

# Teacher Directions

## Who is this booklet for?

This booklet is appropriate throughout the elementary school years. It is meant to be a group activity with a variety of aged children. Younger children may need more support with some of it (such as dictating their answers for you to write and/or a little math help). Older children may find it is a good review of material they already know.

## When should you use it?

The idea is to pull this booklet out when each season changes and review the first four pages. Then work through the two pages related to the current season.

**Materials:** Print a set of pages 2 – 7 for each child. (If you want to include the quizzes, also print pages 8-9). You only need a pencil and something to color with, but it would also be helpful if you had a globe, calendar and a lantern for a demonstration. Children are also encouraged to feel how a fire is warmer the closer you stand next to it, but of course do this when convenient. 😊 Children are encouraged to get outside and look for signs of the season around them.

**Preparation:** Cut the pages in half and put them in the correct order based upon what season you are starting with. Page numbers are at the bottom right, but will need to be filled in for the season pages depending on what order you place them in.

**Instructions:** The text in the booklets walks you through the lesson. Depending on what your children have learned in the past, you may want to spend some more time in certain areas and less time in others. The quizzes are optional. There is a general quiz covering the first four pages and then a quiz for each season. The answer key is on page 10.

**Hope you enjoy and your children have a better understanding of why seasons change!**

# Why Do Seasons Change?

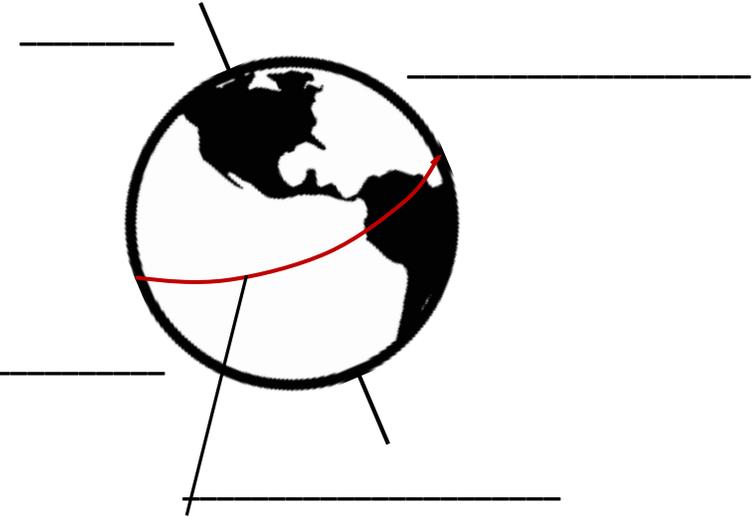
So do you ever wonder why the seasons change? Why some months are colder or warmer than others? Why sometimes it gets dark at dinner time and other times it is still light when you get into bed?

To understand why all of this occurs, first you need to learn a little more about the earth!

## Earth

- 1) You live on earth!
- 2) The earth is round!
- 3) There is an imaginary line around the center of the earth called the **equator**.
- 4) The half of the earth above the equator is called the **Northern Hemisphere**. (sphere = round shape, hemi = half)
- 5) The half of the earth below the equator is called the **Southern Hemisphere**.
- 6) The earth spins as if there is an imaginary pole that sticks up through the center of it. We call this the earth's **axis**.
- 7) The earth's axis is tilted (at  $23.5^\circ$ ).

Before we talk about why all of this is important, label the following parts of the picture below: Northern Hemisphere, Southern Hemisphere, axis, equator. Then, color the oceans blue.



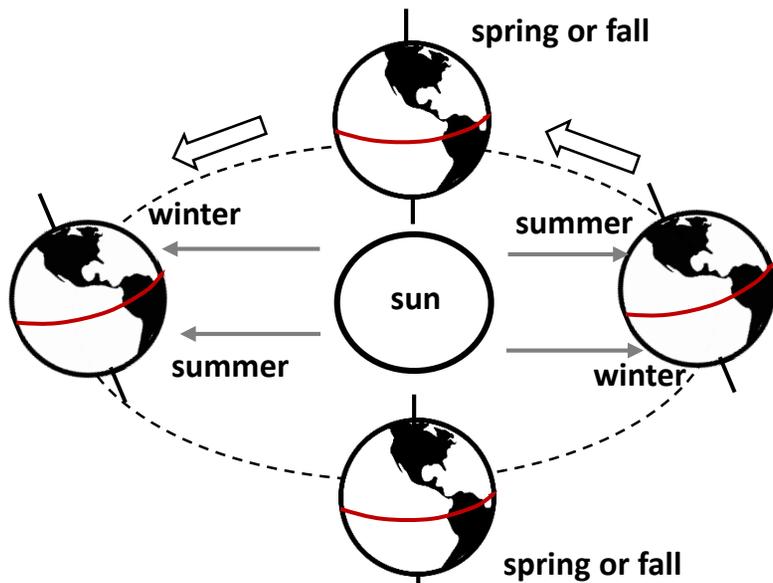
## Solar System

Now let's talk about how the earth moves around the sun. Both, the earth and the sun (as well as 7 other planets) are part of the solar system. (solar = sun) The sun is a star that is much closer to us than other stars. The earth and 7 other planets revolve or move around the sun.

The sun provides us with:

**Heat**  
**Light**

The temperature and the amount of light changes with each season. Let's see why this is.



Note: The labels of the seasons above differ based upon which hemisphere you live in.

It takes  $365 \frac{1}{4}$  days for earth to move around the sun, which is approximately equal to one year. But, we can't have a  $\frac{1}{4}$  day in our calendar. That would be weird, wouldn't it? So most years have 365 days and then once every four years, we add an extra day to the calendar, February 29<sup>th</sup>. In these years, there are 366 days and the year is called Leap Year. Use your resources to find when the next leap year is!

You can see in the picture above that as the earth moves around the sun, one hemisphere will be closer to the sun than the other because of the way the earth's axis is tilted. So when a hemisphere is closer to the sun, you have warmer temperatures and more daylight or what we call summer. When a hemisphere is further from the sun, you have lower temperatures and less daylight or what we call winter.

You can see that the distance from the equator to the sun does not change as the earth moves. It is always slightly closer to the sun than the two hemispheres, therefore it is always warmer at the equator.

You can also see that the top of the earth or the North Pole and the bottom of the earth or the South Pole tilt further away from the sun in the winter. The winter in these areas is even colder with less daylight than other areas of the hemisphere.

In fact, as you move from the equator toward one of the poles, the temperature will decrease and you will have less sunlight.

*Color your hemisphere blue in each of the four earths in the diagram. Circle the season next to each earth that matches that hemisphere.*

### Act it out

Stand by a fire: Turn sideways and feel how the heat warms one side of your body more. Tilt toward and away from the fire (be careful to keep your balance around a fire!) and feel how the part of your body closest to the fire is warmer.

Be the sun and the earth: This works best with two people in a dark room. One is the 'sun' and holds a lantern or a lamp. The other is the 'earth' and revolves around the sun. The 'earth' can tilt and call out what season it is as he or she revolves around the earth.

# Winter

When the hemisphere you are in is tilted away from the sun, you have winter.

The first day of winter is called the winter solstice and occurs around December 21<sup>st</sup> in the Northern Hemisphere. (June 21<sup>st</sup> in the Southern Hemisphere) This is based upon where the earth is compared to the sun.

The winter solstice is the shortest day of the year. Determine how short your day is by checking your resources for your area (such as a weather app) and using your math skills.

Time of sunrise: \_\_\_\_\_  
Time of sunset: \_\_\_\_\_  
Total length of daylight: \_\_\_\_\_  
Total length of darkness: \_\_\_\_\_

The **meteorological winter** starts on December 1<sup>st</sup>. This is the day meteorologists or people who study the weather consider the first day of winter.

What is the temperature today? \_\_\_\_\_  
Have you had any wintry weather lately? \_\_\_\_\_  
\_\_\_\_\_

What different clothes do you wear in the winter?  
\_\_\_\_\_  
\_\_\_\_\_

## Look at the world around you:

What do the trees look like? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

The **deciduous** trees have probably lost most of their leaves, but the evergreen trees are still green with their needles or thick leaves.

Do you see any plants that still have leaves or flowers?  
Draw a picture of one:

Do you see any animals? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Winter can be hard on animals and they often respond in the following ways:

**Migrate:** Some animals, especially birds move to a warmer place for the winter.

**Hibernate:** Some animals such as bears, bats, bees, and snakes, sleep for the winter.

**Adapt:** Some animals adapt to the winter by growing heavier fur or feathers and sometimes by changing color to blend in with snow.

# Spring

The first day of spring is called the spring equinox and usually occurs on March 20<sup>th</sup> or 21<sup>st</sup> in the Northern Hemisphere. (September 22<sup>nd</sup> or 23<sup>rd</sup> in the Southern Hemisphere) During an equinox, both the Northern and Southern Hemispheres receive equal amounts of sunlight.

Typically, the amount of daylight and nighttime is close to equal during an equinox. Determine the length of daylight and darkness in your area by checking your resources for your area (such as a weather app) and using your math skills.

Time of sunrise: \_\_\_\_\_

Time of sunset: \_\_\_\_\_

Total length of daylight: \_\_\_\_\_

Total length of darkness: \_\_\_\_\_

The **meteorological spring** starts on March 1<sup>st</sup>. This is the day meteorologists or people who study the weather consider the first day of spring.

What is the temperature today? \_\_\_\_\_

Does it seem like spring where you are? \_\_\_\_\_

\_\_\_\_\_

What different clothes do you wear in the spring?

\_\_\_\_\_

\_\_\_\_\_

Some people plant gardens in the spring. Do you? \_\_\_\_\_

## Look at the world around you:

What do the trees look like? \_\_\_\_\_

\_\_\_\_\_

The **deciduous** trees are probably starting to get buds that will turn into flowers and leaves. The evergreen trees may also have fresh growth or new flowers in the spring.

Do you see any plants starting to get buds or flowers? Draw a picture of one:

Spring is when some animals come out of hibernation or return from their migration to a warmer place for the winter. Do you see any animals returning? \_\_\_\_\_

\_\_\_\_\_

Some shed their thick layer of fur or feathers that they needed for the winter. Have you seen fur or feathers that have been shed? \_\_\_\_\_

\_\_\_\_\_

Many animals have their babies in the spring. Do you see any baby animals? \_\_\_\_\_

\_\_\_\_\_

# Summer

When the hemisphere you are in is tilted toward the sun, you have summer.

The first day of summer is called the summer solstice and occurs around June 21<sup>st</sup> in the Northern Hemisphere. (December 21<sup>st</sup> in the Southern Hemisphere) This is based upon where the earth is compared to the sun.

The summer solstice is the longest day of the year. Determine how long your day is by checking your resources for your area (such as a weather app) and using your math skills.

Time of sunrise: \_\_\_\_\_  
Time of sunset: \_\_\_\_\_  
Total length of daylight: \_\_\_\_\_  
Total length of darkness: \_\_\_\_\_

The **meteorological summer** starts on June 1<sup>st</sup>. This is the day meteorologists or people who study the weather consider the first day of summer.

What is the temperature today? \_\_\_\_\_  
Have you had summery weather lately? \_\_\_\_\_  
\_\_\_\_\_

What different clothes do you wear in the summer?  
\_\_\_\_\_  
\_\_\_\_\_

## Look at the world around you:

What do the trees look like? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

The **deciduous** trees have probably have most of their leaves now. The evergreen trees are still green with their needles or thick leaves.

Draw a picture of one or more of the plants around you:

Do you see any animals? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Many animals come out during the summer, but sometimes the heat can be hard for them and they may hide during the hottest part of the day.

Some animals only come out at night and are called **nocturnal**. These include bats, raccoons, and possums. Animals that are out during the day and sleep at night are called **diurnal**.

Have you noticed any animals that are usually out at a certain time of day? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# Fall

The first day of fall is called the fall equinox and usually occurs on September 22<sup>nd</sup> or 23<sup>rd</sup> in the Northern Hemisphere. (March 20<sup>th</sup> or 21<sup>st</sup> in the Southern Hemisphere) During an equinox, both the Northern and Southern Hemispheres receive equal amounts of sunlight.

Typically, the amount of daylight and nighttime is close to equal during an equinox. Determine the length of daylight and darkness in your area by checking your resources for your area (such as a weather app) and using your math skills.

Time of sunrise: \_\_\_\_\_

Time of sunset: \_\_\_\_\_

Total length of daylight: \_\_\_\_\_

Total length of darkness: \_\_\_\_\_

The **meteorological fall** starts on September 1<sup>st</sup>. This is the day meteorologists or people who study the weather consider the first day of fall.

What is the temperature today? \_\_\_\_\_

Does it seem like fall where you are? \_\_\_\_\_

What different clothes do you wear in the fall?

Fruits and vegetables are often harvested in the fall. Do you have a favorite fall food? \_\_\_\_\_

## Look at the world around you:

What do the trees look like? \_\_\_\_\_

The leaves on **deciduous** trees are probably starting to change colors. The evergreen trees are probably not showing any changes. Collect some leaves and draw a picture of one:

Do you see any plants that still have flowers? Draw a picture of one:

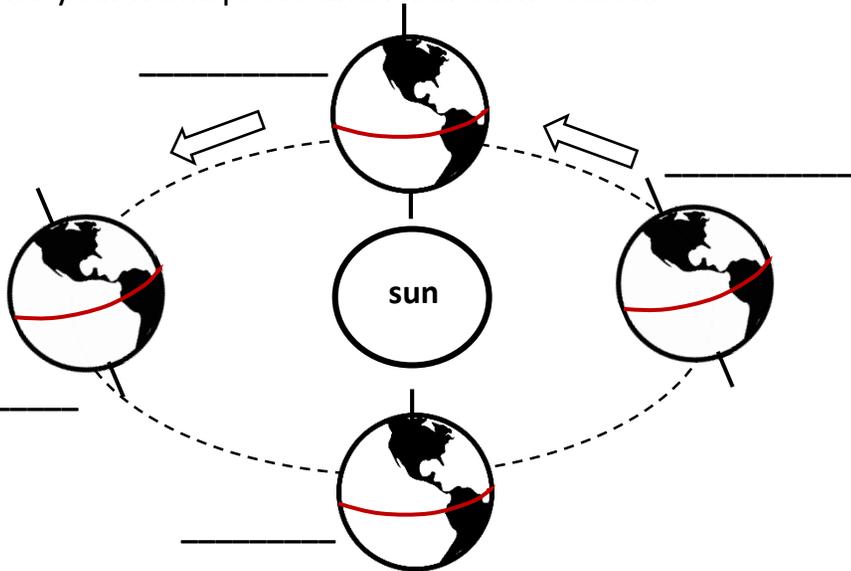
Do you see any animals? \_\_\_\_\_

Animals may be out more and more playful once the hot summer temperatures have passed. Many animals also start getting ready for winter. Some animals eat extra food to build up body fat. Other animals collect and store food like nuts and acorns to eat later in the winter.

Have you seen any animals collecting food? \_\_\_\_\_

# Quizzes

1. The earth rotates on its \_\_\_\_\_, which is \_\_\_\_\_ 23.5°.
2. The sun gives the earth \_\_\_\_\_ and \_\_\_\_\_.
3. The \_\_\_\_\_ moves around the \_\_\_\_\_.
4. Color your hemisphere and label each season.



4. It takes \_\_\_\_\_ days for the earth to move around the sun.
5. When your part of the earth is tilted toward the sun, it is the \_\_\_\_\_ season.
6. When your part of the earth is tilted away from the sun, it is the \_\_\_\_\_ season.

7. The \_\_\_\_\_ around the center of the earth is always \_\_\_\_\_.

8. The \_\_\_\_\_ and the \_\_\_\_\_ at the top and bottom of the earth are always \_\_\_\_\_.

## Winter

1. The shortest day of the year is called the \_\_\_\_\_.
2. It occurs around \_\_\_\_\_ in the Northern Hemisphere.
3. Meteorological winter includes the months of \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ in the Northern Hemisphere.
4. What do deciduous trees look like in the winter? \_\_\_\_\_
5. What three ways do animals deal with winter? Explain each one.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

# Spring

1. The first day of spring is called the \_\_\_\_\_  
\_\_\_\_\_.
2. It occurs around \_\_\_\_\_ in the Southern Hemisphere.
3. Meteorological spring includes the months of \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ in the Northern Hemisphere.
4. What do deciduous trees look like in the spring? \_\_\_\_\_  
\_\_\_\_\_.
5. Animals often have \_\_\_\_\_ in the spring.

# Summer

1. The longest day of the year is called the \_\_\_\_\_  
\_\_\_\_\_.
2. It occurs around \_\_\_\_\_ in the Northern Hemisphere.
3. Meteorological summer includes the months of \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ in the Northern Hemisphere.
4. What do deciduous trees look like in the summer? \_\_\_\_\_  
\_\_\_\_\_.

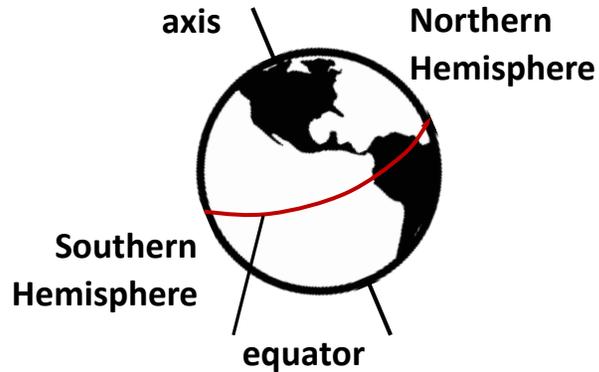
5. Animals may stay hidden during the \_\_\_\_\_  
part of the day.
6. Nocturnal animals sleep during the \_\_\_\_\_  
and are awake at \_\_\_\_\_.
7. Diurnal animals sleep at \_\_\_\_\_ and are awake  
during the \_\_\_\_\_.

# Fall

1. The first day of fall is called the \_\_\_\_\_  
\_\_\_\_\_.
2. It occurs around \_\_\_\_\_ in the Southern Hemisphere.
3. Meteorological fall includes the months of \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ in the Northern Hemisphere.
4. What do deciduous trees look like in the fall? \_\_\_\_\_  
\_\_\_\_\_.
5. What are two ways animals prepare for winter?
  1. \_\_\_\_\_  
\_\_\_\_\_
  2. \_\_\_\_\_  
\_\_\_\_\_

# Answer Key

Page 2:



Page 13-14:

1. axis tilted
2. heat and light
3. earth, sun
4. Northern Hemisphere: left: winter, bottom: spring, right: summer, top: fall  
Southern Hemisphere: left: summer, bottom: fall, right: winter, top: spring
5. 365 (or  $365 \frac{1}{4}$ )
6. summer
7. winter
8. equator, hot
9. North Pole, South Pole, cold

Winter:

1. winter solstice
2. December 21<sup>st</sup>
3. December, January, February
4. Bare, leaves have fallen off, etc.

Winter (cont.):

5. Migrate: move someplace warmer  
Hibernate: sleep the whole winter  
Adapt: grow thicker fur or feathers, change color to blend in with snow

Spring:

1. spring equinox
2. September 22<sup>nd</sup>
3. March, April, May
4. Start to get buds.
5. babies

Summer:

1. Summer solstice
2. June 21<sup>st</sup>
3. June, July, August
4. They have green leaves.
5. hottest
6. day, night
7. night, day

Fall:

1. Fall equinox
2. March 21<sup>st</sup>
3. September, October, November
4. Leaves change colors and fall off.
5. Eat extra food to put on body fat. Store food for winter.

# Credits

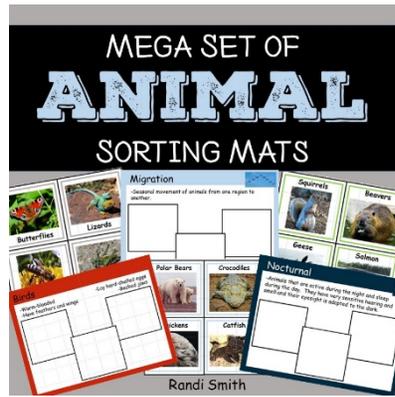
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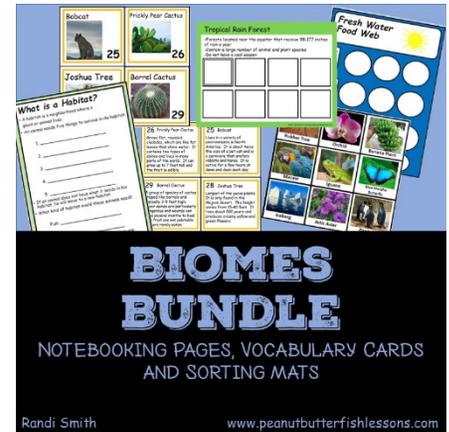
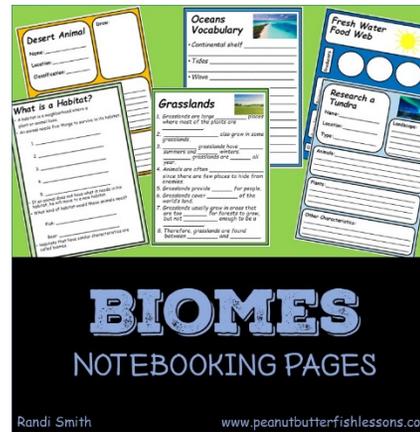
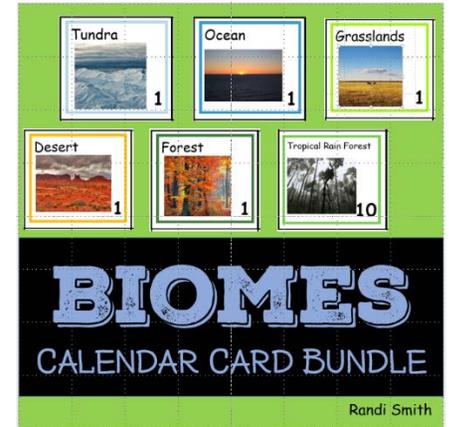
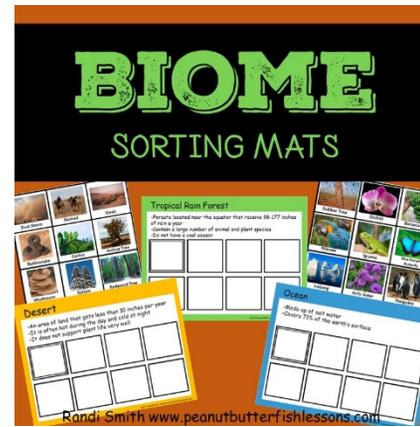
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