

#3571

BILL NYE THE SCIENCE GUY: EARTH'S SEASONS

Grade Levels: 3-8

24 minutes

DISNEY EDUCATIONAL PRODUCTIONS 1994

DESCRIPTION

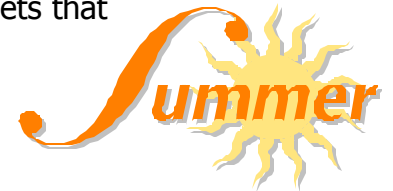
Why does the earth have seasons? Bill Nye emphasizes the earth's tilt and its effects on seasons with a variety of examples. Also defines solstice and equinox.

ACADEMIC STANDARDS

Subject Area: Science (Earth and Space)

- ◆ Standard: Understands basic features of the earth
 - Benchmark: Knows that night and day are caused by the earth's rotation on its axis

- ◆ Standard: Understands essential ideas about the composition and structure of the universe and the earth's place in it
 - Benchmark: Knows basic patterns of the sun and moon (e.g., the sun appears every day, and the moon appears sometimes at night and sometimes during the day; the sun and moon appear to move from east to west across the sky; the moon appears to change shape over the course of a month)
 - Benchmark: Knows that the earth is one of several planets that orbit the sun, and the moon orbits around the earth



AFTER SHOWING

Discussion Items and Questions

1. Why does the earth have seasons? (The earth has seasons because it is tilted.)
2. What season is it when our part of the world is tilted toward the sun? (Summer is the season when our part of the world is tilted toward the sun.)
3. How long does it take the earth to travel all the way around the sun? (It takes the earth one year to travel around the sun. This transit actually takes 365 and 1/4 days, which is the reason for leap year.)

Applications and Activities

1. An Angle on the Seasons

Objective: To demonstrate how direct sunrays are absorbed by objects.

- a. Get 3 juice or soup can lids and paint them black.
- b. Stick the lids into small pieces of clay so that one is straight up, one is at an angle, and one lies flat.
- c. Using a 100-watt bulb, turn a lamp on directly over the top of the lids (12 centimeters above the lids); wait for 2 to 3 minutes.
- d. The flat lid (direct) illustrates the effects of the sun in summer. The tilted lid (diverted) demonstrates the sun's effects during spring. The lid that is straight up (less direct) represents the effects of the sun in winter.



2. Changing Seasons

Objective: To develop a model to display the earth's days and nights, direct and indirect sunrays, and the changing seasons.

a. Part 1: Newborn

- (1) Use a classroom globe with a stand and axis.
- (2) Place a flashlight 2 meters away from the globe and shine the light directly at the equator.
- (3) Discuss day and night sides of the earth.
- (4) Cut 2 small, 1-inch circles out of colored paper.
- (5) Stick one on the equator and the other on the Arctic Circle; place both paper circles on the same longitude.
- (6) Turn the globe on its axis and note the following:
 - (a) Are the circles in the light equal amounts of time as the globe turns on its axis?
 - (b) Do they enter the light and dark sides at the same time when the globe is rotated?
 - (c) How would our days and nights change if the earth's axis were straight up and down in relation to the sun?

b. Part 2: A New Tilt

- (1) Tilt the globe's axis straight up and down (pointing toward the ceiling) by lifting the globe on its stand and adjusting it.
- (2) Repeat the procedure in Part 1 and compare results.

c. Part 3: Rotisserie Around the Sun

- (1) Tilting the globe on its axis (23 and ½ degrees) as in Part 1, you will slide the earth around the sun.
- (2) Place 4 flashlights on a table so that the bottom ends of all 4 flashlights touch, forming a cross.
- (3) Place the flashlights on a stack of books so that they shine on the equator of the globe.
- (4) Turn the lights on and place the globe 2 meters away, opposite the light, facing the left side of the room.



- (5) The globe's axis should always point toward the left side of the room (North Pole).
- (6) Slide the globe in a counterclockwise circle around the lights, 2 meters away, keeping its axis fixed and pointed toward the left side of the room. Don't turn or spin the globe on its axis.
- (7) Choose a city to follow on the globe.
- (8) Describe the seasons that occur in your chosen city as the globe passes in front of each flashlight. Why is the globe moved counterclockwise?

RELATED RESOURCES

Captioned Media Program

- The Changing Forest #2458
- Snowballs and Sandcastles #2524
- Sun, Earth, Moon #3301



World Wide Web



The following Web sites complement the contents of this guide; they were selected by professionals who have experience in teaching deaf and hard of hearing students. Every effort was made to select accurate, educationally relevant, and "kid-safe" sites. However, teachers should preview them before use. The U.S. Department of Education, the National Association of the Deaf, and the Captioned Media Program do not endorse the sites and are not responsible for their content.

- **NASAKIDS**

<http://kids.msfc.nasa.gov/>

The NASA kids explain why we have seasons in a simple newsletter format. Straightforward text, graphics, and simple animations.

- **THE EARTH'S ROTATION**

<http://www.treasure-troves.com/astro/movies/Seasons.mov>

An interesting QuickTime animation that demonstrates each day of the earth's rotation through the year.

- **BRAIN POP SEASONS**

<http://www.brainpop.com/science/ecology/watercycle/index.weml>

An award-winning site designed to give kids' brains a workout full of fun. Many animated health, science, and technology movies to choose from. Long movie load time but well worth the wait! Play the content-based quiz while you wait.

- **SEASONS REFERENCE**

<http://csep10.phys.utk.edu/astr161/lect/time/seasonhtml>

The seasons explained (for the strong middle grades reader) in text with simple graphics. Dispels common misunderstandings.