

## Episode 9

Strand <b>6.1</b>	Standard <b>6.1.1</b>	Big Idea <b>Seasons occur due to the orbit of the earth around the sun and the tilt of the earth's axis.</b>
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Title <b>Tilt of the Earth</b>	Time <b>60 minutes</b>	CCCs <b>Patterns Cause and Effect</b>	Practices <b>Obtain information Ask questions Analyze and interpret data</b>
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**Phenomenon:** *The tilt of the earth and the earth's orbit around the sun causes seasons.*

### **Gathering**

#### **Use Models to Gather Data**

Students will obtain information by investigating a simulation of the tilt of the earth. Students will create a model based on what they have learned about seasons and the tilt of the earth.

*Teacher Support: Students will stand around the classroom in a circle with their bodies representing Earth. In the middle of the room, place an object that represents the sun. You should also select a place in the room that represents the North Star (Polaris). Discuss the movement of Earth in relation to the sun (the earth revolves around the sun but also rotates on its axis).*

- *Have students make these motions by having them first rotate on their axes. As students are rotating, ask them to share what the earth is experiencing at this point (day and night, 24 hours).*
- *Ask students to make both motions of the earth (revolution and rotation). As students are revolving and rotating around the sun, ask them what else the earth is experiencing besides day and night (1 year, 365 days).*
- *Point out to students that there is one component missing from their physical models that causes the seasons. Have students discuss and share their ideas.*
- *Direct students' attention to the place designated as the North Star, and tell them that the earth's axis is always pointed toward the North Star; it never changes. Send students back to their groups, and have them discuss what this might mean in relation to seasons.*
- *Ask students to use the physical models they were moving around and apply the idea that the earth's axis always stays in one spot. Student discussions should lend themselves to some ideas about direct vs. indirect sunlight.*

### **Reasoning**

#### **Analyze and Interpret Data**

Using the data they have collected and what they learned through the simulation, students will analyze the cause and effect of the tilt of the earth. Students will learn that the earth is tilted toward the North Star at 23.5 degrees and that as the earth rotates and revolves, it stays tilted toward the North Star and experiences different seasons. Students will refine their understanding and align their models of the phenomena.

### ***Communicating***

#### **Construct an Explanation**

In groups, students will discuss their findings and models and construct an explanation of the tilt of the earth and the amount of direct and indirect light the earth receives due to the earth's tilt.

<b>Assessment:</b> Students' explanations could include a picture model along with their written explanations of the the tilt of the earth toward the North Star. Explanations should include the role of revolution and rotation of the earth around the sun in relation to the North Star.	<b>Materials, resources, handouts, etc.</b> Lamp Plastic globes Projector (North Star—students just need something to be selected as the North Star to know how to keep the earth tilted.) <a href="#">Simulator</a>
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