This learning segment will expand on student's knowledge of Georgia habitats and geographic regions. While learning about the plants and animals living in each region, students will learn how heat affects the organisms and nonliving objects in these habitats.

Grade or course Third Grade	**Title:**
Topic: Habitats in Georgia	Under the Sun

Performance Expectation for GSE:

S3L1. Obtain, evaluate, and communicate information about the similarities and differences between plants, animals, and habitats found within geographic regions (Blue Ridge Mountains, Piedmont, Coastal Plains, Valley and Ridge, and Appalachian Plateau) of Georgia.

a. Ask questions to differentiate between plants, animals, and habitats found within Georgia's geographic regions.
b. Construct an explanation of how external features and adaptations (camouflage, hibernation, migration, mimicry) of animals allow them to survive in their habitat.
c. Use evidence to construct an explanation of why some organisms can thrive in one habitat and not in another.

S3P1. Obtain, evaluate, and communicate information about the ways heat energy is transferred and measured.

a. Ask questions to identify sources of heat energy.
(*Clarification statement:* Examples could include sunlight, friction, and burning.)
b. Plan and carry out an investigation to gather data using thermometers to produce tables and charts that illustrate the effect of sunlight on various objects.
(*Clarification statement:* The use of both Fahrenheit and Celsius temperature scales is expected.)
c. Use tools and everyday materials to design and construct a device/structure that will increase/decrease the warming effects of sunlight on various materials.
(*Clarification statement:* Conduction, convection, and radiation are taught in upper grades.)

Performance Expectations for Instruction:

After a study about plants and animals in the habitats of Georgia Regions, students will

- construct an explanation for why some organisms thrive in a habitat while others do not.
- transfer their knowledge of heat from organisms to non-living objects.
- understand that 'heat' refers to the transfer of energy from objects at a higher temperature (hotter) to objects at a lower temperature (cooler) to balance the temperature.
- conduct experiments where heat transfers are measured as a change in temperature.
- explain that heat is produced in many ways, such as burning, rubbing, and mixing certain substances with one another.
- conduct experiments with lights and sunlight to warm objects.
- explain why an object's temperature increase depends on how intense the light striking its surface is, how long the light shines on the object, and how much of the light is absorbed.
- understand that the amount of light absorbed by an object is affected by the object's properties, including color and material.
- understand that changes in environments can happen naturally or are influenced by humans.
- give examples to support the idea that some environmental changes are good, some are bad, and some are neither good nor bad.
- understand that plants and animals live in a variety of habitats, and that change in those habitats affects the organisms living there.

Additional notes on student supports

Materials: A map of Georgia with different cities from each of the geographic regions of Georgia identified, a copy of Collecting Weather Data for Georgia Cities for each student, books or electronics to research the different cities. Construction paper of different colors (some light and some dark).

For the shelter activity: Craft supplies, balance scales, ice cubes, cups, material used for insulation

Students will continuously obtain, evaluate, and communicate information. This is not a linear process. Students will communicate through writing and discussions to allow for formative assessment. This benefits the teacher, student, and whole group to guide instruction to clarify misconceptions or extend content.

Engaging Learners	**Phenomenon** Project Map of the Cities in Georgia onto the board at the front of the room. Place students into small groups of three or four, making sure that you have at least five groups so that all the geographic regions are represented. Allow the groups to each select a different geographic region, and then pick two cities from that region to research.
	Obtaining Collecting Weather Data for Georgia Cities Students will work in small groups to record their data. Graphing the data in bar graphs could help students see the temperature differences more clearly. Students can total rainfall to see which city had the most rain. Graphing Weather Data
	Evaluating Post the completed graphs around the classroom, with the two cities from the same region together. Have the class walk around, study the bar graphs, and make notes about any patterns that they see. (The temperatures at the southeast coast are warmer, the temperatures in the mountains are cooler, etc.) Hold a class discussion to analyze the differences between the regions. Answer questions such as: ● Which area(s) was the warmest? What types of plants and animals do you think would do well in that area? What kind of adaptations do those animals have to live in the warm areas? ● Which area(s) was the coolest? What types of plants and animals do you think would do well in that area? How do the plants and animals adapt to the cool weather? What kind of adaptations do those animals have to live in the cool areas? ● Which area(s) received the most rain? What types of plants and animals like a lot of rain?
	Communicating Have groups of students use a thermometer to measure the temperature of ice water, room temperature water (set out for an hour before), and warm water (less than 90 degrees) Learning to Read and Use a Thermometer

	Have groups of students use a thermometer to measure the temperature of water in different containers that are set in the sun. How Does Sunlight Affect Different Materials?
Exploring	*Obtaining* Divide students into groups of 2-3. Assign a Region (Blue Ridge Mountains, Piedmont, Coastal Plains, Valley and Ridge, and Appalachian Plateau). Tell students that they will make a model of their region and need to know the region well as they will take their classmates on a "tour" of the region when their project is complete. Provide each group of students with books from your school library and the internet if available. Students will use the Georgia Regions Research guide to find information about their regions and the habitats in their regions. Students will use the research they collected to design a poster, PowerPoint, diorama, brochure, or pamphlet to tell about their region.
	Communicating Students will set up their presentations in the classroom and act as a tour guide for their fellow students.
	Evaluating Regions of Georgia Research Project Rubric
	Formative Assessment of Student Learning
Explaining Finalizing Model	**Phenomenon** Read books such as Beneath the Sun, by Melissa Stewart or Desert Animal Adaptations by Julie Murphy. *Teacher Notes: Conduct an internet search for the title of the books to find access.* Tell students now that they have learned about different rocks and soils located in Georgia and what plants grow in each, they will explore the different regions in Georgia, the plants and animals that live there, and how sunlight affects those plants and animals. *Obtaining* Allow students to explore different books and websites to gather information about animals in different regions and habitats of Georgia. Students will ask questions to determine the habitats within the geographical regions of Georgia. Allow students to ask questions to determine where heat comes from in their habitats.
	Evaluating Students will choose their favorite Georgia Region for which to construct an explanation of why specific animals and plants can survive in that

	region and why others cannot. Students will write a song using a familiar tune (Under the Sun), power point, poster, or presentation of their choice to demonstrate their knowledge.
	Communicating Students will share their projects with the class.
Elaborating Applying Model to Solve a Problems	*Obtaining* *(Adapting shelter from one habitat to another)* Using the Research Guide and what students have learned from each other, students will choose an animal from another region to move into their region. Students will identify their animal and the region it originally came from. Introduce the term "adaptation" to the students. Give examples, such as a crane having long legs to be able to walk around in a water environment. Some animals try to look like other animals to scare predators away. Others try to blend in and hide. Some adaptations have to do with surviving the weather, rather than hiding from predators. An example of that would be bears hibernating. Show the PowerPoint: **Animal Adaptations** (Located in the Teacher Resource Link—Essential Toolkit) Students will draw or make the animal from craft materials and make adaptations to the animal so that it could survive in its new habitat. (An example is webbed feet on a land animal so that it could survive in a water habitat.) Remind students that animals cannot choose to adapt or change their features. A bird can't choose its beak. Animals and plants are born with an adaptation and that helps their ability to survive. Students will then think about what type of shelter the animal will need to stay warm in the winter and cool in the summer. (The shelter does not allow heat energy to pass through; it is an insulator.) Tell students they should design a shelter that will keep an ice cube frozen the longest. Students will design a shelter for their animal. (Teacher will need to provide materials that can be used for this, including materials that can be used as insulation). <u>Designing a Shelter</u> Students build models of the different types of shelters animals build that either demonstrate or illustrate a function such as protection from sunlight.

	1. Students research materials for their habitat that are used as insulators. 2. Students draw a sketch of their shelter. 3. Students determine what materials they will use. 4. Students build their shelter. 5. Students test their shelter. <u>Testing a Shelter</u> 1. Students will take their shelter to a warm location. (Outside in the sunlight if possible). 2. Students will place an ice cube in a cup and then in their shelter for 2 minutes and see how much of their ice cube melted. They can measure the weight of the ice cube before and after. 3. Discuss the lab results with the students, emphasizing that they should watch out for data that does not make sense. Should water that has an ice cube melting in it get warmer? Should hot water that is cooling off suddenly go up in temperature? 4. Encourage the students to think about the data that they are recording and make sure that it seems reasonable. If not, they should double check the results.
	Evaluating Students determine if their shelter protected their animal from the heat. If not, they can redesign and try again for five minutes.
	Communicating Students will present their project to the class.
Evaluation	***Assessment of Student Learning***
	Shelter Project Grading Rubric
SEP, CCC, DCI	**Science Essentials**
Science and Engineering Practices	• Planning and carrying out investigations • Asking questions and defining problems • Constructing explanations and designing solutions • Obtaining, evaluating, and communicating information
Crosscutting Concepts	• Structure and Function • Systems and System Models • Energy and Matter • Cause and Effect
Disciplinary Core Ideas	From *A Framework for K-12 Science Education:* • LS1.A Structure and Function • LS4.C Adaptation • PS3B. Conservation of Energy and Energy Transfer

Additional Supports for struggling learners:

The following supports are suggestions for this lesson and are not the only options to support students in the classroom. These supports target students that struggle with science material, this lesson or a previous lesson. These are generalized supports and do not take the place of IEP accommodations as required by each student's Individualized Education Program.

General supports for the following categories:

Reading:	Writing:	Math:
1. The teacher can have students match letters prior to reading to remind them of the alphabet. 2. The teacher can have students identify words that they know in the text as the class reads. 3. The teacher should remind students to use strategies when they are reading.	1. The teacher can provide practice for students in the area of writing both in context and practicing just letters. 2. The teacher can provide a sentence starter for the students. 3. The teacher should continually give encouragement to the students. 4. The teacher can provide constructive positive feedback during the writing process to help students understand the expectations.	1. Provide students with opportunities to interact with numbers. 2. The teacher can provide manipulatives to allow the students to count and interact with materials.

Supports for this specific lesson if needed:

Performance expectations for instruction:

1. The teacher should provide information to students in various formats to reach as many students as possible.
2. The students should be given adequate time to complete each part of the lesson.
3. The students should be allowed to express their knowledge in various formats.
4. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material.

Engage:

1. The teacher should use intentional and flexible grouping to group students. Best practice is to use data to drive student groupings.
2. The teacher should consider providing sources for students to use in their research.

3. The teacher should be prepared to explicitly teach the students how to graph data. The teacher should create a bar graph of some data, then everyone should practice together and finally the teacher can ask the students to graph their data.
4. The teacher should consider having student groups compare how their graphs look. Have the students focus on similarities and differences in the graph and not the data.
5. The teacher should consider having some options for students to give feedback on the graphs. The teacher can give students sticky notes to write on, cart paper beside the graph or a group member at the graph to receive feedback.
6. The teacher should have clear and consistent guidelines for class discussion. The idea is that the guidelines will help students feel more secure in the class and be more likely to participate.
7. The teacher may need to explicitly teach students to use and read a thermometer.

Exploring:

1. The teacher should use intentional and flexible grouping to group students. Best practice is to use data to drive student groupings.
2. The teacher should consider providing students with resources to use in their research.
3. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material. This could include labeling images, drawing pictures, writing or verbally explaining.
4. The teacher should have some options for students to share their work using technology, a gallery walks or presentations.
5. The teachers should give clear and consistent guidelines on how to provide feedback to other students.
6. Students may need additional time to revise their work and complete the assignment.

Explaining:

1. The teacher should consider leaving the book out for students to refer to after reading it to the class.
2. The teacher should consider providing students with an organizer to record their research.
3. The teacher should consider providing students with sources to use in their research.
4. The teacher should consider providing students with question stems to help them draft questions.
5. The teachers should give clear and consistent guidelines on how to provide feedback to other students.
6. Students may need additional time to complete the assignment.

Elaborating:

1. The teacher should consider having a list of animals that students can choose to move from one area to another.
2. The teacher should consider showing students a habitat and the animals that live there. Then ask questions about what helps those animals survive.
3. The teacher should consider having the PowerPoint available after the lesson so that students can use it as a resource.
4. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material. This could include labeling images, drawing pictures, writing or verbally explaining.
5. Students may need additional time to complete the assignment.
6. The teacher should be prepared to repeat directions as needed.
7. The teacher should show students materials that they can use to build their shelter.
8. The teacher should consider using guiding questions to help students with the assignment.

9. The teacher should consider having students work in groups to build the shelters.

Evaluating:

1. Students may need additional time to complete their assignment.
2. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material. This could include labeling images, drawing pictures, writing or verbally explaining.

Map of Cities in Georgia

[Return to Instructional Segment]

Name: _____

Collecting Historic Weather Data from Georgia Cities

Your teacher will assign you a region to study. Choose two cities within your region. Using a computer, look up the weather data history for your city, including any rainfall.

You can search by putting in the name of the city and state and the date you want the weather. For instance, if you are searching for the weather for Atlanta, you would enter weather history for Atlanta, Georgia for January 10, 2016. Then click on the result for a historic average.

Record the weather data in the charts.

Our assigned region is _____

First City Name: _____

Date	High Temperature	Low Temperature	Rainfall Amount
1/10/2016			
2/10/2016			
3/10/2016			
4/10/2016			
5/10/2016			
6/10/2016			
7/10/2016			
8/10/2016			
9/10/2016			
10/10/2016			
11/10/2016			
12/10/2016			

Name: _____

Second City Name: _____

Date	High Temperature	Low Temperature	Rainfall Amount
1/10/2016			
2/10/2016			
3/10/2016			
4/10/2016			
5/10/2016			
6/10/2016			
7/10/2016			
8/10/2016			
9/10/2016			
10/10/2016			
11/10/2016			
12/10/2016			

Which city had the warmest temperature for the year? _____

Which city had the coolest temperature for the year? _____

Which city had the most rainfall for the year? _____

What types of plants and animals do you think will live in the first city? _____

_____

What types of plants and animals do you think will live in the second city? _____

_____

What does this data make you wonder? _____

Return to Instructional Segment

Graphing Weather Data

Region _____ City _____

High	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10	11/10	12/10
100												
90												
80												
70												
60												
50												
40												
30												
20												
10												

Low	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10	11/10	12/10
100												
90												
80												
70												
60												
50												
40												
30												
20												
10												

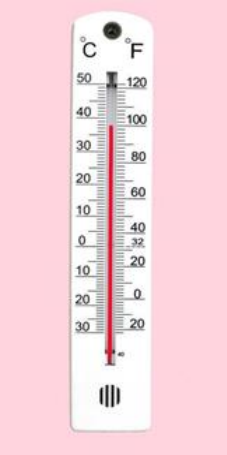
Return to Instructional Segment

Student Name: _____

Learning to Read and Use a Thermometer

Thermometers are used to measure temperature. Temperature is measured in units called degrees. Thermometers that scientists use may have lines down the middle, with units of measurement on both sides of the lines. There are two main temperature scales, the Fahrenheit scale and the Celsius scale. When a number has an 'F' after it, it stands for Fahrenheit. We normally measure our temperatures in the United States in degrees Fahrenheit. Scientists also use the Celsius scale, which is part of the Metric system and used by many other countries outside of the United States. Degrees Celsius are represented by 'C'.

For most thermometers, like the one below, each line represents a two-degree change. That means that you count by twos when you read the thermometer. Below, the lines between zero and ten stands for 2, 4, 6 and 8. It is important not to place your fingers or hand on the bulb part of the thermometer, because then it will measure how hot your hand is, rather than the temperature of what you are trying to measure.



Use the thermometer above to compare the two temperature scales.

1. 0 degrees Celsius is equal to _____ degrees Fahrenheit.
2. 10 degrees Celsius is equal to _____ degrees Fahrenheit.
3. 70 degrees Fahrenheit is equal to _____degrees Celsius.
4. 100 degrees Fahrenheit is equal to _____degrees Celsius.

Get a tray with filled cups and thermometers from your teacher. Place a thermometer in each cup. Take a measurement every ten minutes for half an hour. Record the temperature change below.

Cup One: Ice Water

Time	Temperature Degrees Celsius	Temperature Degrees Fahrenheit

Cup Two: Room Temperature Water

Time	Temperature Degrees Celsius	Temperature Degrees Fahrenheit

Cup Three: Warm Water (below 90 degrees)

Time	Temperature Degrees Celsius	Temperature Degrees Fahrenheit

Which cup(s) changed temperature the most? _____

Why do you think it changed the most? _____

Which cup changed the least? _____

Why do you think it stayed about the same temperature? _____

Return to Instructional Segment

Student Name: _____

How does Sunlight Affect Different Materials?

For this activity you will need three containers that will hold water. Try to find some that are made from different materials, such as paper, metal, or plastic. Fill the containers halfway with room temperature water. Place the containers into a tray and place the tray outside in the sunlight. Check the temperature of the water immediately, and then every thirty minutes for two hours. Record the temperature changes below.

Container 1. What is this container made from? _____

Time	Temperature

How much warmer did the water in this container get? (Ending temperature minus the starting temperature)

_____ minus _____ equals _____ degrees.

Container 2. What is this container made from? _____

Time	Temperature

How much warmer did the water in this container get? (Ending temperature minus the starting temperature)

_____ minus _____ equals _____ degrees.

3. What is this container made from? _____

Time	Temperature

How much warmer did the water in this container get? (Ending temperature minus the starting temperature)

_____ minus _____ equals _____ degrees.

In which container did the water temperature increase the most? _____

In which container did the water increase the least in temperature? _____

Why do you think that happened? _____

_____

What do you want to test next to check your hypothesis? Why? _____

_____

Design an experiment to test your hypothesis: _____

_____

_____

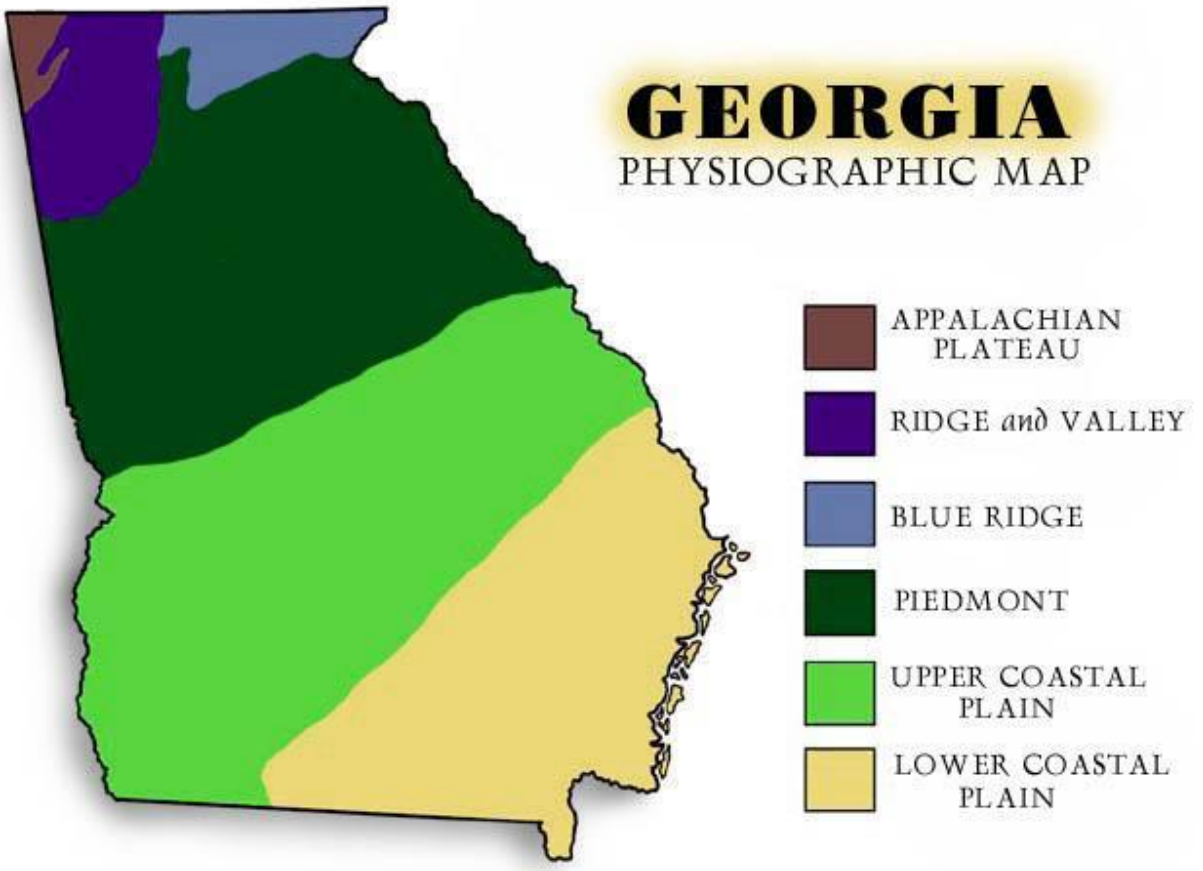
_____

_____

Return to Instructional Segment

Georgia Regions: Research Guide

Name:_____ Region chosen_____



Directions: Locate your region on the map and draw a star on it. Do research to answer these questions about your region.

1. What types of rock can you find in your region?

2. When the rocks are broken down by wind and water, what kind of soil do they become?

3. What type of plants can live in the soil from your region?

4. What special features do the plants have that allow them to survive in your region?

5. What types of animals live in your region?

6. What special features do the animals have that allow them to survive in your region?

7. What type of weather is found in your region?

8. How do the animals protect themselves from the sun and other types of weather?

Return to Instructional Segment

Regions of Georgia Research Project Rubric

	25 Points	20 Points	10 Points	5 Points
Plants of the Region	The student included at least five plants, and they were all plants found in the chosen region and the information was factually accurate.	The student included at least three plants, and they were all plants found in the chosen region and the information was factually accurate.	The student included at least three plants, but they were not all plants found in the chosen region OR the information was not factually accurate.	The student included only one or two plants in their project.
Animals of the Region	The student included at least five animals, and they were all animals found in the chosen region and the information was factually accurate.	The student included at least three animals, and they were all animals found in the chosen region and the information was factually accurate.	The student included at least three animals, but they were not all animals found in the chosen region OR the information was not factually accurate.	The student included only one or two animals in their project.
Adaptations to allow the plants and animals to live in that region.	The students gave multiple examples of adaptations that allowed the plants and animals to live in the region.	The students gave one example of an adaptation that allowed a plant and an animal to live in the region.	The students gave one example of an adaptation that allowed a plant OR an animal to live in the region.	The students gave failed to give any examples of plant or animal adaptations.
Presentation	The student -organized the material in a logical manner -prepared a display of some kind -presented the material in a manner that allowed others to learn	Two of the three objectives were met.	One of the three objectives were met.	The students did not present their project to the class.

Return to Instructional Segment

Names: _____

Shelter Design Project Rubric

	20 Points	15 Points	10 Points	5 Points
The students correctly identified materials that were insulators.	All of the materials used to build the shelter were insulators.	Most of the materials used were insulators, but one or two were not.	Several of the materials used were not insulators.	The majority of the items used to insulate were not insulators.
Shelter Build	The students carefully considered the design and materials, and carefully built their structure.	The students considered only the design, or only the materials, OR did not take care when building their structure.	The students considered only the design, or only the materials, AND did not take care when building their structure.	The shelter was put together quickly, without much thought in the design or materials.
Shelter Performance, Trial 1	The shelter kept the ice cube frozen for at least ten minutes or longer.	The shelter kept the ice cube frozen for at least seven minutes.	The shelter kept the ice cube frozen for at least five minutes.	The shelter kept the ice cube frozen for less than five minutes.
Test and Redesign	The student examined the trial 1 data, the shelter materials, and the design, and revised their plan.	The student examined two of the following: ● the trial 1 data ● the shelter materials ● the design and revised their plan.	The student considered only 1 of the following: ● the trial 1 data ● the shelter materials ● the design and revised their plan.	The students made no changes to their design.
Shelter Performance, Trial 2	The shelter kept the ice cube frozen for at least fifteen minutes or longer.	The shelter kept the ice cube frozen for at least ten minutes.	The shelter kept the ice cube frozen for at least five minutes.	The shelter kept the ice cube frozen for less than five minutes.

Grade: _____ Comments:

Return to Instructional Segment