

Sample Science Learning Plan

Big Idea/ Topic

Plants Throughout the Year – This segment will focus on the plants portion of S1L1.

Standard Alignment

S1L1. Obtain, evaluate, and communicate information about the basic needs of plants and animals.

- Develop models to identify the parts of a plant -- root, stem, leaf, and flower.
- Ask questions to compare and contrast the basic needs of plants (air, water, light, and nutrients) and animals (air, water, food, and shelter).
- Design a solution to ensure that a plant or animal has all of its needs met.

S1E1. Obtain, evaluate, and communicate weather data to identify weather patterns.

- Represent data in tables and/or graphs to identify and describe different types of weather and the characteristics of each type.
- Ask questions to identify forms of precipitation such as rain, sleet, and hailstones as either solid (ice) or liquid (water).
- Plan and carry out investigations in current weather conditions by observing, measuring, with simple weather instruments (thermometer, wind vane, rain gauge), and recording weather data (temperature, precipitation, sky condition, and weather events) in a periodic journal, on a calendar, and graphically).
- Analyze data to identify seasonal patterns of change. (Clarification Statement: Examples could include temperature, rainfall/snowfall, and changes to the environment.)

Connections to other content areas:

ELAGSE1RI1: Ask and answer questions about key details in a text.

ELAGSE1RI6: Distinguish between information provided by pictures or other illustrations and information provided by the words in a text.

ELAGSE1RI10: With prompting and support, read informational texts appropriately complex for grade 1.

ELAGSE1RF4: Read with sufficient accuracy and fluency to support comprehension.

ELAGSE1W2: Write informative/ explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure.

ELAGSE1W3: Write narratives in which they recount two or more appropriately sequenced events, include some details regarding what happened, use temporal words to signal event order, and provide some sense of closure.

ELAGSE1W8: With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

ELAGSE1SL2: Ask and answer questions about key details in a text read aloud or information presented orally or through other media.

ELAGSE1SL3: Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood.

ELAGSE1SL4: Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.

ELAGSE1SL5: Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.

MGSE1.MD.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

MGSE1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

MGSE1.OA.3 Apply properties of operations as strategies to add and subtract.

MGSE1.MD.3 Tell and write time in hours and half-hours using analog and digital clocks.

SS Information Process Skills: Interpret timelines, charts, and tables.

Instructional Design

Use the handout [Parent Letter](#) or write your own to inform parents about the instructional segment and materials they can gather for their child to successfully participate in the activities and investigations. Provide the handout [I Have a Question](#) so they can communicate questions when you read their work or talk with them. This handout will give them a place to remember their needs and focus the discussion for feedback and follow up communication.

Engage

Phenomenon: Time lapse video of a tree changing through the seasons

Show students how trees change through the seasons using pictures: Handout [Trees Change with the Seasons](#). or a [Time Lapse video of Trees through a Year in 40 Seconds](#). Show the video again and have students focus on how the weather changed around the tree. A tree as a focal point will help students to use a specific spot or area to gather their weather data.

If possible, “adopt” a tree in the school yard, home or neighborhood and photograph it to show how it changes throughout the year. Students may also draw it.

Ask: What are the parts of a plant? Where are these parts on a tree? Have students draw a picture of a plant or tree labeling the stem (trunk and branches of a tree), leaves (Evergreens have needles.), flowers (in the spring Evergreens have cones.) or fruit (in the summer), and roots. Have students tell what each one does so the plant can meet its needs. Ask: How does the weather help the tree meet its needs for air, sunlight, and water?



Teacher Note: *Since Georgia does not have the same climate as many northern states, it is misleading to show winter trees covered in snow. Also, Georgia has many evergreen trees that don't change as much as deciduous trees. There are changes even though they are called evergreens. Have students note the subtle changes in needles and cones. A power point is included to give you more ideas about teaching seasons to first grade: [Seasons for Teachers](#).*

Tracking Weather: (This will be a year-long activity that students will revisit as the seasons change throughout the year.) Students can track types of weather conditions each season on a calendar for a few weeks each month during fall, winter, spring and start of summer. Students will track daily weather conditions each day. [Blank calendar](#) and [Sample Weather Symbols for Calendar](#) are provided.

At the end of the week(s), they will then graph the data on a bar graph (i.e. rainy days, sunny days etc.). Use the Sample Weather Symbols for Calendar to make a pictograph to show the data for the month.

Use the data in practicing math skills. Example: It rained 3 days and was sunny 15 days. Students can see more, less, and equal. (17 is more than 3.) You can use the data to do adding and subtracting problems ($17 - 3 = 14$) Or word problems: How many more days was it sunny than it was rainy?

The teacher will also introduce types of weather conditions, such as rain, sleet, snow, hail, temperature, sky conditions, or weather events. In addition, introduce types of tools to measure weather conditions (thermometer, wind vane and rain gauge). Teachers can use pictures to introduce these tools for better understanding. [Sample Weather Tools Pictures](#) are included.

Using the data students will then discuss what will happen to the plants and animals in these weather conditions. For example, it is too cold for some plants to survive, or there was not enough rain for some plants and animals to live.

Plugged: Students can view a video such as You Tube time lapse video of a tree changing through the seasons: [Time Lapse video of Trees through a Year in 40 Seconds](#). Have them write about how trees change during the seasons of the year.

Encourage students to keep a weather calendar and use the symbols each day to record the weather of the day. Students can take pictures of the sky to show the changes during each kind of weather. This weather calendar can be an interactive cut and paste or you can provide students with the handouts, [Blank Calendar](#) and [Weather Symbols for Calendar](#). Students can upload onto the class webpage so you can keep a record of their work.

Unplugged: Provide students with the [Blank Calendar](#) and [Weather Symbols for the Calendar](#) so they can cut and paste their weather data for the month. Encourage students to keep a weather calendar and use the symbols each day to record the weather of the day. Schedule a time when the work is due and plan how to collect the work. Parents can drop off the packets to a designated location or you can schedule a time for collecting the completed work.



Students can use pictures of trees through the seasons to see how they change during the year— Handout [Trees Change with the Seasons](#). Encourage students to write about the ways trees change in each season.

This handout: [Seasonal ideas to talk about with your child](#) is included for classroom discussions or to provide for parents to discuss with their child.

The main activity for this lesson will be to have students think about how the weather changes throughout the year by having them consider how they dress during each season.

- What do the winter clothes have in common? (They are all heavy and designed to cover and keep the body warm.)
- What do the summer clothes have in common? (They are all light weight and do not cover as much of the body. They are designed to allow heat to escape.)
- What other things do we do to keep ourselves comfortable in the winter? (We stay indoors, exercise, use heat to keep our homes warm, etc.)
- What other ways do we prepare for cold, snowy weather? (We gather wood, build a fire, turn up the thermostat, put more blankets on the bed, go shopping for winter coats, put snow tires on the car, buy a snow shovel, etc.)
- What other things do we do to keep ourselves comfortable in the summer? (We stay indoors, don't exercise, seek shade, and go swimming or splash in water from the hose.)
- What other ways do we prepare for hot weather? (We turn up the air conditioner, take blankets off the bed, buy a fan, etc.)

Now, have students describe and or draw a picture of themselves doing an activity that is associated with a season (e.g., sledding, swimming, shoveling) and have others guess what season they're talking about. Here are some suggested questions:

- What is it about that activity that allows it to be done only in the given season? (For example, sledding requires snow, and it only snows in winter.)
- Could that activity be done at other times of the year? Why/why not? (For example, football could be played in the spring, but usually is played in the fall. This is because of tradition and favorable weather. Fall is usually dryer than spring.)
- Finish up this section by asking these questions to get students thinking about the seasons:
- What are some other things that make you think of winter? (Examples could include things like holidays [Christmas, New Year], snow, cold weather, etc.)
- What are some other things that make you think of spring? (Examples could include flowers blooming, lots of rain, warmer weather, etc.)
- What are some other things that make you think of summer? (Examples could include hot weather, picnics, beach, etc.)
- What are some other things that make you think of fall? (Examples could include leaves changing color, leaves falling from trees, cooler weather, etc.)

How often do seasons occur? (Each season occurs once a year.)

- Do you notice a pattern, or cycle, to the seasons? (Yes. The pattern is winter, spring, summer, fall and the pattern keeps repeating itself.)
- How is weather the same and how is weather different during each season?

Explore

Students can make a wind vane using paper cups, pencils, paper and straws. Directions are on the handout, [Make a Wind Finder](#). Students also enjoy using pinwheels or streamers to see how the moving air affects them. Allow students to go outside and experiment. Take the wind vane outside

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and place it in an open area. When the wind blows, observe which direction the arrow points. The arrow will point in the direction the wind is blowing from. So, if the arrow points north, the wind is blowing from the north.

Students can record data daily on a chart or calendar and determine seasonal changes.

Teacher can ask probing questions, such as

- What happens when it gets windy?
- Is the season changing?
- What will happen to leaves on the trees?
- Ask students what they notice are they track the data on the windy conditions?
- What is happening to the temperature is it getting colder or hotter? Why?
- How will this weather change affect the plants and animals in the environment?

Teacher Note: Teacher should explain the different characteristics of weather and identify the forms of precipitation such as rain, sleet, and hailstones as either solid (ice) or liquid (water). Have students observe how much precipitation falls by catching it in a plastic soda bottle with the top of the bottle cut off or a cup. They can mark the bottle or cup with the date, empty it and use it for the next event. They can then discuss greater than and less than amounts according to the day the precipitation fell.

If you have access to a rain gauge, place it in a prominent location and have students graph the data.

Your students can build a rain gauge using an empty clear soda bottle or clear cup, funnel and ruler: Handout [Building a Rain Gauge](#).

Teacher Note: Having a journal or notebook for students to visit throughout the year help remind students of how the weather changed during the year. A classroom calendar is a useful tool to track data. Students can count the number of rainy days, sunny days or snowy days and use mathematical calculations such as

- Were there more sunny days or rainy days this month? How many more?
- Why do we have less snowy days than sunny days?
- How can we show the numbers in a pictograph?

Plugged: Encourage students to watch and/or listen to weather reports on the television, radio, or computer weather website. Have them listen for what the report says will happen and observe what they actually see happening. Have them keep data on the weather through the month and year in a notebook or journal. This can be an interactive journal online or using paper, coloring tools, and pencil.

Unplugged: Provide students with directions to make a wind vane and rain gauge. Encourage them to draw pictures of their project to include in their completed packet. Have them write about how their homemade instruments worked. Encourage them to watch and/or listen to weather reports on the television or radio or read about the weather in the news. Ask them to keep data on the weather through the month and year in a notebook or journal using the instructions in the handout: [My Weather Journal](#).



Students will need practice and written feedback to successfully match their data into a graph format. [My Weather Graph](#) is included for them to use as practice. Provide them with the handout [Weather Symbols for the Calendar](#) to use in a pictograph format of cutting and pasting symbols if they are having difficulty corresponding tally marks into colors on a graph. Continue to give feedback on how to improve the graph until they have success. You can communicate answers to their questions by phoning or reading their questions in their worksheet packet.

Schedule a time to pick up their work and return their work so they can understand this concept as they work through the year on collecting data and making simple graphs.

Explain

Students can record the precipitation that occurs during each season. Ask students, what types of precipitation happens during each season? Why? When do we get the most rain? When do we see the most clouds or fog? When are the thunderstorms?

Ask: Does the weather determine the season? Answer: No. *The season is determined by length of days/nights during certain months of the year. We can have cold weather or warm weather any time during the year.*

Have students draw pictures of weather that usually happens in each season throughout the year and compile them in a Student Season Scrapbook. Have students to remember to include plants and animals and what they may look like in their pictures.

Teacher Note: NSTA Learning Center <http://learningcenter.nsta.org> Search “seasons” and select “free” and “elementary school,” to find the Science Object “Earth, Sun, and Moon: Earth’s Seasons,” a primer on teaching the reason for the seasons.

Plugged: Students can make an electronic presentation of pictures of weather that usually happen in each season through the year by using clip art that they cut and paste into a word document or Power Point. Their work can be uploaded to the class webpage for sharing and feedback.

Unplugged: Encourage students to include pictures they draw showing weather events and how the weather affects plants and animals around them.

Literature links: Encourage students to read about the weather and how it affects us and the plants and animals around us. If you see (read alouds) next to the author’s name, the book has been videoed for plugged students to hear and see pages in YouTube and other video formats. Unplugged students are encouraged to check out books or you can include one from the school or public media center in their worksheet packet. You can then have them drop it off at a designated area before it is due.

Explore both fiction and non-fiction books about the topic:

For unplugged students, you may wish to provide families with information about public libraries in your county: [Georgia Public Library Directory](#).

[Readworks.org](#) is a non-profit that provides free access to content online or to print.

For lists of award winning books, visit [NSTA](#) and [AAAS](#). Selected instructional materials should comply with your local system’s procedures and policies.



For students with internet access, explore online readings such as [Thunder Cake](#) by Patricia. *Patricia Polacco's bright illustrations bring life to her childhood memory of how her grandma helped her overcome this universal childhood fear of thunder.*

Evaluate

Have students explain how weather instruments help with understanding the weather. Have them draw the different instruments in a setting that shows what data the instruments collect. Check their weather journals and daily observation calendars to make sure they are not just cutting and pasting pictures, but actually show an understanding of the weather patterns.

Part 2 Plants Have Needs.

Phenomenon: Read the part of [Jack and the Beanstalk](#) (available - <https://www.galileo.usg.edu/>) where Jack's mother threw the seeds out the window and they found the bean stalk the next day. Ask: Is that the way plants grow? Do they grow that quickly? Do they grow that tall? Can you really climb a bean stalk? Let's find out more about seeds and plants!

Show pictures of different ways we help plants and animals meet their basic needs. Handout [Helping Plants Stay Alive](#)

The teacher will read books to students about plants and keeping them healthy. See above "literature links."

Engage Provide students with the handout, [What Do They Need to Live?](#) The instructions include cut and paste pictures into the correct category of what a plant or animal needs to live. Pictures are included on page 2 or they can draw their own.

Plugged: Students can do this as a virtual cut and paste exercise on a word document using online clip art and uploading their work to the class web page for feedback. Resources from [www.galileo.usg](http://www.galileo.usg.edu) can be shared in some online platforms.

Unplugged: Provide students with the handout and schedule a time to pick up their work or a designated drop off location. Remember to let them know how they did with comments as well as suggestions for other ways to show they recognize the needs of plants and animals when you communicate with them. Make sure they have access to scissors and glue to do this handout. The text of the story of [Jack and the Beanstalk](#) can be found at and printed to share with families ([Project Gutenberg](#)).

Explore

Allow students to find out more about plants by growing a plant from a seed. Find a place for the project near a window after the seeds germinate. Instructions are included on this site: [Seed Starting Lesson Plan](#).

Students will grow plants in different conditions. When they notice that a plant is not doing well, they will vary the limited condition to make the plant healthy. **Dead plants are not the objective in the unit. What do plants need?** Instructions are included on this site: [Light Plants and Dark Plants, Wet Plants and Dry Ones](#).



Ask children what a plant needs to grow. Obtain several small flowerpots and a packet of fast-sprouting seeds (see suggestions above). Plant seeds in several pots kept under different conditions and compare the growth of the plants.

Suggested conditions:

- Different amounts of sunlight
- Different liquids used to “water” the plants
- Don’t forget to keep a “control” plant under what the child feels would be the best conditions for plant growth.
- Students will use books or texts to learn more about plants and as references.
- Use the handout [Apple Head Dolls](#). Peel an apple. Record the weight and circumference of the apple. Soak it in lemon juice with a tablespoon of salt for half an hour to preserve it. Let it sit out on a plate and measure it each day for two weeks. Discuss the data to determine why it is important to water plants.
- Leaves make sugar for the plant to have energy: Use a paper clip and piece of construction paper to cover part of a leaf. Check under the paper after a couple days until you observe that the part of the leaf that doesn't get sunlight begins to fade to yellow instead of green. Take the paper off so that the leaf can make food again and it will become green once more.

Plugged and Unplugged: Have students grow seeds in cups, baggies or egg cartons. Plugged students can upload pictures of the seeds as they grow, and unplugged students can draw sketches. Encourage students to measure growth and record their information about the seeds. Seeds may need to be provided for students.

Explain

Use the handout [Parts of a Plant](#) for students to record how each part helps the plant live and grow. Allow students to investigate the different parts by

- Covering the leaf on a bush or tree in the school yard for two weeks. Notice the differences of the color of the leaf.
- Stems bring water to the parts of the plant: The handout [Stems](#) has ideas to show students how capillary action (the water going up the stem) works. Do the toothpick demonstration to show students how wood soaks up water. Put a white carnation or stalk of celery in a cup of water with red food coloring to see the color go up the stem to the leaves and flower. (You can pull the red tubes from the celery.
- Roots soak up the water. Put a strip of paper towel so that it goes from a plastic cup of water into an empty cup to see how it pulls water as it absorbs from the filled cup.

Choose a tree or other plant in the school yard or back yard to watch as a focal point. Use one or more of these to record information. Have students get to know their tree so that they can observe the changes more closely. They can name their tree, and you can remind them to visit it often to see how it changes during the year.

1. Take photographs,
2. Use a sketchbook and draw various scenes of the same tree.
3. Keep a “Journal of the Seasons” or “My Tree Journal” to record information.

Explain to students that weather affects the growth of plants. Ask students what types of precipitation help plants grow? Are all types of precipitation good for plants? Encourage them to think about too



much rain, not enough rain, hailstorms, snow and ice storms. Have them explain their thinking by drawing a picture and writing a sentence.

Plugged: Encourage students to take pictures of a tree or flower bed showing how wilting plants need water, pictures of rain, storms, snow/ice and ask them to compile them in a collage format in a word document, or a power point display with captions of precipitation and how it helps plants survive. Have them upload their work into the class webpage for others to share.

Encourage them to keep a journal and find a tree to observe. Have them draw sketches of the tree and notice how it changes during the year. They can trace, measure, and do leaf rubbings of the leaves, find out what lives in and around the tree, and observe it throughout each season. Designate a time to collect their observations and give positive feedback and encouragement to continue their work. You could video a tree if you have concerns about your students' access and share it with them.

Unplugged: Provide students with the handout [Water, Water Everywhere](#). Scan their pictures and drawings onto the class webpage for others to share or compile them in a scrapbook format to make a class booklet. Encourage them to keep a journal and find a tree to observe. Have them draw sketches of the tree and notice how it changes during the year. They can trace, measure, and do leaf rubbings of the leaves, find out what lives in and around the tree, and observe it throughout each season. Designate a time to collect their observations and give positive feedback and encouragement to continue their work.

Elaborate

Encourage students to observe plants and animals through the year as the seasons change. Provide them with a handout such as [Living Through the Seasons](#) so they can document what they observe. Make a booklet of their observations from Fall, Winter, Spring, and Summer.

To get students interested in natural things outside, have them go on a Nature Scavenger Hunt different seasons of the year and mark the ones they find. A handout is provided: [Nature Scavenger Hunt](#)

Plugged: Students can upload pictures and research videos of plants and animals during the year.

Unplugged: Provide students with the handouts and encourage them to document their observations during the seasons of the year. Give students feedback on their successes as you communicate with them. Remind them that they don't have to find everything on the [Nature Scavenger Hunt](#), but to check off what they see and draw sketches.

Evaluate

Assessment Ideas

Teacher Observation

- Were students able to differentiate plants from other things?
- How many students were also able to identify the parts of a plant?
- Copies of students' writing about plants and their diagram drawings should be saved for their assessment portfolios.



- As students grow plants and investigate growth, they will keep journals that measure, describe, and illustrate the growth they observe.
- Students will label the parts of a plant and explain what each part does to help the plant stay healthy. (A four-tab book foldable works well for this.)
- Students will report to the class their ways to keep the plants under their care healthy.
- Students will sketch the before and after observations of each investigation.
- Sort pictures of various fruits and vegetables into those growing above the ground (stems, flowers and leaves) and those growing below the ground (roots).

Have students draw before and after pictures of plants that didn't get enough water, plants that got too much water, plants that didn't get enough sun, etc. and what the plants would look like if the students gave them the right things to keep the plant healthy.

Review journal/sketchbook, or photographs/captions for understanding of the seasonal changes and how they impact plants and animals. Consider having students build a model using the engineering design challenge process of an effective greenhouse so plants have basic needs met no matter what the weather. Encourage students to interview greenhouse owners, workers and landscapers to find out more about how a greenhouse works.

Plugged: Review journal/sketchbook, or photographs/captions for understanding of the seasonal changes and how they impact plants and animals.

Students can research pictures of greenhouses to see how they help plants thrive. They can record their interviews and use the information in their design. A YouTube video shows farmers building two greenhouses. It is two minutes with time lapse motion: [Building Two Greenhouses Really Fast](#).

Have students explain why greenhouses help plants. Listen for them to explain that sometimes the weather doesn't provide enough rain, causes too much rain, or the temperatures are too extreme for healthy plant growth. Have them realize that the farmers used plastic so that the plants could get the sunlight they need, and it was quick and did not cost a lot.

Challenge students to design a [Greenhouse](#). If they choose to build it, have them take pictures of the process so they can share their engineering design with the rest of the class. Have them discuss their greenhouses in a distance learning platform.

Unplugged: Review journal/sketchbook for understanding of the seasonal changes and how they impact plants and animals. Give feedback on student worksheets. Provide students with the handout [Greenhouse](#). Communicate with them to find out if they are finding ways to care for the plants around their homes such as making sure they have the right amount of sunlight, water, and temperatures.

Part 3 Basic Needs of Animals

The next section would have students learn more about the basic needs of animals and the role that healthy plants and good weather have on those basic needs. You can begin with the phenomenon: [How Do Butterflies Survive the Winter?](#) The handout is included.

Lesson Goals Checklist

- Record observations in a variety of formats
- Use simple weather instruments to collect weather data
- Compile weather data in a graph, on a calendar, and/or in a journal

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- Compare the basic needs of plants (air, water, light, and nutrients) and animals (air, water, food, and shelter)
- Choose a plant and observe how it changes in different kinds of weather through the seasons

Handouts

Apple Head Dolls
 Blank Calendar
 Building a Rain Gauge
 Dear Parent
 Dressing for the Season
 Greenhouses
 Helping Plants Stay Alive
 How Do Butterflies Survive the Winter?
 I Have a Question
 Living Through the Seasons
 Make a Wind Finder
 My Weather Graph
 My Weather Journal
 Nature Scavenger Hunt
 Parts of a Plant
 Sample Weather Symbols for Calendar
 Sample Weather Tool Pictures
 Seasonal ideas to talk about with your child
 Seasons for teachers
 Seed Starting Lesson Plan
 Stems
 Trees Change with the Seasons
 Water, Water Everywhere
 What Do They Need to Live?

Supplies

- Journal or notebook for data collection, sketches and recording observations
- Access to a weather report
- Coloring tools such as markers, crayons or color pencils
- Paper
- Glue
- Scissors
- Thermometer or temperature gauge (Can be one viewed in the weather report)

Activity-based materials:

- Materials to make a wind finder: 1 pencil with eraser, a paper cup, a straight pin, a straw, a paper clip, paper
- Materials to make a rain gauge: plastic water bottle, tape, marker, rocks/pebbles, ruler
- An apple or other piece of fruit to show that plants need water (Apple Head Doll Activity)

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- A cup, place in the yard, or cut off plastic bottle to use to plant a seed.
- Soil (can be spooned from a place in the yard)
- Seeds for planting (a dried bean or any seed will work)
- A place to observe a tree nearby

Evidence of Student Success

Student mastery is assessed throughout this unit using formative and summative components. Student discussion, explanations and products should reflect the understanding indicated in the Evaluate section above. Each activity in the segment functions as an assessment opportunity as well to plan targeted supports or provide extension items. Formative options using the self-evaluation checklist and the sorting activity at various points during the segment.

Distance Learning Supports

The goal for science education in the state of Georgia is as follows: All Students, over multiple years of school, actively engage in science and engineering practices and apply crosscutting concepts to deepen their understanding of the core ideas in these fields.

The learning experiences provided for students should engage them with fundamental questions about the world and with how scientists have investigated and found answers to those questions. This lesson includes the disciplinary core ideas, science and engineering practices and crosscutting concepts to actively engage students in exploring science concepts with real world topics. As part of the vision we must support the inclusion of all students in science learning.

Some **general** strategies to include all students in the learning process of science are as follows:

- Provide consistent and positive feedback.
- Keep directions brief and clear.
- Make sure parents and students know schedules, due dates, requirements, expectations, and how assignments/tests are going to be collected.
- Share evaluation results in a timely manner to students and parents.
- Package assignments in a way that students know the sequence, what is required, when it is required, what is available as choice and what is for fun.
- Provide/encourage organizational strategies such as where to work, store work, when and where to turn in assignments, graphic organizers, etc.
- Provide reminders of important dates and requirements.
- Go over notebook and journal ideas and share your entries with students so they can see what you expect.
- Allow dictation and/or text to speech software programs and tools
- Check in with students by phone or online to answer questions, give reminders, and check progress.
- Provide parents with updates on progress and upcoming assignments. Communicate often.
- Provide resources that students can access offline.
- Allow students to give information orally or in drawings.
- Model expectations and demonstrations in video/online/phone.



Some strategies **specific** to this lesson are as follows:

- The teacher should make sure that they explain the time lapse to students. The teacher should make sure that students understand that it is showing the tree throughout the entire year.
- The teacher may need to show the video more than once.
- The teacher should consider providing students with an image of a plant to label.
- The teacher should have clear and consistent guidelines for student discussion, sharing of work and other student interactions in this new environment.
- The teacher should present information about plants and weather in multiple formats so that students can access the information. These formats could include books, videos, observations, discussion, and/or direct teaching.
- The teacher should consider providing students with weather data for their area. So that students can compare their collected data to what weather reports have observed.
- The teacher should consider read alouds for books or other information that is sent home. The teacher should be sure to consult district guidance about communication with students prior to deciding how to read aloud to students that are unplugged.
- The teacher should allow students to keep the season scrapbook in multiple formats. This could include drawing, taking pictures, or writing about what they see.
- The teacher should consider growing plants in different conditions (different types of soils, different amounts of sunlight, different amounts of water, etc.). The teacher could take pictures to show the students. Some students may not be able to grow plants in their home and images would give them access to the information.
- The teacher should allow students to present their knowledge in different formats. These formats could include drawing, writing or recording video or audio.

Engaging Families

- Additional resources to support this segment can be found at GPB: [Georgia Home Classroom](#).
- [Sample Learning Menu Strategies for K-12 Science](#)
- [Science Support for Families During School Closures](#)
- [Dear Parent Letter](#) – Include “[I Have a Question](#)” and “[Dressing for the Season](#)”



Dear Parent,

This instructional segment in science is about how to observe, collect and record data about weather and its effects on plants and animals through the seasons. Students will use this information to understand the concepts such as

- The basic needs of plants (air, water, light, a place to grow, and nutrients)
- The basic needs of animals (air, water, food, and shelter)
- People can help plants and animals with their needs.
- There are four main seasons—spring, summer, fall, and winter.
- Plants and animals change during the seasons of the year.
- People use weather instruments like thermometers, rain gauges, and wind vanes to measure weather conditions.
- People observe the weather by looking at the clouds in the sky, measuring precipitation, and noting weather events like storms, fog, drought, etc.
- Weather (temperature, rainfall/snowfall, etc.) changes through the seasons of the year.

The investigations will involve investigating weather and planning how to care for plants and animals. Make sure your child never looks directly at the sun when observing the clouds.

It will help to find a specific location (two opposite windows, for example) for your child to observe from each day and evening. Observing from the same locations will help students observe the direction the wind moves the clouds and how the sunlight changes through the day and season.

A materials place (shoe box or tote bag) will help your child locate and store what is needed so you won't have to go searching during the class.

Here are the materials needed for this segment in science:

- Journal or notebook for data collection, sketches and recording observations
- Access to a weather report
- Coloring tools such as markers, crayons or color pencils
- Paper
- Glue
- Scissors
- Thermometer or temperature gauge (Can be one viewed in the weather report)

Activity-based materials:

- Materials to make a wind finder: 1 pencil with eraser, a paper cup, a straight pin, a straw, a paper clip, paper
- Materials to make a rain gauge: plastic water bottle, tape, marker, rocks/pebbles, ruler
- An apple or other piece of fruit to show that plants need water (Apple Head Doll Activity)
- A cup, place in the yard, or cut off plastic bottle to use to plant a seed.
- Soil (can be spooned from a place in the yard)
- Seeds for planting (a dried bean or any seed will work)
- A place to safely observe a tree nearby

When your child plants a seed in the soil, he/she is learning how a plant grows from the seed and how to care for the plant. Overwatering, not watering enough, not enough sunlight, too much

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sunlight/heat will help alert your child to the basic needs and how he/she can help the plant survive. Remind them to watch for droopy leaves, yellow leaves, etc. and record their observations in their journal with sketches or pictures.

I have included a handout titled “[I Have a Question.](#)” This will help your child remember what he or she wanted to know and can focus our conversations on what he or she needs. It will help for you to keep such a page in their notebook so that we can work together. Feel free to also write down the questions you have as you work to help your child with these lessons.

Additionally, you may use the handout, “[Dressing for the Seasons](#)” to have productive science conversations with your child.





I Have a Question

I was working on

I did not understand

I was wondering about

This page will give you a place to keep your questions for the next time we talk.

Seasonal ideas to talk about with your child:

Dressing for the Season

The main activity for this lesson will be to have students think about how the weather changes throughout the year by having them consider how they dress during each season.

- What do the winter clothes have in common? (They are all heavy and designed to cover and keep the body warm.)
- What do the summer clothes have in common? (They are all light weight and do not cover as much of the body. They are designed to allow heat to escape.)
- What other things do we do to keep ourselves comfortable in the winter? (We stay indoors, exercise, use heat to keep our homes warm, etc.)
- What other ways do we prepare for cold, snowy weather? (We gather wood, build a fire, turn up the thermostat, put more blankets on the bed, go shopping for winter coats, put snow tires on the car, buy a snow shovel, etc.)
- What other things do we do to keep ourselves comfortable in the summer? (We stay indoors, don't exercise, seek shade, and go swimming or splash in water from the hose.)
- What other ways do we prepare for hot weather? (We turn up the air conditioner, take blankets off the bed, buy a fan, etc.)

Now, have students describe and or draw a picture of themselves doing an activity that is associated with a season (e.g., sledding, swimming, shoveling) and have others guess what season they're talking about. Here are some suggested questions:

- What is it about that activity that allows it to be done only in the given season? (For example, sledding requires snow, and it only snows in winter.)
- Could that activity be done at other times of the year? Why/why not? (For example, football could be played in the spring, but usually is played in the fall. This is because of tradition and favorable weather. Fall is usually dryer than spring.)
- Finish up this section by asking these questions to get students thinking about the seasons:
- What are some other things that make you think of winter? (Examples could include things like holidays [Christmas, New Year], snow, cold weather, etc.)
- What are some other things that make you think of spring? (Examples could include flowers blooming, lots of rain, warmer weather, etc.)
- What are some other things that make you think of summer? (Examples could include hot weather, picnics, beach, etc.)
- What are some other things that make you think of fall? (Examples could include leaves changing color, leaves falling from trees, cooler weather, etc.)

How often do seasons occur? (Each season occurs once a year.)

- Do you notice a pattern, or cycle, to the seasons? (Yes. The pattern is winter, spring, summer, fall and the pattern keeps repeating itself.)
- How is weather the same and how is weather different during each season?



Calendar

Month

Year

Fill in the dates according to the day of the week. *(The first day of the month may not start on Sunday. It might start on another day of the week!)*

<i>Sunday</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>	<i>Saturday</i>

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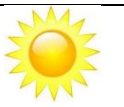
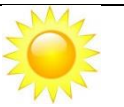





































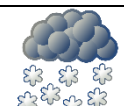







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Sample Weather Symbols for Calendar

You can cut and paste these into your calendar each day to record the weather. Choose the one that fits best. Sometimes it will change later in the day. That is okay. Just try to do this at about the same time each day. There are some extra pictures, but you can draw or write the word if you run out of pictures.

Sunny							
Partly Cloudy							
Stormy							
Rainy							
Cloudy							
Snow, Sleet, Freezing Rain							
Hailstones							
							
							
							
							
							
							

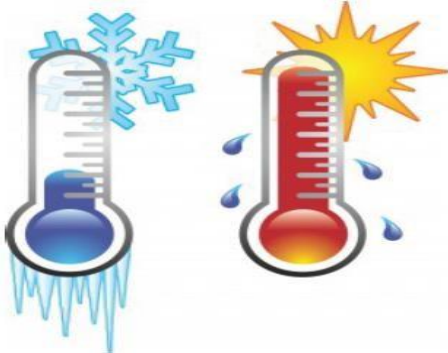

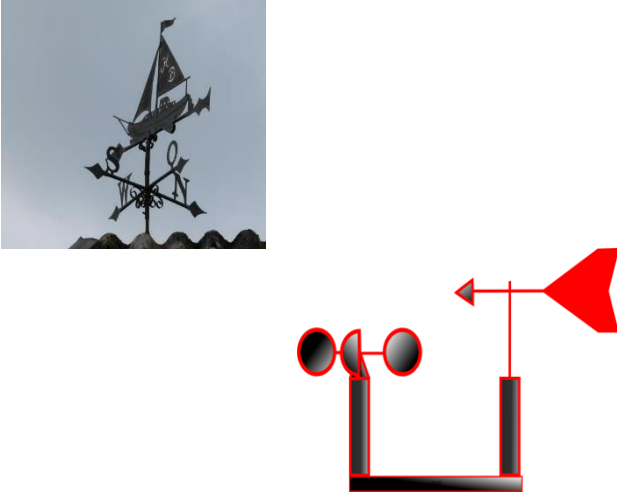
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Sample Weather Tool Pictures

<p>Thermometers measure temperature.</p>	<p>Use words like cool, cold, warm, and hot.</p>	
<p>Rain gauges tell how much rain fell.</p>	<p>A gauge measures the depth in inches or centimeters.</p>	
<p>Wind vanes tell wind direction and how strong the wind is blowing.</p>	<p>North, South, East, or West</p> <p>Use words like breezy, windy, blustery, still, calm, etc.</p>	

Trees Change with the Seasons

Look at pictures of trees during each season. Write a sentence telling how the trees changed during the year.

Fall:



Winter



Spring



Summer



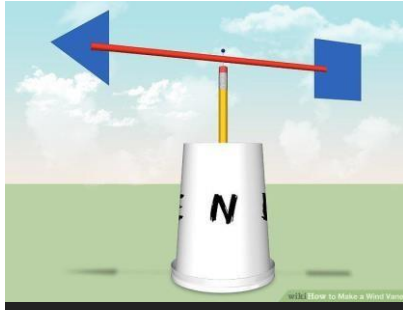
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Make A Wind Finder

Materials: 1 pencil with eraser, a paper cup, a straight pin, a straw, a paper clip, tag board



Activity:

1. Trace and cut out 2 pointers and 2 tails for your wind vane. Decide and experiment with what shapes would be best for your wind vane.
2. Place a paperclip on the end of the straw to give it weight.
3. Push the straight pin through the straw into a pencil eraser.
4. Glue the 2 pointers together on the paper clip end of the straw and glue the 2 tails on the end of the straw.
5. Push the pencil point through the bottom of the cup.
6. Take your wind vane outside and try to find wind direction.

QUESTIONS TO THINK ABOUT:

Which way is the pointer facing when the wind is blowing? into the wind? away from the wind?

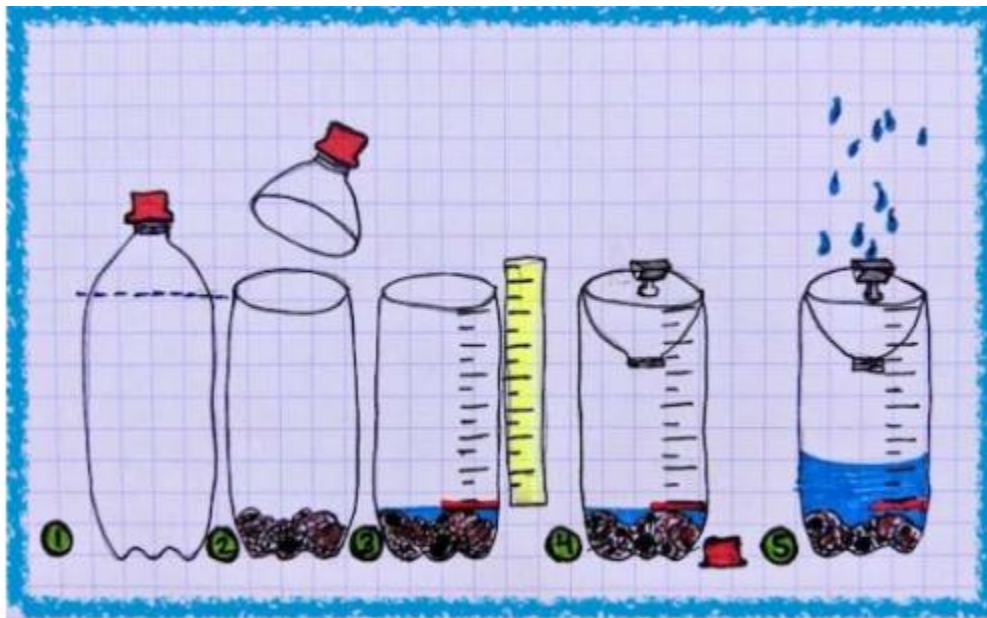
Can you tell which direction the wind is blowing? If not, then how can you find out? If yes, how do you know?

How can you tell if the wind is strong or light? What does your wind vane do?

What information does your wind vane tell you? As a meteorologist, how would you record that data?

Building a Rain Gauge

1. If using a plastic water bottle, cut the neck on the cylindrical part where it begins to curve. Note: Get help from an adult to make this cut! If the edge is sharp, use tape to cover it so it is smooth.
2. Fill the bottom of the bottle with about a cup of rocks/pebbles.
3. Choose a spot on the bottle just above the rock line to be your zero mark, or your baseline. Draw a line in red.
4. Line the ruler up to the side of the bottle with the "0" in line with your baseline and mark up the bottle every 5 millimeters. Label every other line (counting by 10).
5. Pour just enough water to cover the pebbles and so the water line is even with your zero mark.
6. Invert the top to make a funnel and use the binder clip to attach it to the bottle. This funnel will direct the rainfall and prevent evaporation of water.
7. Place your gauge in a level area that will catch the rain (avoid placing the gauge under a tree or other covered area!).
8. Check the gauge once a week and record the rainfall on your data sheet. (Note: If the value is hard to determine (in between values), use your ruler to help!)
9. Empty and reset it each time you take a reading. (Note: To reset the gauge, empty the water, replace the rocks in the bottom of the bottle, and refill enough to reach your base line. Place it back on your chosen site.)



My Weather Journal

Things to include in your journal:

- Draw a picture of an interesting weather day.
- Write about how you felt on this day.
- Draw a picture of a plant on a very hot day.
- Write what you think the plant needs on a very hot day.
- Draw a picture of an animal on a very hot day.
- Write what you think the animal needs on a very hot day.
- Write how you feel during a storm.
- Draw a picture of a rainy day and write how it makes you feel.
- Draw a picture of a windy day and write how it makes you feel.
- Put a tally mark in the box on the Weather Data chart that matches your weather calendar for each day.

Weather Data Chart

<i>Most of the day was</i>	Sunny	Cloudy	Rainy	Stormy
Tally marks (One for each day of the month)				
Total Number of Tally Marks				

- At the end of the month use the tally marks to make a graph of the number of each of the weather days. On the My Weather Graph color in one block for each tally mark.

Example to go by

Sunny	IIII
Cloudy	
Rainy	I
Stormy	II

	1	2	3	4	5
Sunny					
Cloudy					
Rainy					
Stormy					

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My Weather Graph

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Sunny																															
Cloudy																															
Rainy																															
Stormy																															



Helping Plants Stay Alive



1. What could you do to help a plant stay alive?
2. How would you know that it is helping the plant?



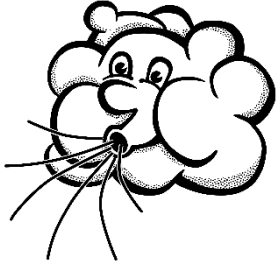
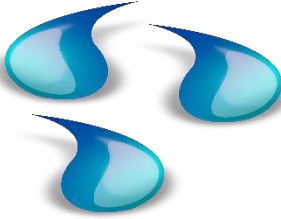
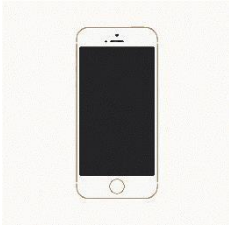





What do they need to live?

Name _____ Date _____

Directions: Cut and paste pictures into the correct category of what a plant or animal needs to live. Pictures are included on page 2 or you can draw your own.

Needs to Live	Does Not Need to Live

Cut and paste these pictures or draw your own in the right box on the chart.

<p>Sun</p> 	<p>Car</p> 
<p>Air</p> 	<p>Water</p> 
<p>Phone</p> 	<p>Shelter</p> 
<p>Nutrients</p> 	<p>Bed</p> 
<p>Trash</p> 	<p>Toys</p> 

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Apple Head Dolls

This activity shows students what happens when a plant part does not have what it needs.

It emphasizes how much of the plant is water. Students weigh and measure the peeled fruit or vegetable each day to see how much water has evaporated and the physical effect of the process.



Phenomenon

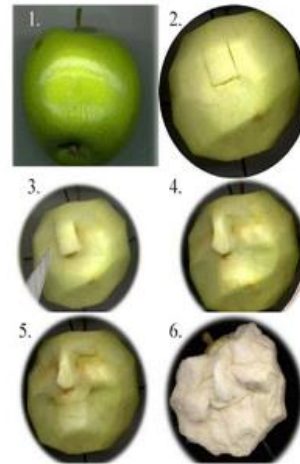


- Apple head and data will be used to introduce the concept of why plants need water.
- How can we find out how much of the apple was water?
- What is a plant?
- What other things do plants need? What are the structures a plant needs?
- Why? What do those structures do for the plant?

Apple Head Doll lesson



- 1 Granny Smith apple
- Lemon juice
- 1 Tablespoon salt
- Peeling and carving tool
- Measuring tools– food scale and cm ruler



What do you know from the data? 85% water

Date	Ounces	Grams	Centimeters	Difference
August 3, 2016	7.3	209	25	
Peeled + peeling	$6.4 + .9 = 7.3$	$183 + 26 = 209$		
Carved apple	6.3	180	23.5	
Soaked in juice and salt	6.3	180		
August 4	5.4	156	22.2	-24 grams
August 5	4.6	132	21.5	
August 6	3.6	104	20	
August 7	3.1	88	19	
August 8	2.6	71	18	
August 9	2.2	66	17.7	
August 10	1.9	55	17	
August 11	1.6	47	16.5	
August 12	?	?	?	
August 13	1.3	37	15.5	
August 14	1.1	33	14.8	
August 15	1.0	31	14.7	
August 16	1.0	29	14.5	
August 17	.9	28	14.5	-152 grams and 9 centimeters

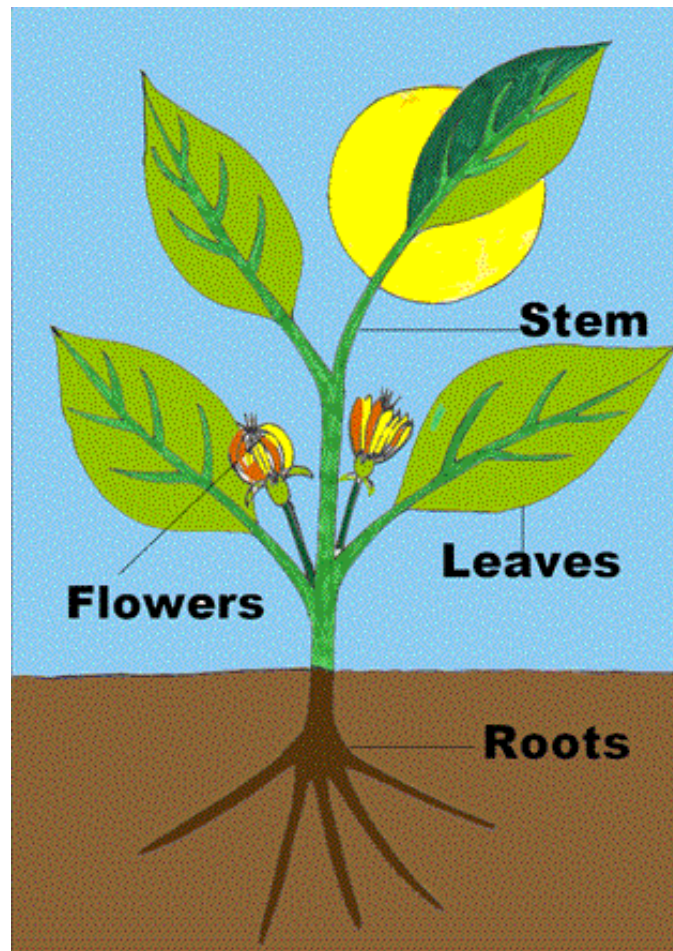
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Parts of a Plant



Tell what each part does to keep the plant healthy.

Roots _____

Stems _____

Leaves _____

Flowers _____

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Stems

Capillary action (flower stem soaking up water) with toothpicks



Bend the toothpicks in the middle so they snap but are still attached by a little piece of wood fragment.



Arrange the toothpicks on a flat smooth surface so they are roughly in the form of a star.



Make sure the pointed ends of each toothpick are pressed together as close as possible. There should be a small circle in the middle.



Use the dropper to place about three drops of water in the center circle of your star formation.

Celery Stems in Red Food Coloring



Pieces of celery



Place in red food coloring overnight.



The red shows the veins.



The veins will pull out.



-Kids' Science-
Bicolor Flowers



Demo that the stem is not a sponge,
but a series of small tubes like straws.

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Water, Water Everywhere!

Water in the weather comes in different forms. Draw a picture and write about how a plant is affected by these weather events. You can use the back of the page.

Hot days without rain

Rainstorm with flooding rain

Hailstorm

Snow or ice storm





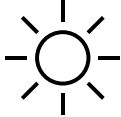
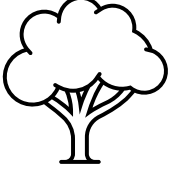

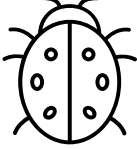


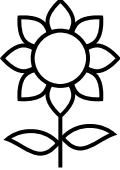

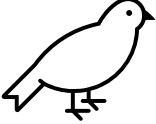
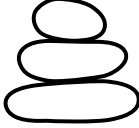
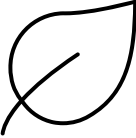



Living Through the Seasons

Plants and animals have special ways to meet their needs during the different times of the year.

Fill out the chart showing these changes.

Season	Fall	Winter	Spring	Summer
General Weather				
How a plant changes				
How an animal changes				

Nature Scavenger Hunt

Water 	Clouds 	Sun 	Tree 
Butterfly 	Crawling Insect 	Flying Insect 	Worm 
Flower 	Squirrel 	Bird 	Rock 
Leaf 	Mushroom 	Animal Tracks 	Acorn 

Greenhouses

The purpose of a greenhouse is to keep crops from cold or heat and unwanted pests. A greenhouse worker controls the temperature and amount of water plants can get. A clear covering over the greenhouse lets the sun shine on the plants. The sunshine also makes the inside of the greenhouse very warm so openings will let the wind blow through if it gets too warm.

Plants need air, water, sun, nutrients, and a place to grow. Plan a greenhouse that would help a plant meet its needs.

What materials will you need?

How does your plan fit the needs of the plant?

Air _____

Water _____

Sunlight _____

Space to grow _____

Not too hot and not too cold _____

How do Butterflies Survive the Winter?

Even with a foot of snow on the ground, and temperatures averaging in the 20's for highs and single digits for lows, they still have to be somewhere. Most everyone is familiar with the epic migration of the Monarch butterfly, but I decided to find out how some of the rest of the butterflies in my area survive the winter. I used the list of species in this thread:

<http://www.wildlifegardeners.org/for...ly-garden.html>

It turns out that each species has its own strategy for carrying on its species into the next year. Each of the stages of the butterfly's life cycle are used by various butterflies. Some will overwinter as an egg (ovum), some as a caterpillar (larva), some as a chrysalis (pupa) and some as an adult (imago). Here's what I found for the list of butterflies:

Pipevine Swallowtail (*Battus philenor*) - Chrysalis
Zebra Swallowtail (*Eurytides marcellus*) - Chrysalis
Black Swallowtail (*Papilio polyxenes*) - Chrysalis
Canadian Tiger Swallowtail (*Papilio canadensis*) - Chrysalis
Eastern Tiger Swallowtail (*Papilio glaucus*) - Chrysalis
Spicebush Swallowtail (*Papilio troilus*) - Chrysalis
Giant Swallowtail (*Papilio cresphontes*) - Chrysalis
Mustard White (*Pieris napi*) - Chrysalis
Clouded Sulphur (*Colias philodice*) - Chrysalis
Orange Sulphur (*Colias eurytheme*) - Chrysalis
Coral Hairstreak (*Satyrrium titus*) - Egg
Edwards' Hairstreak (*Satyrrium edwardsii*) - Egg
Eastern Tailed-Blue (*Everes comyntas*) - Caterpillar
Karner Blue (*Lycaeides melissa samuelis*) (rare, endangered) - Egg
Spring Azure (*Celastrina ladon*) - Chrysalis
Monarch (*Danaus plexippus*) - Migrant
Variegated Fritillary (*Euptoieta claudia*) - Migrant
Great Spangled Fritillary (*Speyeria cybele*) - Caterpillar
Aphrodite Fritillary (*Speyeria aphrodite*) - Caterpillar
Atlantis Fritillary (*Speyeria atlantis*) - Caterpillar
Silver-bordered Fritillary (*Boloria selene*) - Caterpillar
Meadow Fritillary (*Boloria bellona*) - Caterpillar
Silvery Checkerspot (*Chlosyne nycteis*) - Caterpillar
Harris' Checkerspot (*Chlosyne harrisii*) - Caterpillar
Northern Crescent (*Phyciodes cocyta*) - Caterpillar
Baltimore (*Euphydryas phaeton*) - Caterpillar
Gray Comma (*Polygonia progne*) - Adult Hibernation
Compton Tortoiseshell (*Nymphalis vaualbum*) - Adult Hibernation
Mourning Cloak (*Nymphalis antiopa*) - Adult Hibernation
Milbert's Tortoiseshell (*Nymphalis milberti*) - Adult Hibernation
American Lady (*Vanessa virginiensis*) - Migrant
Painted Lady (*Vanessa cardui*) - Migrant
Red Admiral (*Vanessa atalanta*) - Migrant
Common Buckeye (*Junonia coenia*) - Migrant
Red-spotted Purple (*Limenitis arthemis astyanax*) - Caterpillar

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White Admiral (*Limenitis arthemis arthemis*) - Caterpillar
Viceroy (*Limenitis archippus*) - Caterpillar
Northern Pearly Eye (*Enodia anthedon*) - Caterpillar
Little Wood Satyr (*Megisto cymela*) - Caterpillar
Common Wood-Nymph (*Cercyonis pegala*) - Caterpillar
Tawny-edged Skipper (*Polites themistocles*) - Chrysalis
Peck's Skipper (*Polites peckius*) - Caterpillar

Some sources differed on the stage by which a species overwinters. This list is my best assessment of how these species overwinter in my area. Some butterflies will use a different strategy in a different geographical location. And of course, the Migrants overwinter by some means in locations more southerly than mine.

It was interesting to note the types of comments that were sometimes included in the overwintering information. Interesting in that the various caterpillars and adults often had different strategies for their individual survival:

1. Fourth-stage caterpillars hibernate in rolled leaves on the ground.
2. Third-stage caterpillars make a shelter from a rolled leaf tip in which to spend the winter.
3. Partially grown caterpillars hibernate at the base of the host plant.
4. Overwinters as a caterpillar in seed pods of food plant.
5. Overwinters as a caterpillar in silken nests below host plants on ground.
6. Overwinters as an adult in the shelter of hollow trees, under bark or utilize seasonal outbuildings.
7. Hibernate as adults. For protection they use hollow logs, woodpiles and loose bark.
8. Overwinters as a young caterpillar in a hibernaculum (rolled leaf) on host plants.
9. Caterpillars overwinter in leafy case on host plants.
10. Overwinters as caterpillar in leaf tip shelter.

It seems that nature's 'untidiness' is very important to butterflies. Without these places of shelter their ability to survive the winter would be greatly diminished. It also provides us with a great reason to embrace untidiness. We should be cautious about being too tidy in our butterfly gardens, prairies, and other butterfly habitat.

