arrival: the act of getting to a place

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 the Clock Jumps on a Flight East

Square group

Dev boards an airplane at nine o'clock in the morning for a flight of five hours toward the east. When the plane touches down, his watch still reads 2:00 in the afternoon, yet the clock mounted on the airport wall says 4:00. Nobody has made an error; Dev has simply crossed into a new time zone.

Earth rotates once about every 24 hours, and a complete rotation measures 360 degrees. Dividing 360 by 24 yields 15, so the sun appears to travel across 15 degrees of sky every hour. Mapmakers rely on this fact to divide the world into time zones, each of which is roughly 15 degrees wide. Traveling eastward from one zone into the next adds an hour to the clock, whereas traveling westward subtracts one.

In practice, the zones are not perfectly tidy. Their borders frequently follow state lines, rivers, and country borders so that neighboring communities can share the same time. As a consequence, some zones are considerably wider than others.

Returning to Dev, the clocks in his destination run two hours ahead of those at home. To calculate the local arrival time, he adds the 5 hours of flying to the 9:00 departure, and then adds the 2 hours of difference. Nine plus five plus two equals 16, which is 4:00 in the afternoon. The elapsed time, meaning the time that genuinely passed, remains five hours. Only the clock has changed.

Questions

1. What time did the clock on the airport wall show when Dev arrived?

_____

_____

2. How many degrees of sky does the sun appear to cross each hour?

_____

_____

3. What happens to the clock when a traveler goes east into the next zone?

_____

_____

4. Why are some time zones considerably wider than others?

_____

_____

5. Why did Dev's watch disagree with the airport clock?

_____

_____

6. How long did Dev's journey actually last in elapsed time?

_____

_____

Words to know

zone: an area of the world that shares the same clock time
degrees: units used to measure parts of a circle
elapsed: having passed, as in time that goes by
borders: the lines that separate one place from another
arrival: the act of getting to a place

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 the Clock Jumps on a Flight East

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

Circle: Why the Clock Jumps on a Flight East

Easier · 162 words · Flesch-Kincaid grade 0.9

1. 4:00 in the afternoon.
2. 15 degrees.
3. An hour is added.
4. Their borders follow state lines, rivers, and country borders.
5. His watch had home time, and the new city is two hours ahead.
6. Five hours. Only the clock changed.

Triangle: Why the Clock Jumps on a Flight East

This passage · 219 words · Flesch-Kincaid grade 5.4

1. 4:00 in the afternoon.
2. 15 degrees.
3. An hour is added.
4. Their borders follow state lines, rivers, and country borders.
5. His watch still ran on home time, and the new city is two hours ahead.
6. Five hours, because only the clock changed and not the time that passed.

Square: Why the Clock Jumps on a Flight East

Harder · 222 words · Flesch-Kincaid grade 7.1

1. 4:00 in the afternoon.
2. 15 degrees.
3. An hour is added.
4. Their borders follow state lines, rivers, and country borders.
5. His watch still kept home time, and the new city is two hours ahead.
6. Five hours, because only the clock changed and not the time that passed.