Lesson Plan for Implementing NETS•S—Template I
(More Directed Learning Activities)

Template with guiding questions

Teacher(s) Name	Hillary Johnson
Position	Biology Teacher
School/District	Lassiter High School/Cobb County School District
Grade Level(s)	9th
Content Area	Biology
Time line	6 classes of on-level biology students, meeting for three class periods, 55 min each class, plus two weekend days (March 2-6, project due @ 11:59pm March 6th on Google drive)

Standards (What do you want students to know and be able to do? What knowledge, skills, and strategies do you expect students to gain? Are there connections to other curriculum areas and subject area benchmarks?) Please put a summary of the standards you will be addressing rather than abbreviations and numbers that indicate which standards were addressed.

This lesson addresses all of the content standards in the ecology domain of biology, so I've included all of those below. In addition, students will use their skills from English language arts and social studies and will likely address several content standards from those courses. Specifically in grammar and writing composition for English and geography and climate which relates to social studies. This lesson also addresses a majority of the technology standards but I have only listed the major standards with direct correlations to technology use in this specific lesson.

Content Standards

_____

SB4. Students will assess the dependence of all organisms on one another and the flow of energy and matter within their ecosystems.
   a. Investigate the relationships among organisms, populations, communities, ecosystems, and biomes
   b. Explain the flow of matter and energy through ecosystems by…
        a. Arranging components of a food chain according to energy flow
        b. Comparing the quantity of energy in the steps of an energy pyramid
        c. Explaining the need for cycling of major nutrients (C, O, H, N, P)
   c. Relate environmental conditions to successional changes in ecosystems
   d. Assess and explain human activities that influence and modify the environment such as global warming, population growth, pesticide use, and water and power consumption
   e. Relate plant adaptations, including tropisms, to the ability to survive stressful environmental conditions
   f. Relate animal adaptations, including behaviors, to the ability to survive stressful environmental conditions

1. Creativity and innovation (b) Create original works as a means of personal or group expression. *(Specific Technologies: Blogger, Weebly, Wix, Movie Maker)*
2. Communication and collaboration (a) Interact, collaborate, and publish with peers, experts or others employing a variety of digital environments and media. (b) Communicate information and ideas effectively to multiple audiences using a variety of media and formats. *(Specific Technologies: Schoology, Weebly, Wix, Blogger, Movie Maker, Google Drive)*
3. Research and information fluency (b) Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media. (c) Evaluate and select information sources and digital tools based on the appropriateness to specific tasks. (d) Process data and report results. *(Specific Technologies: Schoology, Google)*
5. Digital citizenship (a) Advocate and practice safe, legal, and responsible use of information and technology. (b) Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity. *(Specific Technologies: Google for research, Google Drive)*
6. Technology operations and concepts (a) Understand and use technology systems. (b) Select and use applications effectively and productively. (c) Troubleshoot systems and applications. *(Specific Technologies: Schoology, Google Drive, Wix, Weebly, Blogger, Movie Maker)*

Overview (a short summary of the lesson or unit including assignment or expected or possible products)

This lesson is a cumulative assignment students did at the end of the ecology unit. High school freshmen come into 9th grade biology with a pretty good understanding of ecology, so most of this unit tends to be a review and somewhat boring for them. After reviewing the basic content material with them over the course of the unit, they were assigned this cumulative project. This project gives students the option to create a travel blog, video, or website about a biome of their choice. Students are allowed complete creative freedom for which platform they would like to use and the design of the final product. Within this project, students will address each of the content standards of the unit and how each standard relates to the chosen biome. Upon completion of the project, students will fill out an organizer for each of the six major biomes using the information from the best representations of their peers.

Essential Questions (What essential question or learning are you addressing? What would students care or want to know about the topic? What are some questions to get students thinking about the topic or generate interest about the topic? Additionally, what questions can you ask students to help them focus on important aspects of the topic? (Guiding questions) What background or prior knowledge will you expect students to bring to this topic and build on?) Remember, essential questions are meant to guide the lesson by provoking inquiry. They should not be answered with a simple "yes" or "no" and should have many acceptable answers.

- Essential Question #1: How does matter and energy link organisms to each other and their environment?
- Essential Question #2: How do humans have an impact on the diversity and stability of an ecosystem?
- Questions to generate interest:

- How do plants and animals interact within the biomes of the world?
- How do different types of matter cycle within a biome?
- How are humans impacting biome in general *and* specifically the plants and animals within them?
- What relationships do animals have with each other within an ecosystem?

I will expect students to have basic background knowledge on the different types of biomes (i.e. desert, tundra, rainforest, etc.) such as general climate information and location, as well as be able to list several specific plant and animal species within each of these biomes. During this lesson I will expect students to build on this prior knowledge of biomes by further exploring how matter cycles specifically within a biome and furthermore, be able to describe the specific things humans are doing to harm the biomes and describe the resulting effects on the flora and fauna of the biomes as well as the specific adaptations within each biome.

Assessment (What will students do or produce to illustrate their learning? What can students do to generate new knowledge? How will you assess how students are progressing (formative assessment)? How will you assess what they produce or do? How will you differentiate products?) You must attach copies of your assessment and/or rubrics. Include these in your presentation as well.

As a final product, students will demonstrate their learning by creating a travel blog, adventure video, or website for a biome of their choosing. To generate new knowledge, students will further explore the connection between important elements and how they cycle within the biome as well as human impact on the biome and adaptations and relationships of the plants and animals.

During the lesson, students will be assessed with both formative and summative assessments. On Friday, March 4th they will have already been working for two full class periods on this lesson. At this time, each student will take a 5 question "check for understanding" on Google forms tailored to his or her specific biome. This formative assessment will demonstrate who has been doing accurate research on their biome. In addition, on Friday, I will briefly review the Google doc of each individual or group to make sure they are making sufficient progress. For the summative assessment, students will be graded according to a rubric that was passed out at the beginning of the lesson. The final product (blog, video, or website) will be assessed for each of the content standards covered by this project.

Products will be differentiated in several ways. First, students are able to choose which biome they would like to research. A list of choices will be provided. Second, within the project, students choose which cycles they will discuss. They can choose either the water cycle or the carbon cycle. Then they can also choose either the nitrogen cycle or phosphorous cycle. Finally, students will choose what they want their final product to be: travel blog, adventure video, or website.

Resources (How does technology support student learning? What digital tools, and resources— online student tools, research sites, student handouts, tools, tutorials, templates, assessment

This lesson primarily focuses on technology use. Prior to starting this project, students will need some basic technology skills. Students will need to know how to navigate the course website on Schoology, how to create a shared document on Google drive, and how to research appropriate and accurate information using their favorite search engine. Students will also use a variety of tools throughout this lesson. First, students will use **Schoology** to access the project description and rubric. It is essential that students have already viewed and taken notes on the lecture videos posted on Schoology prior to starting this project. The formative assessment on the third day of the lesson will also take place on Schoology. I will post a 5 question quiz specific to each biome and each student will be responsible for taking the quiz that pertains to his or her specific biome.

Google and **Google drive** will also be important for students during this lesson. Once students have viewed the project, they will research using the search engine of their choice. Most students will probably use Google for this process. Also, students will need to create a document within their Google drive folder that is already shared with me. Students will also need to share this document with their partners so they can *both* research and add information according to the requirements of the rubric. I will also be viewing and commenting on this document as a method of formative assessment.

Once students have all the information necessary according to the rubric, they will begin creating their final product. Because there are several options, many different types of technology will be used. For the travel blog, students can use **Blogger** or **Weebly** or another program of their choice. For the video, students can use **Movie Maker, iMovie**, or another program of their choice to finish and publish the video and can use a variety of tools to record the actual video as well. For the website, students can use **Wix** or **Weebly**, or another program of their choice. I will post tutorials for Blogger, Weebly, Wix, and Movie Maker on Schoology. Students choosing to use other tools will be responsible for figuring out the technology on their own as well as any minor troubleshooting that may be necessary.

Instructional Plan
Preparation (What student needs, interests, and prior learning provide a foundation for this lesson? How can you find out if students have this foundation? What difficulties might students have?)

In terms of content preparation, prior to this lesson, students have been studying ecology topics for the past two weeks so they have already been taught all necessary content. Also, students spend roughly three months on the basics of ecology during 7th grade so much of this information is review for them. Based on open-note homework checks and video views, I will know if the students are staying on track with the content prior to starting this lesson.

For technology preparation, students will most likely choose which type of project they do based on their interests. Many students are interested in making videos or website creation which will make this project fun for them. Other students are great creative writers and will likely want to do the travel blog option. Students creating websites would benefit from having some prior knowledge of Wix or Weebly, but I will also post tutorial videos on the blog for those who have

never created a website using one of these platforms before. Also, students doing the video option will need some basic understanding of how to record a video and how to edit and publish a final version.

In general, all the technology students will be using is user-friendly and easy for beginners to learn. I will have a general discussion with my students prior to starting the lesson to determine how much experience they have with website and video creation and to prepare myself for the extent of tutorials and troubleshooting that I will have to do during the lesson. I can see students having difficulties with the initial setup of a website or travel blog but I will encourage them to use Google to find answers to their questions too as many people post FAQs and other troubleshooting tips for all these technologies. In addition, I know from doing past projects technology-based projects with them, that my students are very good about being proactive and looking up the instructions when they do not know how to do something with a particular technology tool.

Management Describe the classroom management strategies will you use to manage your students and the use of digital tools and resources. How and where will your students work? (Small groups, whole group, individuals, classroom, lab, etc.) What strategies will you use to achieve equitable access to the Internet while completing this lesson? Describe what technical issues might arise during the Internet lesson and explain how you will resolve or trouble-shoot them? Please note: Trouble-shooting should occur prior to implementing the lesson as well as throughout the process. Be sure to indicate how you prepared for problems and work through the issues that occurred as you implemented and even after the lesson was completed.

My students are generally pretty responsible with digital tool use, so they know the procedures when we have laptops or when we are in the media center. For this project, students will be working either alone or with a partner (this is student choice) and they can spread out throughout the classroom. I have several work areas in my classroom, so some students choose to sit on bean bags on the rug, others choose to sit on the back lab tables, and others will simply turn their chairs around and sit at their desks to work together. For internet access, many students prefer to use their phones for research and then desktops or laptops to work on final products. I would prefer to reserve the laptop cart from the media center for this project as there will be a lot of collaboration which may be too noisy for the desktops in the media center. If the cart is not available, the media center desktops are a great alternate choice. If neither of these are available, there are other science department laptop carts, which are not as reliable, but still usable.

During this project I foresee several technical issues arising. The issues will be dependent on which computer option I am able to use. *(Note: I was able to reserve the media center cart for two of the three days and we worked in the media center on one of the days.)* The primary issue with the laptops is that the laptops do not make it through six class periods on one charge. I will need to make sure all laptops are properly stowed during my 3rd period lunch to charge and in addition, I will obtain power cords for the laptops that way students can plug in the laptop if the battery is low during 6th or 7th period. I have more outlets than I can count throughout my classroom, so there is ample space for students to charge.

Other issues that could occur would be focused on internet access and login issues. Sometimes when too many laptops try to log on at once, some are rejected by the server. If this happens, I

will try to restart the computer and if that still continues to be a problem, I will send the student(s) to the media center with a pass to use a desktop computer. Cell phones are also a good backup if the internet is not working while students are doing research. Students can easily research using Google on their phones and most of them have the Google drive app so they can also add to the information document. If for some reason the entire internet system in the building goes down, students will have textbooks and class notes to help them gather the information. I will also print additional biome resources for students who do not have cell phone internet access. If the internet continues to be an issue for several of the days we are working, I will postpone the due date to allow the students more time to complete the project either outside of school or at school once the internet is fixed, although I cannot imagine a time where the internet would be down for more than a couple of hours. If the students doing a travel blog or website have issues with the website programs working properly, I will offer an alternative of a Word document or PowerPoint as the final project submission.

Reflection: During the actual implementation of this lesson, I did have some minor issues. Several students (at least one individual or group) per class period had a problem with laptop logins. For two of my classes there are more students than laptops, so there were not enough leftover computers and I ended up having to send these students to the media center to use the desktop computers. The other classes were able to use leftover computers and log on when this problem arose. Another concern of mine was the charge of the laptops. This was not a problem until my last class of the day. During this class five of the laptops gave low battery warnings, but I was able to give these students power cords and they moved somewhere else in the class where they could plug in the laptop and continue working. One final issue I had to work through that I was not prepared for, was the blocking of Blogger by the school Wi-Fi. After this first happened during second period, I asked several other students who were using Blogger how they were able to use it on the Wi-Fi when one particular group wasn't able to use the program on their laptop. We determined that only the creation of a Blogger account was blocked. So the student that was having trouble went home that night and created an account and then was able to easily logon the next day in class. Had this issue happened to someone that did not have internet access at home, I would have recommended that the student use a different platform, such as Weebly, to complete the assignment.

Instructional Strategies and Learning Activities – Describe the research-based instructional strategies you will use with this lesson. How will your learning environment support these activities? What is your role? What are the students' roles in the lesson? How can you ensure higher order thinking at the analysis, evaluation, or creativity levels of Bloom's Taxonomy? How can the technology support your teaching? What authentic, relevant, and meaningful learning activities and tasks will your students complete? How will they build knowledge and skills? How will students use digital tools and resources to communicate and collaborate with each other and others? How will you facilitate the collaboration?

The great thing about this lesson is the students learn through a very self-directed method by creating the final product and get to have fun and be creative in the process. I will function as a facilitator in the beginning, but after we start the lesson students really become their own facilitators. At that point, I will help students troubleshoot technology issues that may arise and point them in the right direction for finding reputable sources. In addition, I will be guiding students "behind the scenes" by looking at their Google drive documents and commenting when

necessary regarding the validity and quantity of information they have typed in their Google doc. During this lesson, students will be researching and ultimately creating a final product to be published and potentially shared with their peers.

This lesson relies heavily on collaboration for those that choose to work with a partner *(Note: only eight students total chose to do this project individually).* Students have to collaborate during class while working on the blog, video, or website, and students also have to collaborate out of class through the Google doc and the chosen program for the final product. As previously mentioned, I will also be moderating the gathering of information by reviewing the Google docs of students as they research. Perhaps my favorite part about this project is the human impact part. Prior to this lesson, we discussed human impact in depth and many students were outraged by the issues of poaching, deforestation, and global warming among other topics. This project allows students to take a closer look at how these human impact issues directly impact each biome and the plants and animals that live in it which is meaningful in that it will hopefully impact their decisions in the future.

All three higher levels of Bloom's taxonomy are also addressed through this project. Through analysis, students are reporting their initial data to me via Google drive but also reporting their final product via publishing on the web. With evaluation, students are collaborating on the final product, and the best projects of each biome will be presented to their peers for review. Creativity is the basis of this whole project because students are creating an original product whether it be a travel blog, website, or adventure video.

Differentiation (How will you differentiate content and process to accommodate various learning styles and abilities? How will you help students learn independently and with others? How will you provide extensions and opportunities for enrichment? What assistive technologies will you need to provide?)

The content in this lesson is differentiated in several ways. From a content perspective, students can choose whichever biome they would like to research. Most students have a favorite animal or exotic place they want to visit, so by allowing choice of biome, students will automatically have a high interest in the content. Some biomes are also easier than others to find information on (i.e tundra, desert, and rainforest), so for some of my lower performing students special education students and my ELL students I will direct them toward one of these easier biomes to make sure they are able to find adequate information while searching for material. Also content based is the choice of which cycles of matter to discuss within the project. Students can choose either the water cycle or carbon cycle. Once again, for my lower performing students and ELL students I will probably encourage them to choose the water cycle. Students can also choose either the nitrogen cycle or phosphorous, and once again I will encourage the nitrogen cycle to some students as this is the easier cycle to understand.

In terms of process, the final product of this lesson is also differentiated. By allowing students to choose which technology they want to use, they are given creative freedom to create a final product that is an expression of them personally and their learning styles too. The project itself is a great extension of their learning because they have to look deeper into biomes instead of just

memorizing the surface information that a typical biology class reviews. I will also be providing several assistive technologies for this project. I have several ELL students with very low English proficiency, so for these students, I don't want them to get caught up in figuring out how to make a website, I'm more concerned about them learning the content. Therefore, my ELL students will be simply creating PowerPoint presentations. I have two students who do not have consistent internet access at home, so for these students, I will allow them to come into my class during their lunch period to use the computers to work on the project. I will monitor the progress of these students and grant a due date extension if necessary. Finally, I have several special education students that require "chunking" of large assignments. For these students, I will be giving them a schedule to keep them on track as we move through the lesson. I will be posting this schedule in Google drive and sharing it with these individual students. I will also include a spot for a parent signature so the parents are aware of what we are doing in class and can hold their children accountable for the steps of the project too. *See the attached documents for a sample of this schedule.*

Reflection (Will there be a closing event? Will students be asked to reflect upon their work? Will students be asked to provide feedback on the assignment itself? What will be your process for answering the following questions?
- **Did students find the lesson meaningful and worth completing?**
- **In what ways was this lesson effective?**
- **What went well and why?**
- **What did not go well and why?**
- **How would you teach this lesson differently?**

The lesson will officially conclude the week after the project is due. During grading of these projects, I will choose the most accurate and well put-together projects to represent each biome. All of these projects will be posted on Schoology and students will be responsible for filling out an organizer with the specific information they need to know about each biome. At this point, students will also reflect on the assignment, more specifically the technology aspect, to give me feedback for implementation next year. They will fill out a five question Google form survey on the specific technology chosen for that particular student's project. To gather information on whether the lesson was meaningful I will go simply by conversations I have with students or conversations I hear them having with their peers. My students are generally quite open and honest with me about their opinions and don't hesitate to tell me the truth if they don't think a particular assignment was worthwhile. The effectiveness of the lesson will be initially answered through the summative assessment test grades and furthermore, the End of Course scores in the ecology section of the test. To determine what went well and what did not I will use the feedback on the technology and also the rubric and what portions students had trouble completing or completing accurately. I will use all of the information gathered (formative assessment, summative assessment, surveys, student conversations, and overall project grades) to address how I may teach this lesson differently in upcoming school years.

Closure: Anything else you would like to reflect upon regarding lessons learned and/or your experience with implementing this lesson. What advice would you give others if they were to

My experience implementing this lesson was a great success! The students were actively engaged the entire time and liked the additional challenge of also having to learn a type of program or software too. The final product of the lesson was well-liked by my students and for the most part they created wonderful final products. Of all the website programs, Weebly was the most user-friendly and students had the least trouble creating and publishing their websites. Some students had some issues with Wix, so in the future, I will most likely not recommend that website as a primary option.

The website option was also the most common choice, but for future implementation, I would like to somehow require the website be more interactive or also include a video or more information throughout, as this choice almost seemed like the "easy way out" for students. The few students that created travel blogs were very creative and made you feel as if you were exploring the biome by their sides. Several of the videos were also excellent, but some of the videos were lacking. Next time I do this lesson, I will need to address the video content more specifically and the requirement for the video to be engaging and exciting, as several videos had students sitting at desks simply reading off a piece of paper the entire time. The also needs to be a time limit for videos to ensure viewer engagement, as several videos were over 10 minutes long! Because of the differences in final products based on assignment type, I plan to create three separate rubrics for next year's implementation. In this way, I can address each of the specific issues that arose dependent on the project choice.

Another issue I was *not* expecting to be so extreme was plagiarism. In general, I require students to use Turnitin.com when they write essays or papers to check for plagiarism. Despite my stressing for students to write their own material, many students copied and pasted information from websites without quoting it or using proper citation thinking they could get away with it because it wasn't in paper form. One parent actually demanded a parent teacher conference with administration present when her child got a zero because he copied and pasted the whole thing and she thought that since he put links to the websites he used at the end of the website it wasn't actually plagiarism. After working through the previous module on online safety in this course and other coursework regarding plagiarism, I think I will add an extra day to this lesson next year and do a digital safety and proper use of the internet mini-lesson before starting this project. Then my students will be well-aware of how to properly use resources and will hopefully be a little more mindful of how they communicate the information for this project.

Overall, I loved doing this as a cumulative wrap-up of all the content we learned and reviewed in the ecology unit for my on-level biology students, but next year I will also be teaching STEM biology. For this reason, I think I may try this project to start the unit with my STEM students because most of them will already have more than enough prior knowledge to be successful during this lesson. Then, we can spend more class time further exploring human impact after they have already researched all the different biomes. I also think this method of implementation would also be a great idea for any teachers that are teaching Honor's biology.

Lesson Plan Resources

5 Question Formative Assessments on Google Forms:

Tundra
1. Give an example of mutualism in the tundra.
2. Name one animal that lives in the tundra. Name an adaptation for survival of this animal.
3. Name one plant that lives in the tundra. Name an adaptation for survival of this animal.
4. Name one predator-prey relationship in the tundra.
5. Name a specific way humans have impacted the tundra negatively.

Grassland
1. Give an example of mutualism in the grassland.
2. Name one animal that lives in the grassland. Name an adaptation for survival of this animal.
3. Name one plant that lives in the grassland. Name an adaptation for survival of this animal.
4. Name one predator-prey relationship in the grassland.
5. Name a specific way humans have impacted the grassland negatively.

Tropical Rainforest
1. Give an example of mutualism in the rainforest.
2. Name one animal that lives in the rainforest. Name an adaptation for survival of this animal.
3. Name one plant that lives in the rainforest. Name an adaptation for survival of this animal.
4. Name one predator-prey relationship in the rainforest.
5. Name a specific way humans have impacted the rainforest negatively.

Desert
1. Give an example of mutualism in the desert.
2. Name one animal that lives in the desert. Name an adaptation for survival of this animal.
3. Name one plant that lives in the desert. Name an adaptation for survival of this animal.
4. Name one predator-prey relationship in the desert.
5. Name a specific way humans have impacted the desert negatively.

Salt Water
1. Give an example of mutualism in salt water.
2. Name one animal that lives in the salt water. Name an adaptation for survival of this animal.
3. Name one plant that lives in the salt water. Name an adaptation for survival of this animal.
4. Name one predator-prey relationship in salt water.
5. Name a specific way humans have impacted salt water negatively.

Temperate Forest
1. Give an example of mutualism in the temperate forest.

2. Name one animal that lives in the temperate forest. Name an adaptation for survival of this animal.
3. Name one plant that lives in the temperate forest. Name an adaptation for survival of this animal.
4. Name one predator-prey relationship in the temperate forest.
5. Name a specific way humans have impacted the temperate forest negatively.

Project Description & Rubric:

Ecology Unit – Culminating Project

For a final project for this unit, you will be using technology to examine a particular biome in greater detail and report your findings to your classmates through the creation of a travel blog, video, or website.

Choose ONE of the following biomes to research:

- ❖ Tundra
- ❖ Grassland
- ❖ Tropical Rainforest
- ❖ Desert
- ❖ Salt Water
- ❖ Temperate Forest

Your project must include the following:
- ✓ Summer & Winter Climate Information
- ✓ Climatograph
- ✓ 3 examples of specific resource competition
- ✓ One example for each type of symbiotic relationship
- ✓ Limiting factors – 2 density-dependent and 2 density-independent
- ✓ 3 animals and a specific adaptation for survival for each animal
- ✓ 3 plants and a specific adaptation for survival for each plant
- ✓ Food web with 10 organisms
- ✓ Energy pyramid with specific organisms (you must also show the amount of energy loss)
- ✓ Discuss one major human impact on this particular biome (pollution, pesticides, global warming, deforestation, overpopulation, etc.)
- ✓ Discuss EITHER the water cycle or carbon cycle in relation to this biome
- ✓ Discuss EITHER the nitrogen cycle or phosphorous cycle in relation to this biome
- ✓ Cite 5 specific sources where you gathered your information

Choose ONE of the following project options:
- ➢ **Travel Blog**
  - o Using Blogger or another site of your choice, create a detailed travel diary of your "journey" through your chosen biome. All blog entries should be detailed and accurate with pictures included. Be sure to include all the components listed above but be creative and make your project eye-catching and unique.
- ➢ **Video**
  - o Using software of your choice, create a professional looking video detailing your "journey" through your chosen biome. You can choose any format you like for this video (ex: news report, national geographic exploration video, video diary of your travels, etc.). Be creative but be sure to include all the components listed above.
- ➢ **Website**
  - o Using Wix, Weebly, Google sites, or another website program of your choice, create a website for your chosen biome. The website should be colorful, eye-catching, and informative. Be sure to include all components listed above on your site. You can also include links to informative sites, embed videos, or add any other additional resources that you think will complement your site.

TOTAL POINTS: 50 PTS >>> See Rubric for point breakdown

Ecology Unit – Project Rubric

Item	Well done!	Good	Fair	Poor
Climate Information **5**	Summer & winter climate information is included. Climatograph present. 5	Missing one season or the Climatograph. 4	Missing both seasons or a season and the Climatograph 3	Climate is minimally discussed or not present at all. 2 1 0
Competition & Relationships **6**	Thorough description of 3 specific competition resources & one of each specific symbiotic relationship. 6	Basic description of competition resources & symbiotic relationships or missing a resource or relationship 4	Missing multiple resources or symbiotic relationships or incomplete descriptions 2	Includes minimal discussion of competition and resources or none at all are included. 1 0
Limiting Factors **4**	Contains multiple density-dependent and density-independent examples 4	Missing one of the four required limiting factors. 3	Missing two of the four required limiting factors. 2	Missing three or all of the four required limiting factors. 1 0
Plant & Animal Adaptations **6**	Contains 3 specific animal adaptations and 3 specific plant adaptions. 6	Missing one or two of the six required adaptations or several adaptions are not specific. 4	Missing three or four of the six required adaptations or all adaptations are not specific 2	Adaptations are not specific or there are five or more of the required six missing. 1 0
Food Web & Energy Pyramid **10**	Food web contains 10 or more organisms. Energy pyramid contains specific organisms and shows energy amounts. 10	Food web is missing two or less organisms. Energy pyramid is missing specific organisms or two or less energy amounts. 7	Food web is missing five or less organisms. Energy pyramid is missing organisms or energy amounts. 4	Missing either a food web, energy pyramid, or both or most of the components of both are missing. 2 0
Human Impact **5**	Discussion of human impact is thorough and relevant. 5	Discussion is brief or not completely relevant to the biome. 4	Discussion is minimal or not relevant to the assigned biome. 2	Discussion is incomplete or not present at all. 1 0
Cycles of Matter **10**	Both cycles are accurate and relevant to the chosen biome. 10	Both cycles are mostly accurate or mostly relevant to the biome. 7	One cycle is missing, both cycles are inaccurate, or both cycles discussions are irrelevant to the biome. 4	Both cycles inaccurate and irrelevant to the biome or both missing completely. 2 0
Sources **5**	Five specific scientific sources are listed. 5	One of the five required sources is missing. 4	Two of the five required sources are missing. 3	Three or more of the five required sources are missing. 2 1 0
Total Points */50*				

Chunking Schedule (SPED Students):

Due Date	Task	Instructor Initials	Parent Initials
3-2-16	• Summer & Winter Climate Information • Climatograph • 3 examples of specific resource competition • One example for each type of symbiotic relationship	HJ	JD
3-3-16	• Limiting factors – 2 density-dependent & 2 density-independent • 3 animals and a specific adaptation for survival for each animal • 3 plants and a specific adaptation for survival for each plant • Decide which platform to use for the website and create a free account.		
3-4-16	• Food web with 10 organisms • Energy pyramid with specific organisms (you must also show the amount of energy loss) • Start working on the website	•	
3-5-16	• Discuss one major human impact on this particular biome (pollution, pesticides, global warming, deforestation, overpopulation, etc.) • Continue adding information to website	•	
3-6-16	• Discuss EITHER the water cycle or carbon cycle in relation to this biome • Discuss EITHER the nitrogen cycle or phosphorous cycle in relation to this biome • Finish adding information to website	•	
Ongoing	• Cite 5 specific sources where you gathered your information	n/a	n/a

LINK TO WEBSITE:

Technology Google Forms Survey:
1. What technology did you use for this lesson?
2. On a scale of 1 – 5 (1 – very difficult and 5 – very simple) how difficult was this technology to learn how to use?

       1   2   3   4   5

3. How likely would you be to use this same technology for another project? (1 – never again and 5 – every time I can)

       1   2   3   4   5

4. What did you like **best** about this technology?
5. What did you like **least** about this technology?

Biome Organizer:

BIOME	Avg Temp. Range		Symbiotic Relationships	Limiting Factors *(DD and DI)*	Plant Adaptations	Animal Adaptations	Major Human Impact(s)
Tundra							
Temperate Forest							
Grassland							
Desert							
Salt Water							
Tropical Rainforest							