

Sample Science Learning Plan

Big Idea/ Topic

Biomes are areas with similar climates and specific types of plants and animals.

Standard Alignment

S7L4. Obtain, evaluate, and communicate information to examine the interdependence of organisms with one another and their environments.

- a. Construct an explanation for the patterns of interactions observed in different ecosystems in terms of the relationships among and between organisms and abiotic components of the ecosystem. (*Clarification statement:* The interactions include, but are not limited to, predator-prey relationships, competition, mutualism, parasitism, and commensalism.)

- d. Ask questions to gather and synthesize information from multiple sources to differentiate between Earth's major terrestrial biomes (i.e., tropical rain forest, savanna, temperate forest, desert, grassland, taiga, and tundra) and aquatic ecosystems (i.e., freshwater, estuaries, and marine). (*Clarification statement:* Emphasis is on the factors that influence patterns across biomes such as the climate, availability of food and water, and location.)

Connection to other content areas:

ELAGSE7W8: Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

ELAGSE7W9: Draw evidence from literary or informational texts to support analysis, reflection, and research.

ELAGSE7SL4: Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.

Engage

Phenomenon: A polar bear would not survive in the wild in Georgia.

Ask students about Georgia. The following questions might help the class have a discussion:

- How much rain does Georgia get every year?
- What types of precipitation does Georgia get?
- What are the temperatures like in the fall/winter? In the spring/summer?
- What types of plants live in Georgia?
- What types of animals live in Georgia?
- What happens to the plants and/or animals when the seasons change?

Teachers note: students may not know the answers to all of the questions above. This discussion is to see what students know about Georgia to assist in later naming the biome that Georgia is in.

Ask students to use what they know about Georgia and polar bears to ask questions about why polar bears would not survive in Georgia. Questions could include but are not limited to:

- What temperatures do polar bears need to survive?
- What do polar bears eat?
- Why are polar bears white?
- What is a polar bears fur like?
- Do polar bears hibernate?
- Where on Earth do polar bears actually live?
- What is the environment like in the areas where polar bears live?

Have students obtain information about polar bears, the environment they live in and Georgia's environment.

The have students construct a basic explanation about why polar bears would not survive in Georgia.

Have students share their explanation and the differences that they noticed in the environment in our state and in the environment in which polar bears live. It might be beneficial to revisit student questions from earlier in the lesson as part of this discussion.

Unplugged: Provide students with an image of a polar bear and the questions should answer about the environment in Georgia. The teacher should have students ask questions and send home articles and images to assist students in obtaining information.

Explore

Have students watch the following video: [Biomes of the World](#)

Then have students generate a list of question that might help them differentiate between the different environments on Earth. Some questions that students may have are included below:

- Where on Earth does this area show up?
- What plants live here?
- What animals live here?
- Is this environment mostly made of land or water?

Now, give students a list of the following terrestrial and aquatic organisms:

Camel	Prairie dogs	Sea turtles	White tailed deer	Scarlet macaw
Snowshoe hare	Elephant	Musk Oxen	Smallmouth bass	Whooping crane

Have students obtain information about the different organisms. Students should focus on the following:

- Where do these organisms live?
- What temperatures do these organisms need to survive?
- What do these organisms eat?
- Is their home on land or in the water?

Then have a class discussion about the areas where these organisms live. Some questions to assist in this discussion:

- What do you think the word biome means? Why?
- How many biomes do you think are in the world? Why?
- What are the unique characteristics of each biome?
- How are the plants and animals of each biome adapted to their environment?
- How are the biomes similar to one another?
- Where in the world is each biome located?
- Which biome do you live in?
- What other biomes have you visited?
- What do you know about each biome?

After students have the opportunity to look at these organisms and discuss the areas that they live in have students begin to fill in the [biome chart](#). Students can start by filling in where they think each of the organism would fit within the chart. Then have students obtain information about the biomes themselves to complete the biome chart.

Unplugged: Provide students with informational text about the biomes of the world, the animals, and a hard copy of the biome chart so that they may complete this activity.

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Explain

Have students obtain information about the location of each biome on Earth. Have students plot the location of each of the biomes on the [map](#). Then have students construct an explanation of where the aquatic biomes would appear on the map.

Teachers note: an extension activity to allow students to create their own biome and make observations can be found at the following link: [Biome in a Baggie Video](#). This allows students to create a Biome in a Baggie. Show the video to the students. This will provide each student with the directions for the making their biome in a bag. Materials might be a problem for students doing this in a distance setting and the teacher could decide to show the video and ask students to make observations.

Have students compare their maps and explanations of the location of the terrestrial and aquatic biomes. Then ask students to discuss the things that they notice about the different biomes. Some questions to assist in the discussion:

- Are there patterns in the location of biomes on Earth?
- What do the biomes have in common?
- What are differences between the biomes?
- How does the biome impact organisms in the environment?
- Which biome do you think has the most diversity of life? Why?
- How do organisms interact with one another in the different environments?

Have students brainstorm ways that they have seen organism interact with each other in the environment. These interactions could include but are not limited to things like:

- Cat stalking a squirrel
- Birds pecking around for worms
- Ants in a garbage can
- Plants growing out of the concrete

Unplugged: Provide hard copies of the map.

Elaborate

Have students evaluate the following [scenarios](#). Students should use the [chart](#) to assist them in finding patterns in the interactions.

Now have students discuss the observations about the interactions. Students should use the chart to assist in the discussion. Some additional questions to assist in the discussion:

- Do these interactions occur in all the different biomes?
- What do these interactions have in common?
- What is different in the interactions?
- Can you think of other examples of interactions that might have similar features?

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Now have students obtain information about the different types of interactions that occur in the environment. Students should focus on the following interactions: predator-prey, commensalism, mutualism, parasitism and competition. Ask students if they can name of the interaction that show up in each scenario after they have obtained information. Discuss as a class.

Then have students construct an explanation of the interactions between organisms in the environment. Students should include information about each interaction and provide examples to support their explanation.

Unplugged: Provide hard copies of the materials needed.

Evaluate

Students should refer to their biome chart and choose one of the biomes. Then students should obtain information about 2 organisms that would live in that biome. Students should include information about why the organism lives in that particular biome. This could include information about adaptations, biome features and other information relevant to the organism and biome.

The students should construct an explanation that describe the interaction between the 2 organisms. Students should include information about the type of interaction, which organism benefits, and if an organism is harmed.

Lesson Checklist:

Standard:

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- d. Ask questions to gather and synthesize information from multiple sources to differentiate between Earth's major terrestrial biomes (i.e., tropical rain forest, savanna, temperate forest, desert, grassland, taiga, and tundra) and aquatic ecosystems (i.e., freshwater, estuaries, and marine). (Clarification statement: Emphasis is on the factors that influence patterns across biomes such as the climate, availability of food and water, and location.)

Checklist:

- Ask questions about different environments on Earth.
- Describe the different terrestrial and aquatic biomes on Earth.
- Describe patterns across the different biomes on Earth based on their location.
- Construct an explanation of interactions between organisms in the different ecosystems on Earth

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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 activities 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** ideas to assist in supporting students that struggle are as follows:

- Be sure that students can access the information that you they are learning. Make sure that you can answer the following questions:
 - Do students have what they need to get the information? This is about them having the book or internet access to get to the information.
 - Once students obtain the information, are students able to determine what information is important? This is about the students having materials on the appropriate grade level and that is in a format that students can understand.
 - Is the material presented in multiple ways that allows all students to interact with information in a way that works for them? Such as video, audio, and articles.
 - Consider read aloud as a potential option for students that have reading deficits as an option to assist students in accessing the material. This could be done using video or via phone.
- Students may need ideas about where to find information. Providing students with information about what a reliable source is and even where to find reliable sources may be beneficial for students.
- Some students may find it difficult to complete the entire lesson workload. Some students may benefit from a reduced workload (note: this should be used only when absolutely necessary). Be sure that the information that is removed will not negatively impact the student's understanding of the disciplinary core idea.
- Consider how students show their knowledge. Students need multiple ways and opportunities to show their knowledge. Things to consider:
 - Recording video or audio
 - Drawing
 - Writing



- Typed
- Verbal
- Provide students with a way to ask questions in a forum that does not cause anxiety. Frequently students do not want to ask questions in front of their peers because they are afraid of what their peers may think of them. So, be sure to provide students a way to ask questions that is private or anonymous.
- Consider materials that students need to complete the assignments.
 - Do students have needed materials?
 - What are some alternative materials that students may have available to them?
- Have a clear and consistent set of guidelines for providing consistent feedback to all students.
- Utilize graphic organizers such as those from the Wonderofscience.com
- Use high leverage and evidence-based practices to reach all students.

Some things to consider, **specific to this lesson**, when designing supports for students are as follows:

- The teacher should consider question providing students with question stems to assist students with writing questions.
- The teacher may need to assist students in writing questions that can be answered scientifically. This can be done by modeling changing a yes or no question to a question with a more open-ended question.
- The teacher should consider using guiding question to assist students.
- The teacher should have clear and consistent guidelines for student discussion. These guidelines should assist students in feeling comfortable sharing.
- The teacher should have different sharing formats for students to share their knowledge.
- The teacher may want to consider having a way for students to share their knowledge, work and ideas in an anonymous format so that students can feel more comfortable with sharing.
- The teacher should consider showing the video more than once as needed for students to make observations about the biomes.
- The teacher should consider providing students with images and information about the different organisms.
- The teacher should consider providing students with sources to find information about biomes.
- The teacher should provide students with questions that students will answer in discussions in advance of discussion. This will allow students to have time to formulate answers before speaking.
- The teacher may need to assist students how to mark the biome locations on the map so that students understand the expectation.
- The teacher should consider providing students with some guiding questions to assist in making observations from the scenarios.
- The teacher should consider providing students a rubric for the evaluate section of the plan.

Engaging Families

Additional resources to support this segment can be found at GPB: [Georgia Home Classroom](http://GeorgiaHomeClassroom.com).

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Biomes of the World

Use the chart below to organize information about the different biomes on Earth.

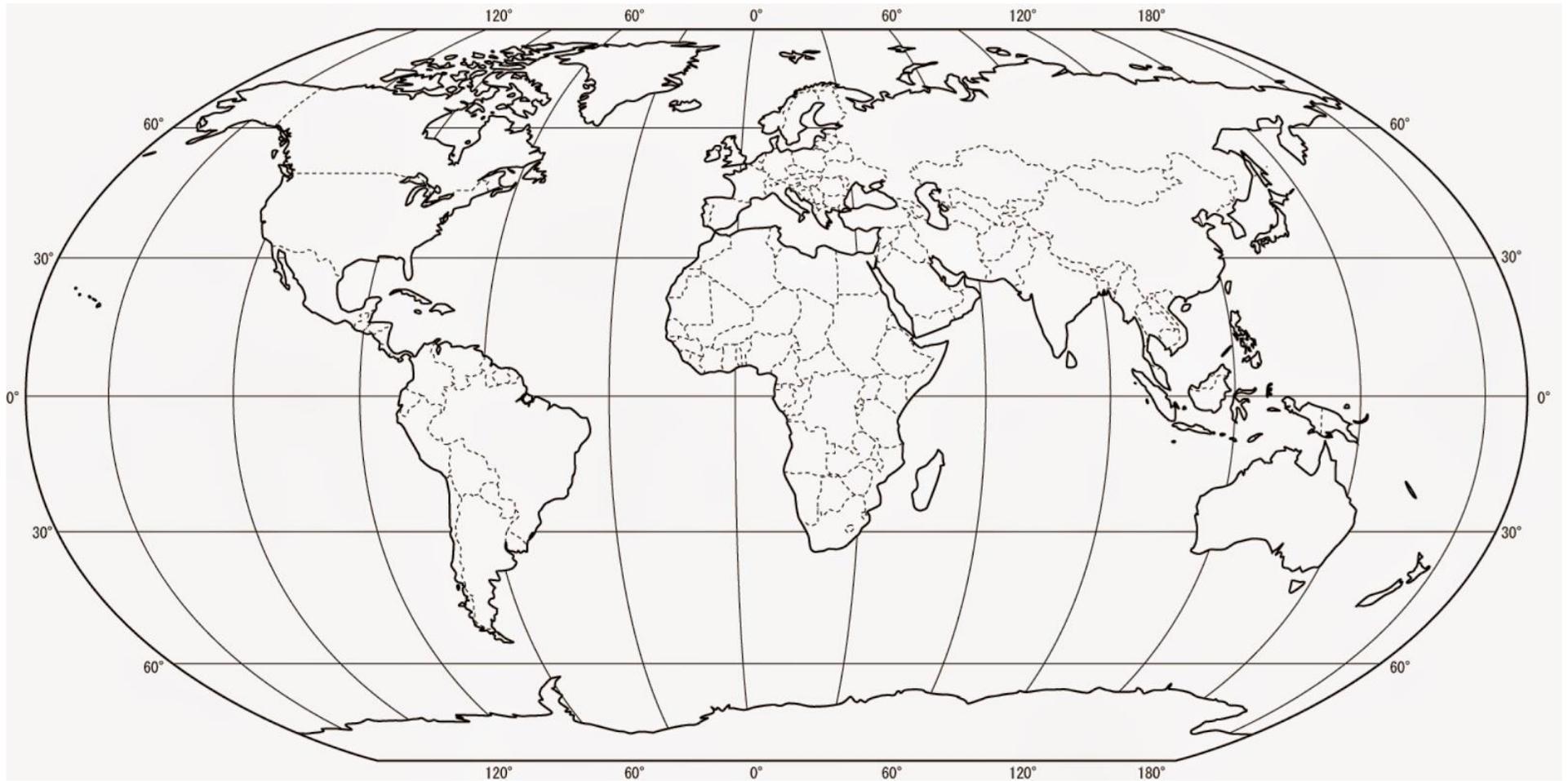
Be sure to place the animals that you are researching into the chart in the biome that you believe they live in. Then begin to fill in the other columns as you find the information.

Biome	Terrestrial (T) or Aquatic (A)	Location	Climate	Plants	Animals
tropical rain forest					
savanna					
temperate forest					
desert					
grassland					
taiga					
tundra					
freshwater					
estuaries					
marine					

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Directions: Use the map above to plot the locations of the different terrestrial biomes. Use a marker, crayon or color pencil to mark the location on the map of each biome. Be sure to fill in the key below with the corresponding colors.

- | | | | |
|--|----------------------------------|---|---------------------------------|
| <input type="checkbox"/> Tropical Rainforest | <input type="checkbox"/> Savanna | <input type="checkbox"/> Temperate Forest | <input type="checkbox"/> Desert |
| <input type="checkbox"/> Grassland | <input type="checkbox"/> Taiga | <input type="checkbox"/> Tundra | |

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Interaction Scenarios

Directions: Evaluate the following scenarios. Look for patterns in the interactions that occur in living things. The different organisms are bolded to make it easier to identify the organisms in the scenario. Use the interaction chart to assist in organizing the information.

1. **Mistletoe** is a plant that grows high up in **trees**. The trees are capable of making their own energy using photosynthesis. Mistletoe, however, is not capable of making enough energy to survive on its own and must take energy from the tree that it lives on.
2. The **grey squirrel** lives in or near **oak trees**. The grey squirrel eats the nuts that oak trees produce. The oak tree produces the acorns as part of its life cycle.
3. A **red fox** is chasing a **mouse** through a field. The mouse tries very hard to get away but the fox catches the mouse.
4. A **gazelle** herd and a **zebra** herd are looking for water. Both herds encounter a watering hole that is only enough for one of the herds. The herd of zebra's and the herd of gazelle jostle each other and drink the watering hole dry. After that both herds must search for water again.
5. A **hummingbird** visits a **flower** garden several times a day to find food. The hummingbird drinks the nectar and picks up pollen from the flowers. The hummingbird drops pollen at other flower gardens that it visits.



Interactions Chart

Directions: As you are looking at the scenarios fill in the chart below to organize information about the interactions.

Organisms	What does organism 1 get from the interaction?	What does organisms 2 get from the interaction?	Does energy flow in this interaction?	Is one or both organisms negatively impacted?
Mistletoe/Tree				
Grey squirrel/Oak tree				
Red fox/Mouse				
Gazelle/Zebra				
Hummingbird/Flower				

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