

Follow-up Discussion

The most important part of this segment is to examine both the facts and beliefs generated by the class in their "Everything We Know About..." list.

Research indicates that students will retain their previous misconceptions — in preference to the new information — until they actively recognize and correct their own errors. Because of this, it is important to lead students to the correct ideas while identifying and correcting any misconceptions from the class list. After reviewing the list, encourage students to share the answers they got to the questions raised, before viewing the program.

Raising a thought-provoking question is a good way to assess the overall depth of understanding. A couple of suggestions are listed below:

- Is it possible for two places, thousands of miles apart, to have the same climate? Why or why not?
- What would happen if the Earth's axis was not tilted?

Follow-up Activities

- Have students measure the shadow lengths of a meter stick every week at the same time of day throughout the year. A comparison of these measurements will show that the shadow lengths increase as winter approaches, becoming longest on the shortest day of the year (about December 21) and then decrease again until the longest day (about June 21). Ask students to explain why this is so. Excellent background information on climate and weather can be found at the following Web site: www.harvard.edu/ECT/the_book/Chap1/Chapter1.html.
- To help students understand that places near the ocean tend to have warmer winters and cooler summers than more inland regions, set up your students with separate pails of water and sand. Making sure the water and sand are measured at equal levels, place each pail in the shade and put a thermometer in each. Leave the buckets in the shade until they reach the same temperature, and then place them in direct sunlight. Which pail heats more quickly? Which pail cools down more quickly? How do these results help us understand climate?
- Encourage students to read the Native American legend, "How Glooskap Found the Summer," that is featured at the following Web address: lehua.ihawaii.net/~stony/lore11.html. As a creative writing exercise, ask students to write their own legend about what makes the seasons change.
- Have students compare the weather forecast of a chosen sibling city each week with their own city.

Suggested Internet Resources

Periodically, Internet Resources are updated on our Web site at www.LibraryVideo.com

- kids.msfc.nasa.gov/News/2000/News-VernalEquinox.asp
This interesting NASA Web site for kids focuses on the reason for the seasons and offers activities, including a plan for making your own sundial.
- www.fi.edu/weather/nino/nino.html
These pages from The Franklin Institute Science Museum explain the many climate changes due to the phenomenon known as "El Nino."

Suggested Print Resources

- Gibbons, Gail. *The Reasons for Seasons*. Holiday House, New York, NY; 1995.
- Singer, Marilyn. *On the Same Day in March: A Tour of the World's Weather*. HarperCollins Publishers, New York, NY; 2000.
- Taylor, Barbara. *Weather and Climate*. Kingfisher Books, New York, NY; 1993.

TEACHER'S GUIDE CONSULTANT

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TITLES

- ALL ABOUT CLIMATE & SEASONS
- ALL ABOUT RAIN, SNOW, SLEET & HAIL
- ALL ABOUT METEOROLOGY
- ALL ABOUT WIND & CLOUDS

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All About Climate & Seasons

Grades K-4

This guide is a supplement, designed for educators to use when presenting this program in an instructional setting.

Before Viewing: Research in learning suggests that it is important for the teacher to discover what the students know — or think they know — about a topic, at the start of a new unit, so that their accurate conceptions can be validated and reinforced, and their misconceptions identified and corrected. Therefore, after reviewing the pre-viewing discussion questions provided for your class, create an "Everything We Know About..." list. Preview key vocabulary words and have students raise additional questions they hope will be answered by this program. Most importantly, students should be told that as "science detectives" they must listen closely, so that after viewing the program, they will be able to tell whether or not the facts/beliefs they put on their list were scientifically accurate.

After Viewing: After a brief discussion about the program, challenge your "science detectives" to prove or disprove the accuracy of the facts they put on their "Everything We Know About..." list. Discuss what else they learned and use the follow-up questions and activities to inspire further discussion. Encourage students to research the topic further with the Internet and reading resources provided.



Program Summary

The sun is the main source of heat energy for the Earth and is the driving force behind all weather, from snowstorms to sunny days. Weather can change from day to day, and even from one hour to the next. Climate is the average weather in a location over a long period of time. If you observe the weather every day, you can determine the climate of an area. For example, a place that doesn't get much rain over many years would have a dry climate. Places by the ocean usually have a damp climate.

Meteorologists, scientists who study weather, measure temperature and rainfall every day and look for patterns in the weather. They also measure the wind, observe the clouds and record information like how foggy it is in a location.

The most important reason for the climate of a place is the amount of direct sunlight that place receives. Places near the middle of the Earth — the equator — receive the most direct sunlight, and places near the top and bottom — the poles — receive the least amount of sunlight. This causes different climate zones.

The polar zone is located near the North and South poles. This zone has a cold climate and receives the least amount of sunlight. The tropical zone, located near the equator, has the hottest climate because it receives the most direct sunlight throughout the year. Places in the tropical zone experience little or no change in climate because the amount of sunlight stays the same. The temperate zone lies between the tropical and the polar zones. This climate zone experiences cold winters when it receives less direct sunlight and warm summers when it receives more direct sunlight.

The Earth spins around on its axis once every 24 hours, creating day and night. It is usually warmer during the day than at night because of the light and heat of the sun. The Earth also travels around the sun every year, and because the axis of the Earth is tilted, different areas of the Earth get different amounts of sunlight, creating the seasons. Summer in the northern hemisphere (above the equator) is a time when the tilt of the Earth puts the northern hemisphere more in line with the sun's direct rays. At that same time, the southern hemisphere is having winter. Because of the tilt of Earth's axis and the yearly orbit around the sun, there is a continuous cycle of seasons: summer to autumn to winter to spring, and then the cycle starts all over again. Depending on the climate zone, these seasonal changes can be hardly noticeable or very different!

Vocabulary

The following words are included for teacher reference or for use with students. They are listed in the order in which they appear in the video.

weather — The changes in temperature and precipitation caused by the interaction of air, sunshine and water in Earth's atmosphere.

climate — The average or typical long-range weather pattern of any one place.

temperature — A measure of how hot or cold something is.

precipitation — Rain, snow, sleet or hail.

meteorologists — Scientists who study weather.

climate zones — Areas of the world that have similar weather patterns. There are three basic climate zones on Earth: the polar zone, the tropical zone and the temperate zone.

polar zone — The climate zones located at the North and South poles. The polar zone has a cold climate with long winters because these areas do not receive direct sunlight.

tropical zone — The climate zone located near the equator. The tropical zone has a hot climate and no winter because it receives the most direct sunlight.

equator — The imaginary line that runs around the middle of the Earth.

temperate zone — The climate zones located in between the polar and tropical zones. The temperate zone has a wide range of temperatures because of the seasonal differences in sunlight.

sea breeze — Usually a daytime ocean breeze from the cooler water to the warmer land.

land breeze — Usually a nighttime breeze at the shore from the cooler land to the warmer ocean.

plains — Wide areas of flat land.

axis — The imaginary line that runs through the Earth, on which it spins. Because the axis is tilted, the seasons change throughout the year as Earth orbits the sun.

seasons — The four divisions of the year that are based on weather changes: winter, spring, summer and autumn.

summer — The warmest season of the year, between spring and autumn, with the most hours of daylight.

winter — The coldest season of the year, between autumn and spring, with the least hours of daylight.

orrery — A scientific tool that demonstrates how Earth and other planets move around the sun.

spring — The season of the year between winter and summer, with gradually warming temperatures and increasing daylight.

autumn — The season of the year between summer and winter, with gradually decreasing temperatures and less hours of daylight.

Pre-viewing Discussion

Before students generate their list of "Everything We Know About..." this topic, stimulate and focus their thinking by raising these questions so that their list will better reflect the key ideas in this show:

- What are the different seasons? What is the weather like during the different seasons?
- Why is the weather different in different places around the world?
- What makes day and night and the seasons?

After the class has completed their "Everything We Know About..." list, and before watching the show, ask them what other questions they have that they hope will be answered during this program. Have students listen closely to learn if everything on their class list is accurate and to hear if any of their own questions are answered.

Focus Questions

You may wish to ask your class the following questions to assess their comprehension of key points presented in the program:

1. What is the difference between weather and climate?
2. What are two important parts of climate?
3. What causes the weather to change?
4. What causes day and night?
5. Where is the equator?
6. Where are the Earth's poles located?
7. What are the different climate zones on Earth? Where are they located?
8. What makes the climate in the tropical zone different from the other two zones?
9. Why are both the North and South polar zones frozen most or all of the year?
10. Which of the three climate zones has the most temperature changes during the year? Why is that so?
11. Why do cities usually have a warmer climate than farm areas right outside of those same cities?
12. Why are areas near the ocean usually cooler in the summer and breezier than places far from the water?
13. Why is the climate usually cooler up in the mountains?
14. Why is it usually cloudier in the mountains than in the desert?
15. What is an axis? Why is it important that the Earth's axis is tilted?
16. How long does it take for the Earth to travel around the sun?
17. Why is the Earth's orbit around the sun important to climate and seasons?
18. When North America is having winter, what season is South America having?