



# The Reasons for Seasons

# 2<sub>A</sub>

**Note:** Introducing the Read-Aloud may have activity options which exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

## ***Introducing the Read-Aloud***

**10** minutes

### **What Have We Already Learned?**

**5** minutes

Review with students that a cycle is a sequence of events that repeats again and again. Daytime and nighttime happen over and over again, so they are events that are part of a cycle that repeats again and again. In fact, the daytime and nighttime cycle is one of the most important cycles in nature. Daytime and nighttime give living things just the right amount of time to be active and time to rest. Remind students that it takes twenty-four hours, or one whole day and one whole night, for Earth to rotate once on its axis. Daytime happens when the part of Earth you live on faces the sun; nighttime happens when the part of Earth you live on faces away from the sun.

### **Essential Background Information or Terms**

**5** minutes

Earth moves in two ways. The first way, rotation, causes daytime and nighttime. Have students demonstrate rotation. For this activity, one student should stand in the center and be the sun. You may wish to create a “sun hat” for this student to wear! The other students can be little Earths. For rotation, have students stand up and turn themselves around in a circle. When students face the sun, they should say, “Daytime!” When their backs are to the sun, they should say, “Nighttime!” Reinforce to students that the sun does not move during the cycle of daytime and nighttime; instead, the earth is rotating, or spinning.

The second way that Earth moves is called revolution. The earth moves, or revolves, in an almost circular path around the sun. Earth makes one revolution, or orbit, around the sun about every 365 days, or every year.

### Seasons Chart

5 minutes

**Note:** Students are not expected to fill in the chart at this point in the lesson. This activity is to get students familiar with the format (columns and rows) of a chart.

Have students identify the four seasons depicted on the cover illustration of the Flip Book. Have students name the four seasons with you—*spring, summer, autumn, winter*. Point out the columns for each of the seasons on the chart. Then read the topics of each row. Explain that they will listen to the next two read-alouds to find out information about each season to fill in this chart.

Tell students that they might already know some information to put on this chart. Begin to fill in the chart with what students already know about the seasons from prior grades. Students should listen carefully to the read-aloud so they can complete the chart during the Extension activity.

	Spring	Summer	Autumn (or Fall)	Winter
<b>Date Season Begins in the Northern Hemisphere</b>				
<b>Amount of Sunshine</b>				
<b>Temperature in the Northern Hemisphere</b>				
<b>Plants</b>				
<b>Animals</b>				
<b>People's Activities/Clothing</b>				



**Equator**

← **Show image 2A-3: Orange cut into halves and Earth cut into hemispheres**

1. In today’s read-aloud you will hear that our planet is divided in half by an imaginary line called the *equator*.
2. Say *equator* with me three times.
3. The equator is an imaginary line that divides Earth into two halves between the North and South Poles. [Point to the equator in the image.]
4. The United States is north of the equator. [Point to the equator and then to the United States on a globe.]
5. Who can point out the North Pole and South Pole? Who can find the imaginary line that is the equator on your globe? [Invite several students to point out the North and South Poles and the line for the equator on the globe.]

What does the equator do? (splits the Earth in half between the North and South Poles)

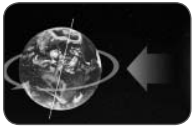
**Hemisphere**

1. In today’s read-aloud you will hear that Earth is divided into *hemispheres*.
2. Say the word *hemispheres* with me three times.
3. Hemisphere is one half of Earth.
4. We live in the Northern Hemisphere because we are north of the equator. [Invite a student to point to the United States on a globe.]
5. What are the names of some other countries that are part of the Northern Hemisphere? What are the names of some countries that are part of the Southern Hemisphere? [Help students locate a few countries in each hemisphere. Tell students to listen carefully to learn how the seasons are different in the different hemispheres.]

## Purpose for Listening

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Tell students to listen carefully to hear about the main topic of the read-aloud: how the tilt of the earth affects the amount of sunshine we receive as it orbits the sun. Tell students they are going to hear more about how the seasons are created by the way the tilted earth orbits the sun.



## The Reasons for Seasons

### ← Show image 2A-1: Earth rotating on its axis

- 1 Counterclockwise means to move in the opposite direction from the hands on a clock. [Demonstrate counterclockwise for students.]
- 2 [Show students which way is east and which way is west in your classroom.]
- 3 Stand up and turn or rotate one time moving in a counterclockwise direction. Your full rotation models the earth's rotation as it completes one full twenty-four hour cycle.

Right now, Earth is moving! Even though you cannot feel it, Earth is always moving in space in two ways. We have already heard about one way the earth moves. It is called rotation. Rotation is the movement of Earth around its axis. This controls the cycle of daytime and nighttime. The Earth takes twenty-four hours to turn, or rotate, once on its axis. The earth rotates in a counterclockwise direction from daytime to nighttime and back to daytime again.<sup>1</sup> During rotation, the part of Earth that is facing the sun changes. When it is daytime where you are, that means that the part of the earth on which you are standing is facing the sun. Sunlight hits our planet and moves across it from east to west. This is why we see the sun rising in the east and setting in the west.<sup>2</sup> Sunset eventually occurs when certain parts of Earth turn, or rotate, away from the sun, and nighttime begins. This cycle continues over and over again.<sup>3</sup>



### ← Show image 2A-2: Diagram of Earth revolving around the sun

The second way the earth moves is called revolution. Earth **revolves**, or orbits, around the sun in an almost circular path. Therefore, since you live on Earth, you are traveling around the sun, too. It takes Earth about 365 days—or one year—to complete one revolution, or orbit.

Earth is tilted as it orbits the sun. **Tilt**, or slant, your head to one side. The earth remains at this same angle and points in the same direction throughout its entire orbit. Now let's find out more about how Earth's tilt causes the seasonal cycle.



### ← Show image 2A-3: Orange cut into halves and Earth cut into hemispheres

Earth is divided into **hemispheres**, or halves. Just like an orange can be cut in half through the center from side to side. Earth can also be divided into two parts. Our planet is divided

in half into the northern and southern hemispheres by an imaginary line on its surface called the **equator**. The equator is the same distance from the North Pole as it is from the South Pole. The United States, where we live, is located in the Northern Hemisphere.



4 [Shine a light on the tilted globe to demonstrate the more direct angle of intense sunlight.]

← **Show image 2A-4: Northern summer**

When the Northern Hemisphere is tilted toward the sun during Earth's revolution around the sun, it receives more intense light from the sun at a more direct angle.<sup>4</sup> During this time it is summer in the Northern Hemisphere. Around June 21 each year, the sun reaches its highest point overhead in the Northern Hemisphere. This is called the summer solstice and is referred to as the longest day of the year. That means that there is daylight for a longer period of time on that day than on any other day of the year.

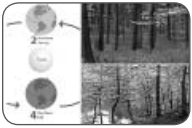
People in the Southern Hemisphere are experiencing winter while people in the Northern Hemisphere are experiencing summer. On June 21 in the Southern Hemisphere, that part of Earth is tilted away from the sun, with the sun at a low angle in the sky. The sunlight is not as strong or as intense, and there is less of it, so that part of Earth receives less light and less energy than the Northern Hemisphere. June 21 is the winter solstice, or shortest day of the year, in the Southern Hemisphere. It is the opposite of the Northern Hemisphere.<sup>5</sup>

5 North and south are opposites, just like summer and winter are opposites.



← **Show image 2A-5: Northern winter**

As Earth revolves around the sun, the seasons begin to change depending on which hemisphere is tilted most directly toward the sun. This depends on where Earth is on its revolution, or orbit, around the sun. One revolution takes one year, and each hemisphere is tilted directly in the sun for part of the year. Six months after the longest day in the Northern Hemisphere, the shortest day occurs. The winter solstice in the Northern Hemisphere is on December 21. This is, of course, the longest day of the year, or summer solstice, in the Southern Hemisphere. They are opposites!



← **Show image 2A-6: Northern spring and fall**

When Earth is halfway between the two solstices, both hemispheres receive the same amount of sunlight. This means that the hours of daylight and of darkness are the same in each hemisphere. The days that are equal are called equinoxes. The spring equinox occurs at the beginning of spring on March 21. The autumn equinox occurs at the beginning of autumn on September 21.

The cycle of one complete orbit or revolution of Earth around the sun marks or measures one year. Living things respond to the changes in sunlight and warmth throughout the four seasons of the year. With increased sunlight and warmth during spring and summer, many living things tend to grow well. Animals are born and plants grow. With decreased sunlight during autumn and winter, some plants are ready to be harvested, whereas others die. Some become dormant—or become inactive, and stop growing and making new leaves for the winter—and wait for the sunlight to return. You will see that most trees do this in the fall and winter. Some animals, to avoid the winter chill, hibernate or migrate. When animals migrate, they move to warmer environments.<sup>6</sup>

6 Think of two words that describe each season.



← **Show image 2A-7: Light hitting Earth**

Not every part of Earth experiences four different seasons, though. Different areas of Earth have different types of weather. This is partly because of the shape and tilt of our planet. This means that different parts of Earth receive different amounts of sunlight and warmth. The area around the equator receives the greatest amount of direct intense sunlight, so some of the warmest parts of Earth are located near the equator. The North and South Poles are at opposite ends of our planet and they receive the least direct sunlight. In fact, although they are so far apart, they have the same kind of weather as each other. It is always cold in the North and South Poles, and both places are usually covered with ice.



← **Show image 2A-8: Four seasons**

In the next lesson you will learn more about the cycle involving the four seasons and how each season brings with it an ever-changing landscape. Which season is your favorite?

## ***Discussing the Read-Aloud***

**15** minutes

### **Comprehension Questions**

**10** minutes

If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses.

1. *Literal* Name the four seasons in order. (Spring, summer, autumn, and winter repeat again and again in the same order.)
2. *Literal* How long does it take Earth to orbit or revolve around the sun? (It takes Earth one year to revolve around the sun.)
3. *Literal* The equator divides Earth into which two hemispheres? (The equator divides Earth into the Northern and Southern Hemispheres.)
4. *Inferential* The first day of summer is called the summer solstice. What is special about this particular day? (It is the day with the greatest number of daylight hours during the year.) The first day of winter is called the winter solstice. What is special about this particular day? (It is the day with the least number of daylight hours during the year.)
5. *Inferential* What do the first day of spring and the first day of autumn have in common? (On both of these days, or equinoxes, there is an equal amount of daylight and darkness over the entire Earth.)
6. *Inferential* How are plants and animals affected by the seasonal cycle? (With more sunshine and food in spring and summer, plants and animals thrive. In autumn, as the weather cools, many plants are harvested. As winter approaches,



some plants die or become inactive, while some animals hibernate or migrate.)

7. *Literal* Does the part of the earth near the equator experience four different seasons? (No, this part of the earth receives the most amount of intense sunshine. It is almost always warm.)
8. *Literal* Do the North and South poles experience four seasons? (No, they do not. They are on the opposite ends of our planet, are almost always cold, and often covered with ice.)

[Please continue to model the *Think Pair Share* process for students, as necessary, and scaffold students in their use of the process.]

I am going to ask a couple of questions. I will give you a minute to think about the questions, and then I will ask you to turn to your neighbor and discuss the questions. Finally, I will call on several of you to share what you discussed with your partner.

9. *Evaluative Think Pair Share:* What activities have you participated in during a particular season? Would it be possible to do these activities during a different season? Why or why not? (Answers may vary.)
10. After hearing today's read-aloud and questions and answers, do you have any remaining questions? [If time permits, you may wish to allow for individual, group, or class research of the text and/or other resources to answer these questions.]

## Word Work: Tilt

5 minutes

1. In the read-aloud you found out how Earth's *tilt* causes the seasonal cycle.
2. Say the word *tilt* with me.
3. *Tilt* means to slant.
4. Andrea will have to tilt her water bucket so that every drop can spill out onto her plants.
5. [Hold up the globe.] Do you see the tilt on this globe? Can you tilt your head in a similar way? Can you tilt your head to the right? Can you tilt your head to the left? [You may wish to have several students tell the class to tilt something to the left or right.]
6. What's the word we've been talking about? What part of speech is the word *tilt*? How do you know that it is an action word?

Use a *Discussion* activity for follow-up. Directions: Describe other objects that you tilt when you use them. [Suggestions: computer screen, cell phone games, seesaw, drawbridges, chairs, measuring cups, etc.]



**Complete Remainder of the Lesson Later in the Day**



# The Reasons for Seasons

# 2<sub>B</sub>

**Note:** Extensions may have activity options that exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

## Extensions

**20 minutes**

### Seasons Chart

**10 minutes**

Continue the class Seasons Chart you started in the lesson introduction. Ask students if they can add any new information they learned from the read-aloud about each season in the first two rows. You may wish to use Image Cards 1–4 and Cycles Poster 1. You may wish to use the following chart as a guide:

	Spring	Summer	Autumn (or Fall)	Winter
<b>Date Season Begins in the Northern Hemisphere</b>	Spring Equinox; on March 21	Summer Solstice; on June 21	Autumn Equinox; on September 21	Winter Solstice; on December 21
<b>Amount of Sunshine</b>	Roughly the same number of daylight and dark hours	longer daylight; it stays light out later.	Roughly the same number of daylight and dark hours	shorter daylight; it gets dark earlier.
<b>Temperature in the Northern Hemisphere</b>				
<b>Plants</b>				
<b>Animals</b>				
<b>People Activities/Clothing</b>				

Continue filling in this chart in Lesson 3.

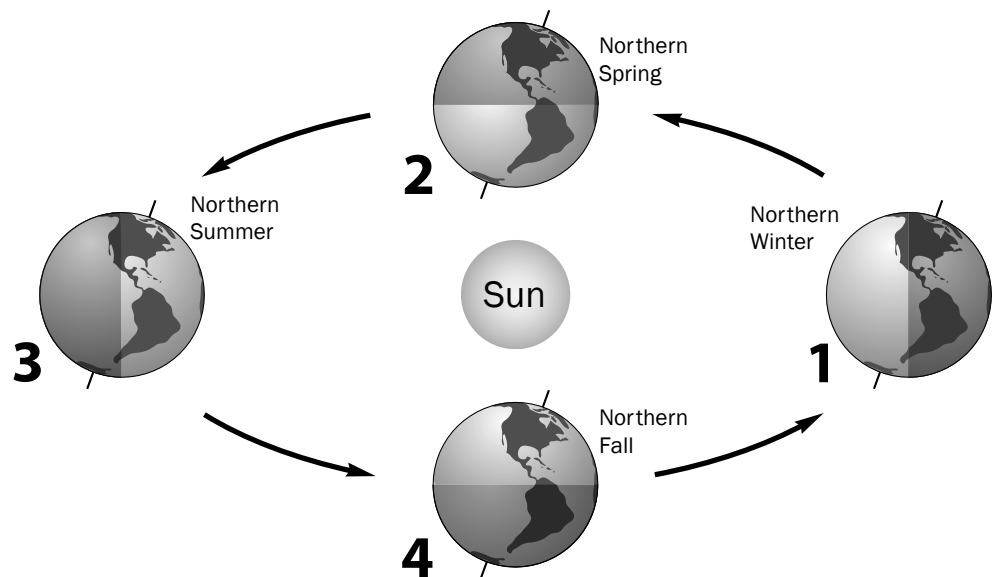
### Demonstration of Earth’s Revolution/Orbit

**10 minutes**

#### *Revolution and Tilt: One Year/Four Seasons*

- If you haven’t done so already, using a flag or pin, mark the approximate location of your town on the globe, and ask: “Do we live north or south of the equator?” (north)

- Tell students that you are going to show them how the orbit of the tilted earth causes the seasons where they live.
- Place a large Hula Hoop™ on the floor, and tell students that this hoop represents the sun. Explain that the sun is much larger than the earth—much larger than the difference between the large hoop and the globe.
- Remind students that the earth does not just rotate, or spin in place on its axis; it also travels around, or orbits, the sun at the same time. Walk counterclockwise around the large hoop while holding and rotating the globe counterclockwise. Be sure to keep the tilt of the globe facing in the same direction (i.e., toward the same wall or corner of the room). Point out the tilt of the globe and ask: “Who remembers the word that means slanted, or placed at an angle?” (tilted)
- Remind students that the tilt of the earth in relation to the sun causes the seasons.
- Darken the room to begin the demonstration. **[Note:** You may wish to explain that even though you will stop several times during this demonstration to explain something, the earth never stops moving as it rotates on its axis and orbits around the sun.]



- [Northern Winter] Ask a volunteer to stand in the middle of the large hoop and point the flashlight at the globe while you hold it steady in Position 1 (Northern Winter). Say: “When the North Pole is tilted away from the sun, the northern half of the earth does not receive as much direct sunlight; we have fewer daylight hours. When our daylight hours decrease, the temperatures become colder. Which season is it when we have fewer daylight hours and colder temperatures?” (winter)
- [Northern Spring] Ask another volunteer to stand in the middle of the large hoop and point the flashlight at the globe, turning and keeping the light on the globe while you revolve counterclockwise a quarter of the way around and stop at Position 2 (Northern Spring). Say: “The tilted earth has continued to orbit the sun, and it is now spring. The daylight hours begin to increase. When daylight hours increase, the temperatures become warmer. Which season follows winter when we begin to have more daylight hours and warmer temperatures?” (spring)
- [Northern Summer] Ask another volunteer to stand in the middle of the large hoop and point the flashlight at the globe, turning and keeping the light on the globe while you revolve counterclockwise a quarter of the way around and stop at Position 3 (Northern Summer). Say: “The tilted earth has continued to orbit the sun, and now it is summer. The North Pole is tilted toward the sun, and the northern half of the earth receives more direct sunlight. When daylight hours increase, the temperatures become hotter. Which season follows spring when we have more daylight hours and hotter temperatures?” (summer)
- [Northern Fall] Ask another volunteer to stand in the middle of the large hoop and point the flashlight at the globe, turning and keeping the light on the globe while you revolve counterclockwise another quarter of the way around and stop at Position 4 (Northern Fall). Say: “The tilted earth has continued to orbit the sun, and now it is fall. The amount of daylight begins to decrease. When daylight hours decrease, the temperatures become cooler. Which season follows summer when we begin to have fewer daylight hours and cooler temperatures?” (autumn or fall)

- Ask another volunteer to stand in the middle of the large hoop and point the flashlight at the globe, turning and keeping the light on the globe while you revolve counterclockwise another quarter of the way around and stop back at Position 1 (Northern Winter). Say: “So how much time has passed now that Earth has orbited the sun one time? (one year) What season follows autumn and begins another seasonal cycle?” (winter)



## “Bed in Summer” by Robert Louis Stevenson

15 minutes

### ← Show image 2B-1: Bed in Summer

Tell students that you are now going to read a poem titled “Bed in Summer,” by Robert Louis Stevenson. Tell them to listen carefully to find out how this poem relates to the tilt of the earth and to what they have learned about the seasonal cycle.

#### *Bed in Summer*

by Robert Louis Stevenson

*In winter I get up at night  
And dress by yellow candle-light.  
In summer, quite the other way,  
I have to go to bed by day.*

*I have to go to bed and see  
The birds still hopping on the tree,  
Or hear the grown-up people’s feet  
Still going past me in the street.*

*And does it not seem hard to you,  
When all the sky is clear and blue,  
And I should like so much to play,  
To have to go to bed by day?*

Discuss with students how the tilt of the earth changes the amount of sunlight we get in each season. Do we get more sunlight in the summer or in the winter? You may wish to ask the following questions:

- Why does Robert Louis Stevenson say, “In winter I get up at night”?
- Why does he say, “In summer, quite the other way, I have to go to bed by day”?
- How does the poet feel about going to bed in summer?
- Have you ever gone to bed while it was still light outside? If yes, was it easy or hard to fall asleep?
- Does your family let you stay up later during the summer, or do you have to go to bed during daylight hours like the poet did?

Share with students that this poem was written in the 1800s, when people did not have electricity like we do today. Explain that when it became dark at night (earlier in seasons other than summer), people could not do as many things with just the light of candles, so they often went to bed earlier.

### Domain-Related Trade Book

20 minutes

- Refer to the list of recommended trade books in the Introduction at the front of this *Supplemental Guide*, and choose one trade book about the cycle of the seasons to read aloud to the class.
- Explain to students that the person who wrote the book is called the author. Tell students the name of the author. Explain to students that the person who makes the pictures for the book is called an illustrator. Tell students the name of the illustrator. Show students where they can find this information on the cover of the book or on the title page.
- As you read, use the same strategies that you have been using when reading the read-aloud selections—pause and ask occasional questions; rapidly clarify critical vocabulary within the context of the read-aloud; etc.
- After you finish reading the trade book aloud, lead students in a discussion as to how the story or information in this book relates to the read-alouds in this domain.