



Day, Night & Seasons

Grade 4-7 Science

Students will be able to:

- Understand how the Earth's rotation affects day and night patterns.
- Understand how the Earth's revolution affects seasonal patterns.

Total time: 25-30 minutes

Location: Outdoors or indoors in a space large enough for your group to stand in a circle

Materials Needed:

- 16" Orbis EarthBall
- Balls to represent the sun and the moon
- Sticker (to place on the EarthBall in order to represent your location)
- Lamp (optional and for indoors only)

Preparation: I find it useful to run through the Earth's rotation and revolution before hand to make sure I have the movements cemented in my mind. This website:

http://www.classzone.com/books/earth_science/terc/content/visualizations/es0408/es0408page01.cfm?chapter_no=04 provides a good visualization of the Earth's movements. Make sure you click on the "show labels" button to get an idea of the months of the year for the Earth's revolution.

Introduction (10 minutes)





Have the students stand in a large circle. Introduce the EarthBall and play a name game with it so that each student gets a chance to hold it (and you get a chance to learn some names!). You can either:

- Have students throw the EarthBall to any classmate and say the name of that person as they throw the ball. They must throw it to someone who has not yet received the ball. Or:
- Have the students simply pass the ball around the circle and have them say their own name as they pass the ball along. Or:
- If students already know each other I find it helpful to let them pass the EarthBall around for a while first as they are usually quite excited by it.

Days and Seasons (15-20 minutes)

Have students stand in a circle. If indoors you can use a lamp for the sun, if outdoors, use a large ball.

- Have one student come up and locate your country and if possible your city or town on the EarthBall (you may need to help them with this). Have them place a sticker on your city or town.
- Talk about how the Earth rotates (spins) on an axis and ask students how long it takes to do one rotation (24 hours or 1 day)
- Introduce the sun-ball (or lamp if you are doing this indoors). To be proportionally accurate (if you are using a 16" EarthBall) the sun-ball would need to be 44m (144') in diameter as the sun is 109 times larger than the Earth. It would also need to be located 4.5km (about 3 miles) away from the EarthBall. Obviously you won't be using a ball this big, or putting it this far away, but





I like to tell students this so that they get an idea of how big space is. I usually compare the distance to something the students can visualize. For example: "4.5km is about the distance from your school to the hospital."

- Place the sun-ball in the centre of the circle of students. Now have each student 'become the Earth', with their nose being their hometown. Have them start with their backs to the sun and ask them what time it is (midnight). Then have them rotate counter-clockwise and stop when their left hand is facing the sun and again ask them what time of day it is (dawn), continue and stop at noon (facing the sun), sunset (right hand facing the sun) and back to midnight (back to the sun).
- Now, do the same demonstration using the EarthBall. Hold the EarthBall so that the sticker (your town) is facing away from the sun. Rotate (spin) the EarthBall counter-clockwise and discuss where the sun is rising and setting. You can either have a student do this or do it yourself as a demonstration.
- Now introduce the Earth's second movement – revolution (revolving around the sun rather than spinning on its axis).
- Show students how the Earth sits on an angle. I like to start with our location angled towards the sun (summer) and then revolve (and rotate) around the sun until our location is angled away from the sun. Note! This can be tricky and I find that I need to run through this *before* I teach this lesson as I can get tripped up by it. This is where the website listed above can come in handy.)
- Now have one student be/hold the sun and have one other student hold the Earth. Put the Earth on an axis and have the student revolve around the sun (don't worry about rotation as much right now, otherwise the student will get dizzy!). The Earth also revolves in a counter-clockwise direction.





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- Explain the seasons – if you live in the northern hemisphere, it is summer when you are tilted towards the sun and winter when you are tilted away from the sun. This tilt will depend on where you are in the revolution around the sun.
- If you have time, have a third student hold a ball representing the moon and let students try and rotate and revolve all at once. A moon-ball should be about grapefruit sized and located 11.6 m (38') from Earth to be proportionally accurate.



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