Gateway Greening
The Power of Growing Food

Fall- Outdoor | K-5th Life Science | 20-30 minute lesson

Autumnal Equinox

Materials:

- Notebooks
- Globe/ball
- Flashlight
- Outdoor space
- Planting space
- Cool weather seeds or seedlings
- Access to Water

Standards and Curricular Connections:

Next Generation Science Standards

K-PS3-1. Make observations to determine the effect of sunlight on the earth's surface.

2-ESS1-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly.

5-ESS1-2 Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some starts in the night sky.

Strategies for Engagement:

Continue to record and observe the sun's position on a weekly basis throughout the year. Try to observe the sun at the same time of day.

Overview & Objective

The autumnal equinox has arrived, and gardeners are getting ready for fall harvests and winter dormancy. While the equinox brings shorter daylight, it also is a chance to observe and explore how seasons affect garden growth. This lesson will include observations and predictions of daylight changes. Then students will determine the best plants to grow in the garden with the arrival of fall.

Students will:

- Observe how the position of the sun affects shadows
- Predict how the amount of daylight will change after the autumnal equinox
- Choose and plant appropriate cool season crops.

Pre-Activity Questions:

- Does the sun rise and set at the same time all year?
- Describe to a friend why seasons change.
- Do all plants need the same thing to grow? Can some plant grow in locations or times of the year that others cannot?

Activity

- Head outside on a sunny day and divide the class into pairs. Each group will observe the sky. In a notebook, they will record the time, where the sun is in the sky (directly above, just over the horizon, etc.) and how large their shadows are. If possible, visit later in the day and repeat the sun and shadow observations. What is different about the position of the sun and shadows? Did the direction of the shadow change?
- Explain that the autumnal equinox is when day and night are nearly equal all around the world and is the start of fall in the northern hemisphere (the opposite is true in the southern hemisphere). It is when we start noticing shorter days in Missouri though days started getting shorter immediately after the longest day of the year, which is on the summer solstice in June.

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Resources:

- Leslie, C. (2010). *The Nature Connection an Outdoor Workbook for Kids, Families and Classrooms*. North Adams: Storey Publishing
- National Geographic Equinox Videos, http://video.nationalgeographic.com/video/equinoxes-sci

Gateway Greening Resources:

Connect with us on Facebook to discover upcoming Youth Garden Institute workshops or join the Gateway Greening Educators Group to connect with other teachers:

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Discover season-specific gardening how-to's and examples of current lessons:

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Activity

- Demonstrate the equinox with a ball or globe and a flashlight. Turn the lights off in the classroom. A student holds a stationary flashlight as the sun. Another student holds the ball or globe at a roughly 23-degree. If possible, mark a rough estimate of where Missouri is (St. Louis is about 38 degrees north). The student with the earth ball walks slowly around the sun. The sun moves with the earth, careful that the earth and sun angles do not change. Pause and discuss when the flashlight is hitting the equator/middle of the globe. Try orbiting the earth again but with it slowly spinning on its' axis. How is the demonstration realistic? If the earth was not tilted, how would that affect the equinox?
- Alternatively, show an Equinox video from the Resource section. In pairs, have students explain how the Equinox affects the seasons. How will the amount of daylight change after the Autumnal Equinox?
- Out in the garden, each pair finds five signs of autumn. Create a class list and discuss the findings.
- Brainstorm how gardeners should change their garden in preparation for shorter days.
- Explain that fruiting plants need the most amount of daylight to grow and can only mature during the summer in Missouri. Choose several cool weather crops (carrots, turnips, beets, and greens) to start from seed or to transplant.
- Observe and record the changing sun position and the cool-weather crop's growth.

Additional Activities & Follow Up

- Use the "Darkness at Night" probe as a pre and post-assessment. Dorsey, Chad, et al. *Uncovering student ideas in science. 25 more formative assessment probes*. NSTA Press, 2007.