

K-2 Seasons and Living Things

Overview

Focus Question

Why is the sun important? What are the seasons and why do we have seasons? How do seasons affect plants, animals, and humans?

Activity Synopsis

Students will participate in an activity in which they observe the sun as the prime energy source for the Earth, model the journey the Earth takes around the sun to understand the reason for seasons and investigate the effects seasons have on living things.

Time Frame

2-3 days (40-60 minutes per day)

Objectives

The learner will be able to:

- Observe and describe how the sun provides heat, energy, and light for the Earth
- Recognize and chart the sun's effect on seasonal weather
- Provide pictorial and/or written explanation to how the seasons affect humans
- Investigate the seasonal effect on living things
- Communicate that animals, plants, and humans are affected by the seasons

Student Key Terms

- hibernation
- migration
- seasons
- sun
- weather

Teacher Key Terms

- brumation
- chlorophyll
- fall (autumnal) equinox
- photoperiodic
- pigment (plant)
- spring equinox
- summer solstice
- winter solstice

Standards

South Carolina College- and Career-Ready Science Standards 2021

Kindergarten: K-PS3-1, K-LS1-1, K-ESS2-1, KESS2-2, K-ESS3-1, K-ESS3-3

1st Grade: 1-LS1-1, 1-LS1-2, 1-ESS1-2

2nd Grade: 2-LS2-1, 2-LS4-1, 2-ESS1-1, 2-ESS2-3, 2-ESS3-1

* **Bold standards are the main standards addressed in this activity**

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Kindergarten: **K.P.1A.1**, **K.P.1A.2**, K.P.1A.3, **K.P.1A.4**, **K.P.1A.8**, K.L.2A.5, **K.E.3A.2**, **K.E.3A.3**, K.E.3A.4

1st Grade: **1.S.1A.1**, **1.S.1A.2**, 1.S.1A.3, **1.S.1A.4**, 1.S.1A.7, **1.S.1A.8**, **1.E.3A.1**, **1.E.3A.4**, **1.L.5B.3**

2nd Grade: **2.S.1A.1**, **2.S.1A.2**, 2.S.1A.3, 2.S.1A.4, 2.S.1A.7, **2.S.1A.8**, 2.L.5B.2, 2.L.5B.3, **2.E.2A.2**

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South Carolina College- and Career-Ready Science Standards 2021

Kindergarten Performance Expectations

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

K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.

K-ESS2-1 Use and share observations of local weather conditions to describe patterns over time.

K-ESS2-2 Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.

K-ESS3-1 Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

K-ESS3-3 Obtain and communicate information to define problems related to human impact on the local environment.

First Grade Performance Expectations

1-LS1-1 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

1-LS1-2 Obtain information from multiple sources to determine patterns in parent and offspring behavior that help offspring survive.

1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.

Second Grade Performance Expectations

2-LS2-1 Plan and conduct an investigation to determine what plants need to grow.

2-LS4-1 Make observations of plants and animals to compare patterns of diversity within different habitats.

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

2-ESS2-3 Obtain information to identify where water is found on Earth and that it can be solid or liquid.

2-ESS3-1 Design solutions to address human impacts on natural resources in the local environment.

2014 Academic Standards and Performance Indicators for Science

Kindergarten Performance Indicators

K.P.1A.1 Ask and answer questions about the natural world using explorations, observations, or structured investigations.

K.P.1A.2 Develop and use models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.

K.P.1A.3 With teacher guidance, conduct structured investigations to answer scientific questions, test predictions and develop explanations: (1) predict possible outcomes, (2) identify materials and follow procedures, (3) use appropriate tools or instruments to make qualitative observations and take nonstandard measurements, and (4) record and represent data in an appropriate form. Use appropriate safety procedures.

K.P.1A.4 Analyze and interpret data from observations, measurements, or investigations to understand patterns and meanings.

K.P.1A.8 Obtain and evaluate informational texts, observations, data collected, or discussions to (1) generate and answer questions about the natural world, (2) understand phenomena, (3) develop models, or (4) support explanations. Communicate observations and explanations using oral and written language.

K.L.2A.5 Construct explanations from observations of what animals need to survive and grow (including air, water, nutrients, and shelter).

K.E.3A.2 Develop and use models to predict seasonal weather patterns and changes.

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K.E.3A.3 Obtain and communicate information to support claims about how changes in seasons affect plants and animals.
K.E.3A.4 Define problems caused by the effects of weather on human activities and design solutions or devices to solve the problem.

First Grade Performance Indicators

1.S.1A.1 Ask and answer questions about the natural world using explorations, observations, or structured investigations.
1.S.1A.2 Develop and use models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.
1.S.1A.3 With teacher guidance, conduct structured investigations to answer scientific questions, test predictions and develop explanations: (1) predict possible outcomes, (2) identify materials and follow procedures, (3) use appropriate tools or instruments to collect qualitative and quantitative data, and (4) record and represent data in an appropriate form. Use appropriate safety procedures.
1.S.1A.4 Analyze and interpret data from observations, measurements, or investigations to understand patterns and meanings.
1.S.1A.7 Construct scientific arguments to support claims or explanations using evidence from observations or data collected
1.S.1A.8 Obtain and evaluate informational texts, observations, data collected, or discussions to (1) generate and answer questions about the natural world, (2) understand phenomena, (3) develop models, or (4) support explanations. Communicate observations and explanations clearly through oral and written language.
1.E.3A.1 Use, analyze, and interpret data from observations to describe and predict seasonal patterns of sunrise and sunset.
1.E.3A.4 Conduct structured investigations to answer questions about the effect of sunlight on Earth’s surface.
1.L.5B.3 Analyze and interpret data from observations to describe how changes in the environment cause plants to respond in different ways (such as turning leaves toward the Sun, leaves changing color, leaves wilting, or trees shedding leaves).

Second Grade Performance Indicators

2.S.1A.1 Ask and answer questions about the natural world using explorations, observations, or structured investigations.
2.S.1A.2 Develop and use models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.
2.S.1A.3 With teacher guidance, conduct structured investigations to answer scientific questions, test predictions and develop explanations: (1) predict possible outcomes, (2) identify materials and follow procedures, (3) use appropriate tools or instruments to collect qualitative and quantitative data, and (4) record and represent data in an appropriate form. Use appropriate safety procedures.
2.S.1A.4 Analyze and interpret data from observations, measurements, or investigations to understand patterns and meanings.
2.S.1A.7 Construct scientific arguments to support claims or explanations using evidence from observations or data collected.
2.S.1A.8 Obtain and evaluate informational texts, observations, data collected, or discussions to (1) generate and answer questions about the natural world, (2) understand phenomena, (3) develop models, or (4) support explanations. Communicate observations and explanations using oral and written language.
2.L.5B.3 Analyze and interpret data from observations to describe how animals respond to changes in their environment (such as changes in food availability, water, or air).
2.E.2A.2 Analyze local weather data to predict daily and seasonal patterns over time.
2.L.5A.2 Construct explanations for how structures (including structures for seeing, hearing, grasping, protection, locomotion, and obtaining and using resources) of different animals help them survive.

Cross Curricular Standards

South Carolina College and Career Standards for Social Studies

K.H.1, K.H.2, K.G.2, K.G.3, K.E.1, K.E.2, 1.H.1

South Carolina College and Career Standards for Math

K.MDA.4, 1.MDA.4

South Carolina College and Career Standards for ELA

Meaning, Content, and Craft (MCC) - K-2.1, 1-2.1, 2-2.1

Inquiry (I) – K-1.1, K-2.1, K-3.1, K-3.2, K-4.1, K-4.2, K-4.3, 1-1.1, 1-2.1, 1-3.1, 1-3.2, 1-4.1, 1-4.2, 1-4.3, 2-1.1, 2-2.1, 2-3.1, 2-3.2, 2-4.1, 2-4.2, 2-4.3

Reading Literacy (RL) – K-6.1, 1-6.1, 2-6.1

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Reading Informational Text (RI) – K-7.1, 1-7.1, 2-7.1

Writing (W) – K-2.1, 1-2.1, 2-2.1

Communication (C) – K-1.1, K-1.2, K-1.4, K-1.5, K-3.1, K-3.2, 1-1.1, 1-1.2, 1-1.4, 1-1.5, 1-3.1 1-3.2, 2-1.1, 2-1.2, 2-1.4, 2-1.5, 2-3.1, 2-3.2

Common Core ELA Standards

Writing – K.2, K.8, 1.2, 1.8, 2.2, 2.8

Speaking/Listening – K.1, K.2, K.3, K.4, K.5, K.6, 1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 2.5

Background

Key Points

Key Points will give you the main information you need to teach the activity.

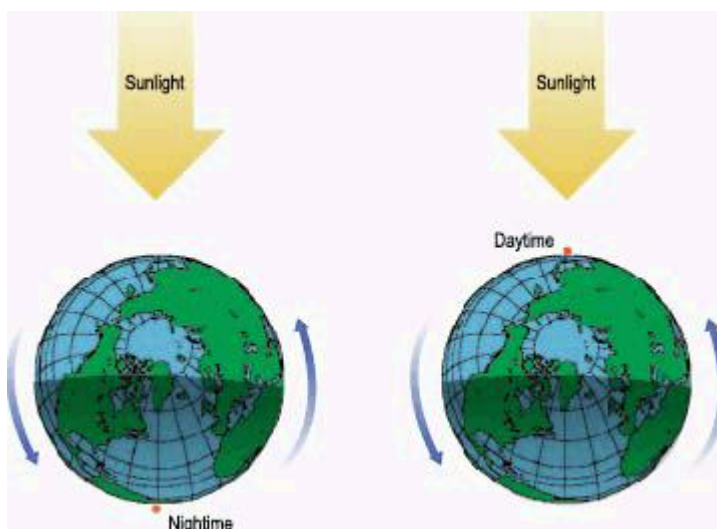
- The **sun** is vital to all living things on Earth. It provides heat, light, weather, energy to plants, and warmer oceans.
- The earth has **seasons** because its axis is tilted at 23.5 degrees from the vertical. The axis is always pointed in the same direction as it orbits the sun, which changes the amount of direct light during the year.
- Plants undergo hardening in the winter to survive cold temperatures. Some trees drop their leaves in the winter, after leaf pigmentation changes in the fall, to help the tree survive freezing temperatures. Most trees grow new leaves and flowers in the spring.
- Animals adapt to the seasons in order to have food, shelter, and water. Animals experiencing cold **weather** in the winter may **hibernate**, **brumate**, **migrate**, scatter hoard, camouflage, or change their coats in order to survive. Most animals have babies in the spring and eat the plentiful food supply in the summer. Most animals typically spend fall preparing for winter.

Detailed Information

Detailed Information gives more in-depth background to increase your knowledge, in case you want to expand the activity or you are asked detailed questions.

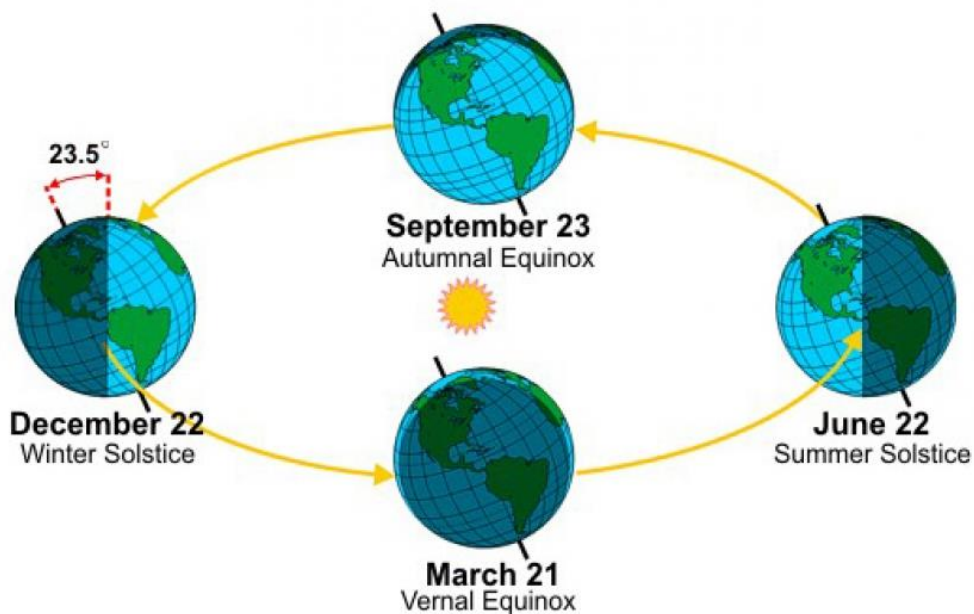
The **sun** is vital to the Earth's existence. Without the sun, there would be no life on Earth. It provides heat and light, warms the oceans, generates weather patterns, and provides energy to plants that provide oxygen and food. The solar system, including the smallest space dust, is held together by the sun's gravity.

The sun appears to move across the sky starting in the east in the morning and then towards the west as the day ends. As the sun spins around its axis counterclockwise, the parts of the earth facing the sun are having day and the parts of the earth facing away from the earth are experiencing night.



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Seasons are the regular changes in **weather** throughout the year. Weather is the state of the atmosphere at a specific place and time, in regards to heat, dryness, sunshine, wind, and precipitation. Seasons are affected by the amount of solar radiation an area gets as the earth rotates around the sun. The earth revolves around the sun, and also turns around itself, causing day and night as mentioned. If the axis was vertical, day and night would be equal everywhere throughout the year, and there would be no seasons. However, for reasons unknown, the axis around which the earth turns deviates from the vertical by 23.5 degrees. As the earth orbits the sun, its tilted axis always points in the same direction. As the earth makes its way around the sun, different parts of earth get the sun's direct rays, causing seasons and changes of daylight. In the summer, the sun's rays are less slanted and concentrated on smaller areas in the northern hemisphere, causing hotter temperatures, as well as longer days as the axis points directly towards the sun. During the winter, the northern hemisphere gets the least direct rays, causing shorter days and colder temperatures due to less heating from the sun. Throughout the spring and fall, the angle of sunlight is about equal during the day and night, causing mild temperatures and somewhat equal daylight and darkness.



Fall

Fall begins on September 22nd, on the **autumnal equinox**, when there is about twelve hours of daylight and twelve hours of darkness. The noon sun appears low in the sky, temperatures gradually get colder, and days get shorter. The leaves on deciduous trees begin to lose chlorophyll, which eventually fall. Some animals begin to **migrate** and other animals prepare for slumber. As daylight decreases, humans can be affected as well. Some people can have a difficult time falling asleep when their circadian biological clock is disrupted, which is governed by neurons that respond to light and dark signals. Some humans also tend to adjust their diets, eating heavier and warmer foods.

Winter

The shortest day of the year in North America is December 21st, the **winter solstice**, when the Northern Hemisphere is tilted furthest away from the sun and begins the winter season. During the winter, temperatures are cold, sometimes freezing along with snow. Some mammals **hibernate** and reptiles can **brumate**. Hibernation and brumation are both periods of inactivity in response to cold temperatures. Mammals that hibernate, will fall asleep and will not eat or drink. Reptiles that go into brumation will slow down, however, they will still have periods of activity. They will not eat, but they will drink. Some birds migrate south to find warmer temperatures in search of food. After the winter solstice, the days gradually become longer as the sun starts to climb higher in the sky every night. Humans can be affected by Seasonal Affective Disorder (SAD), as the winter temperatures set in and the days get shorter, feeling depressed, moody, or experiencing energy loss. Just as animals grow warmer and thicker fur, humans layer with extra clothes to withstand the chilly temperatures.

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Spring

Beginning March 20th on the **spring equinox**, the Northern Hemisphere begins to tilt towards the sun. Just as during the autumnal equinox, there is equal daylight to darkness on the spring equinox. The days become longer with the sun even higher in the sky. Temperatures begin to get warmer with more direct sunlight hitting the northern hemisphere. Plants begin to bud, migrating animals return home, winter coats are shed, birds build nests, and breeding season for some animals begins. Humans are able to spend more time outside.

Summer

The longest day of the year in North America is June 21st, the **summer solstice**, marking the beginning of summer. The northern hemisphere receives the most direct sunlight than any other time of the year, causing long days and hot temperatures. All animals, including humans, take advantage of the fresh food available and ample sunshine in the summer.

Animals have to find an environmental cue to tell them the time of year. When an animal changes in some way in response to day length over the year, they are called **photoperiodic**. Animals that live in seasonal environments must change their behavior to match the season appropriately, or it could be a matter of life or death. For example, spring brings warm temperatures and ample rain to help plants bloom and provide food for insects. At the bottom of the food chain, the plants and insects provide food for the larger animals, which increases their activity. Many animals have their babies in the spring and early summer, because of the increase in plants and insects.

Spring, summer, and fall temperatures are typically easy for plants to grow in. However, plants get ready for winter by going through a process called hardening or acclimation, in which they become used to the cold. Hardening is triggered by the day length shortening, cooling temperatures, and sometimes moisture availability. Plants that develop in cold climates have developed ways to survive periods of sub-freezing temperatures that would kill plants growing in warmer climates. Through hardening, plants are able to withstand the colder temperatures by regulating water content inside and outside of the plant's cells.

Leaf color changes are part of the acclimation to the colder temperatures, as well. Leaves in the fall change color due to changes in leaf **pigment**, which are natural substances produced by leaf cells. The three pigments that color leaves are:

- **chlorophyll** (green)
- carotenoid (yellow, orange, and brown)
- anthocyanin (red)

Trees and other plants use chlorophyll to produce food during photosynthesis, using sunshine as energy. Chlorophyll and carotenoid are both found in leaf cells during the tree's growing season, but the chlorophyll covers the carotenoid, which is why summer leaves are green. When the amount of sunlight decreases in the fall, trees respond by producing less chlorophyll. They eventually stop producing it, and the carotenoid (yellow, orange, and brown) already in the leaves can show through. Anthocyanins (red) are produced by some trees as a form of protection. They help the plant recover nutrients in the leaves before they fall off, preparing the tree for the growing season in the spring.

Leaves eventually fall to help the plant survive the cold temperatures throughout the winter. Roots, branches, and twigs, can withstand freezing temperatures, but the water sap in the leaves will freeze. The plant tissue unable to live through winter seals off and sheds. Oak leaves never fully detach and remain on the tree through the winter. Evergreen trees (pines, spruces, cedars, and firs) do not lose their leaves, due to the heavy wax coating on the needles.

Plant and Animal Information:

Apple Tree- Apple trees rest in the winter, after they shed their leaves through the fall. In the spring, leaf and flower buds begin to unfold and grow. Bees are attracted to the flowers and pollinate the flowers, which become the fleshy apples. In the summer, the apples grow bigger and change color, and ripen in the fall. Two weeks before the harvest, the apples food supply from the tree stops and makes the apples sweeter. Most apples are harvested in September and October.

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Live Oak- Live oaks grow from late February until late September. The trees shed leaves for only a few weeks during or just right before flowers begin to grow in the spring. Acorns begin forming clusters at the tips of the branches from late September until December. Live oaks grow in tropical woodlands, savannas, grasslands, and woodlands on maritime barrier islands. The wood is used for furniture, flooring, pulp, firewood, and ships. Some wildlife that eat live oak acorns include wood ducks, quail, wild turkey, blue jay, woodpecker, grey squirrel, raccoon, and white-tailed deer. Cavities developed in some live oaks provide shelter for many animals. Spanish moss and resurrection ferns grow on live oaks as well.

Red Buckeye- A deciduous shrub, the red buckeye loses its leaves by late September and blooms with clustered red blossoms in April and May. It yields fruit with a smooth shell in mid-fall. New foliage grows through the spring and summer. The beautiful flowers attract hummingbirds, butterflies, and bees. The seeds are consumed by squirrels, however, the seeds and young shoots are poisonous to humans if eaten.

American Alligator- Alligators are active year-round, but they are most active in the warm summer months in South Carolina. Breeding season begins late spring, but by June, pairs have mated, and females begin building mound nests out of reeds and vegetation. The hatchlings arrive in the fall after the mother incubated them through the summer. As cold-blooded reptiles, alligators rely on their environment for temperature regulation and hibernate in the winter, which is equivalent to mammal hibernation. Their brumation begins in November and ends in late February. They do not sleep the whole time and still have periods of activity. On warmer days, alligators will leave their mud hole and bask in the sun. They don't eat, but will drink. As opportunistic feeders, alligators will eat whatever they can catch, including fish, turtles, birds, snakes, frogs, small mammals, and small alligators.

American Bullfrog- As an aquatic frog, American bullfrogs hibernate in oxygen-rich water and spend most of the winter in their hibernaculum, which can be found on top of or partially buried in a streambed. Because they are cold-blooded, their bodies reflect the temperature around them, allowing them to survive for a long period without eating. When spring arrives, the frogs wake up and are ready to eat again and mate. As nocturnal predators, they will eat whatever they can catch and will fit in their mouths, such as insects, mice, fish, birds, and snakes.

Black Bear- Black bears mate in the summer and begin to eat a lot of food in the later part to put on a thick layer of fat. They like to eat grass, roots, berries, insects, and will also fish, mammals, and carrion. They continue to eat throughout the fall, until the winter cold arrives. Black bears hibernate in their den with their front paws covering their head while in a ball. They don't eat, drink, urinate, or defecate while hibernating. They will make their den in caves, burrows, brush piles, or other sheltered spots. If pregnant, a mother bear will give birth to her cubs mid-winter, but then go back to sleep and continue to hibernate as her cubs nurse and grow until spring arrives when they emerge from their den.

Black Swallowtail Butterfly- This butterfly can be found flying spring through summer in gardens, parks, and open areas. The caterpillars like to eat leaves related to carrots and citrus, while the adults sip nectar from clovers, milkweed, thistles, and other flowers. Black swallowtail butterflies lay eggs through the spring and summer, but in the fall, the last generation overwinter in the chrysalis state and emerge the following spring.

Grey Squirrel- Grey squirrels harvest food throughout the fall so they can depend on their food storage to make it through the winter. They bury their food in winter caches, which they can locate using memory and smell, using a method called scatter hoarding. They mostly feed on nuts, seeds, flowers, and buds. Crops can also be eaten in the winter. Generally, females can be more active in the summer and males are more active in the winter. Two litters can be born each year in the late winter and midsummer.

Large-Mouth Bass- Bass become active in the fall as the water cools down. Some will be in shallow and some in deep water. When the water cools down even more in the winter, they move to deep water. Also, their metabolisms slow down, so they don't have to eat very much through the cold weather. Bass fishing is typically slow in the winter, but a good time to catch a big fish. In the early spring, the bass begin to move up to shallow water as the water temperature rises. Once the water temperature rises to 55-65 degrees, the largemouth bass will find a shallow, protected area for spawning. The spawning area must have direct access to the sun and within easy access to deep water. They rest two weeks after spawning and then start to feed again. Summertime is when they focus on eating, however they conserve energy by swimming less. Bass tend to feed in shallow water during the early morning, evening, and late hours, when the sun is less bright.

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Mourning Dove- Also known as turtle doves, can be found in lightly wooded areas, grassland, farms, and urban areas. Even though some birds will not fly far due to bird feeders, fall migration south runs from September to November during the day in flocks. Spring migration north runs from March to May. Mourning doves make nests in trees, the ground, or even in gutters and eaves in the spring. Over 2-4 days, the male carries twigs to female, who then weaves them into a nest. The mother incubates the eggs for about two weeks until the hatchlings emerge. Seeds make up most of their diet, as well as wild grasses, weeds, herbs, and sometimes berries.

Snapping Turtle- Snapping turtles hibernate during the winter in water that is deep enough so it won't freeze, in the mud. Their metabolism slows down so drastically, they can get by with the meager oxygen from the mud. In the summer, they prefer shallow water, which makes it easy for them to breathe. They like to eat anything they can catch, including insects, fish, birds, small mammals, amphibians, aquatic plants, and carrion. Nesting season is from spring till early fall but, females don't lay their first eggs until they are 15-20 years old. They can live to be 30 years old.

White-Tailed Deer- White-tailed deer's mating season runs through the fall to early winter. Fawns are typically born late spring through the summer. Deer have two seasonal coats. The winter coat is grayish tan, with heavy hairs and a thick undercoat for insulation through the cold temperatures. The spring/summer coat is short, reddish tan, with a thin texture. White-tailed deer prefer habitats with a mixture of trees, shrubs, vines, grass, and fungi, as well as a water source. They eat wild herbs, fruits and crops, and even leaves, buds, and twigs if food is scarce. Acorns are their main source of food in the fall and winter, since they don't store their food, migrate, or hibernate through the winter months.

Procedure

Materials

Session one

- [Seasons Data Sheet](#) or science notebook
- Colored pencils or crayons
- Globe
- Lamp without shade

Session two

- Clothes/props for each season:
 - Summer- sunhat, sunglasses, UV shirt, beach towel
 - Fall- sweater, rake, sweatpants
 - Winter- jacket, wool hat, gloves, scarf
 - Spring- umbrella, baseball hat, t-shirt
- [Seasons PowerPoint](#)
- [Seasons Foldable](#)
- Colored pencils or crayons

Session Three

- [Seasons PowerPoint](#)
- [Seasons Plant and Animal Cards](#)
- [Season Labels](#) (cut these apart)

Procedure

Session One Procedures

1. Go outside and invite students outside to investigate the sun (They can all sit in a circle, or walk around, whichever works best for classroom management). Ask: Where do you see the sun and its light? How does it feel on your skin? Is it everywhere? Why is it

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important? What does the sun provide for you and other living things? Students can record their observations through drawings or words on their [Seasons Data Sheet](#) or science notebook.

2. Discuss and record students' observations and ideas in large group. List may include (Kindergarten and 1st- may use pictures instead of words):

<i>Light</i>	<i>Warmth for animals</i>	<i>Seasons</i>
<i>Heat</i>	<i>Weather</i>	<i>Gravity</i>
<i>Energy for plants to grow</i>	<i>Day and night</i>	

3. Begin a discussion about the weather getting cooler and nighttime starting earlier than it was during the summertime. Ask the students if they have noticed that it is getting dark earlier? Do they have less time to play outside afterschool than they did when school first started? Why is this happening? Does it have anything to do with the sun? Ask the students if they notice it getting cooler outside. Why is this occurring?

Briefly explain that it is the Earth changing its position around the sun, starting a new season...FALL! Over the next few days, they will take a journey around the sun to explore the seasons!

(Any season can be used to start the discussion. Fall was used as the introduction discussion because it is the first seasonal change that occurs during the school year.)

GO INSIDE FOR REMAINDER OF LESSON IF DISCUSSION WAS CONDUCTED OUTSIDE

4. Invite the students to pretend they are in a rocket ship overlooking the sun and the earth, to observe why the temperature cools and the days shorten in the fall. "10, 9, 8...BLAST OFF!" Demonstrate how the earth revolves around the sun at a tilt with the globe and lamp. One student can hold the lamp and another can hold the globe. Explain how the tilt of the earth changes the amount of light that hits the earth throughout the year as the earth revolves around the sun. Ask two more students to demonstrate, again. Invite more students to demonstrate as time allows.

5. Welcome the students to come back to Earth. "Houston, preparing for landing! 10, 9, 8...CONTACT!" Ask the students to close their eyes and picture in their minds what the earth looks like during fall. What about the next season, winter? Spring? Fall?

6. With a partner, record what it looks like outside during each season. Students may use the [Seasons Data Sheet](#) or their science notebook to record their answer with crayons or colored pencils. Each student may record their own answer, but work and discuss with a partner to gather ideas.

7. Ask students to share one picture to the rest of the class.

Session Two Procedures

1. Begin a discussion about ways the seasons affect humans. Ask: Now that the weather is cooler, how does this affect you? Do you dress differently? What do you enjoy doing outside? How do the seasons affect humans?

2. Choose two students to help demonstrate the right way to dress for fall. One student can choose three or four items to put on the other student. Ask the class to describe why the clothes and props are important during the fall.

3. Show some pictures of children dressed for fall and playing outside using the [Seasons PowerPoint](#) to help students visualize fall. Discuss the diagram of the Earth's position, as well, if want to cover in more detail.

4. Choose two more students to help demonstrate how to dress for winter. Ask the class to describe why the clothes and props are important and show pictures using the [Seasons PowerPoint](#).

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5. Repeat for spring and summer, using [Seasons PowerPoint](#) to depict each season.

6. Pass out the [Seasons Foldable Template](#) and provide guidelines and expectations. Ask students to draw a picture of themselves dressed and playing during the fall on the first flap and proceed to record how they dress and play the rest of the seasons under the corresponding flaps. The students can describe what they wear each season under each of the corresponding flaps with words. They may also include a conclusion statement or why they think the information is important on the back of the foldable. Some students may need the statement dictated. Provide time for students to share their work.

Session Three Procedures

1. Invite the students to take a moment to reflect on the ways seasons affect them throughout the year to begin a discussion about ways seasons may affect plants and animals. After a brief discussion, tell them they get to find out by playing a game!
2. Divide students into 6 groups. Each group needs one [Seasons Plant or Animal Card](#), which has four different pictures on one piece of paper and a set of [Season Labels](#) (fall, winter, spring and summer). The pictures are of plants or animals adapting to each season. Have them figure out which season each picture of the animal or plant is adapting to, and label it. Students can also describe within their group what the plant or animal is doing to adapt to each season.
3. Provide approximately 5 minutes (or more time if needed) for the students to discuss and label. Give time for each group to share their findings to the rest of the class or have the students rotate the cards.
4. The [Seasons PowerPoint](#) can be used to reveal the answers and to describe the plant or animal in more detail.
5. If time allows, pass out the remainder of the pictures to repeat the activity with the plants and animals not yet discussed.

Follow-Up Questions:

- How would trash in an environment affect the living things adapting to the seasons?
- How would plants and animals respond to temperatures increasing throughout all of the seasons? For example, what if summers became 5 degrees hotter and 20 days longer? What if winters became 5 degrees warmer and 20 days shorter?
- How would animals respond to trees being cut down in their environment as they are preparing for winter?

Assessment

Assessment #1:

Grade the Session 2 Seasons Foldable using the below rubric.

Scoring rubric out of 100 points

Name on back:	10 points
Picture of student dresses for fall:	10 points
Picture of student dressed for winter:	10 points
Picture of student dressed for spring:	10 points
Picture of student dresses for summer:	10 points
Sentence for "I wear..." in fall:	10 points
Sentence for "I wear..." in winter:	10 points
Sentence for "I wear..." in spring:	10 points
Sentence for "I wear..." in summer:	10 points
Overall creativity and performance:	10 points

K-2 Seasons and Living Things

Assessment #2:

Students make another foldable like the one they made of themselves in Session 2, but with a plant or animal from the matching game in Session 3. They can draw a picture of the plant/animal in each season on the front flaps and describe how they adapt to the seasons under the flaps in their own words.

Scoring rubric out of 100 points

Student and organism name on back:	10 points
Picture of organism in fall:	10 points
Picture of organism in winter:	10 points
Picture of organism in spring:	10 points
Picture of organism in summer:	10 points
Sentence for how the organism adapts in fall:	10 points
Sentence for how the organism adapts in winter:	10 points
Sentence for how the organism adapts in spring:	10 points
Sentence for how the organism adapts in summer:	10 points
Overall creativity and performance:	10 points

Cross Curricular Extensions

STEM Extension

Have students collect leaves outside. Chart the different colors of leaves the students found. Graph findings on computer.

STEAM Extension

Create collages representing animals or plants adapting to each season or just one season of choice. Provide feathers, twigs, faux fur, bark, cotton balls, googly eyes, crayons, paper scraps, leaves, tissue paper, grass, flowers. Students can also collect materials outside.

Music Extension

Play *Four Seasons* song and sing with the students. In pairs or groups, have the students write their own lyric about one of the seasons and put all of the lyrics together to make a Four Seasons song written by the whole class.

Four Seasons:

<http://freesongsforkids.com/sites/all/files/audio/FreeSongsForKids-com-FourSeasons-JudyCaplanGinsburgh.mp3>

ELA Extension

Read *Winter's Coming* by Jan Thornhill. Discuss how Lily and some of her friends prepared for winter.

ELA Extension

Read *Nest* by Jorey Hurley. Create a mini books about a living thing changing throughout the four seasons.

Resources

Teacher Reference Books

Anderson, Maxine. *Explore Winter! 25 Great Ways to Learn About Winter*. Nomad Press, Vermont, 2007.

This book provides background information and additional activities.

H.A. Rey. *The Stars*. Houghton Mifflin Harcourt Publishing Company, New York, 2008.

This book is about constellations, with a great resource about the sun and seasons in relation to Earth's position in space.

Teacher Reference Websites

K-2 Seasons and Living Things

NOAA Climate Education Resources: Seasons

<http://www.noaa.gov/resource-collections/changing-seasons>

This site offers background and additional lesson plans.

Ask a Biologist: Seasons and Animals

<https://askabiologist.asu.edu/explore/animals-seasons>

This site offers information to how animals know the seasons are changing.

Student Reference Books

Ganeri, Anita. Season to Season, Heinemann Library, Chicago, 2005.

An easy to read reference book for students to learn about the patterns of seasons

Gibbons, Gail. Sun Up, Sun Down, Voyager Books, San Diego, 1983.

This is a straightforward picture book about the sun, its importance to Earth, and its patterns.

Gibbons, Gail. The Reason for Seasons, Holiday House, New York, 1995.

This is a straightforward picture book describing each season and Earth's position in relation to the sun for each season.

Lundgren, Julie K. What Do Critters Do in the Winter?, Rourke Publishing LLC, Minnesota, 2012.

This is non-fiction picture book about winter and spring adaptations.

McCloskey, Robert. Blueberries for Sal. The Viking Press, New York, 1948.

This is a Caldecott Honor fiction book, about a girl and her mother collecting berries in the summer to can for the winter, and the bears they meet along the way.