Lesson Plan for Outdoor Learning

Estrella/Campos **Grade/Grade Band: HS/9th Grade/Biology**	**Topic:** **Ecosystem Study** **Diversity of Plants and Animals on Campus**

Brief Lesson Description:

Students will study the diversity of plants and animals on our school campus and determine the factors that could affect the survival of those organisms.

Research Questions:
Is there a diversity of plants and animals on campus and how diverse is it?
What factors could affect the presence and survival of organisms including plants and other animals on campus?
What conditions will help the species thrive?

How will you use the outdoors:

Students will select a specific area on campus where there is a diversity of life.
Students will use i***naturalis***t to identify some organisms on campus.
Students will gather and analyze data on surface temperature, air temperature, soil moisture to describe how these factors may affect the diversity of life forms on campus.

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Safety concerns, hazards and mitigation strategies:

Protection from the Sun/ Hat/ Sunscreen
Reminder on Proper Usage of Tools
Reminder on Behavior Outside The Classroom

NGSS Performance Expectation(s) (if have a clear PE paste here)

NGSS LS 2-2:

Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking Questions and Defining Problems	LS2.A: Interdependent Relationships in Ecosystems	Cause and Effect
Developing and Using Models		Patterns
Analyzing and Interpreting Data	LS2.C: Ecosystem Dynamics, Functioning, and Resilience	Stability and Change

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Phenomenon: **Show a video of the area of school with diverse life forms, plants and animals.** **How would you describe the plants and animals on campus?** **Is there a diversity of plants and animals?**		
Learning Target/s for this lesson (use Evidence Statements for science): **SEP 1. Asking questions and define problems.** **SEP 2. Developing and using models** **SEP 3. Planning and Carrying out Investigations** **SEP 4: Analyzing and interpreting data** **HS LS 2-2: Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.**		
What will youth learners be able to *know* at the end of this lesson? **Diversity of Life (Plants and Animals) on Campus**		

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Prior Student Knowledge and Possible Preconceptions/Misconceptions (how will it be assessed?)

Ecosystem

Biotic and Abiotic Factors that Affect Life
Climate

Specific conditions needed to sustain life such as water, sunlight, oxygen

Using Google Sheet

Misconceptions:
Difference between climate and weather.

What will youth learners be able to *do* at the end of this lesson?

- Students should be able to identify a variety of plants and animals on campus using the inaturalist app.
- Students should be able to explain the conditions that affect an ecosystem including the ones in a school campus.
- Students should be able to gather data and use codap/google sheet to present their data in a graph.

What evidence should we gather and discuss about student learning? How will youth learner thinking be captured? (seeing, hearing, doing, writing)

Evidence about student learning includes:

Presentations, Graph, Data Tables,
Inaturalist photos they have collected and presented in a Slide Deck
Posters

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Youth learner thinking will be captured by: Small Group Discussions Collecting Data Using Tools Doing Research

5E Lesson Plan: Biology/Ecology Lesson

Note: keep in mind your responses above

5E Stage	Student Does	Teacher Does
Engage Prior knowledge of concepts to be learned. Introduction of phenomena and opportunity for students to ask questions.	Students choose an area on campus where they may find evidence of life. Students are to write some observations and a question they have related to conditions that sustain life on campus. Student may use the Scavenger hunt/worksheet and list down some evidence of erosion, evidence of water, evidence of animals eating, evidence of human influence on life	*Pre-lab:* Ask students to download the inaturalist app. Explain how to use the app to help identify organisms. Introduce the methods of collecting and tools by watching video clips and providing handouts. Teacher may also do class demonstrations. Give the students time to practice using the tools inside the classroom.

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Explore Concepts students explore to build understanding of the "explain" concept.	**Field Journaling** Each group may select one of the options. a. Using inaturalist- Students do a Bioblitz. Identify plants and animals in the area and use the app to help them identify the organisms they find. b. Nail Test c. Air Temperature d. Surface Temperature e. Soil temperature, pH and moisture test f. Thermal camera Students will record and gather data. Students will write their observations.	*Teacher facilitates.*
Explain Concepts students know or understand (students do the explaining), students explain what they are starting to understand about the phenomenon.	Students will present what they have discovered. Students will compare and contrast the data they have gathered.	Teacher listens to the presentations and facilitates discussion. Teacher will assure students stay on task.
Explore/Explain If more than one	Students will present in their group and the other students will ask questions to help the group to potentially improve thoughts and techniques.	

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Elaborate Concept application.	Students research the plants and animals they have discovered on the school grounds.	Teacher may suggest a list of resources and websites the students may use. Guide the students to discover the features of the tools.
Evaluate Concept(s) students understand at the end of the learning sequence, includes explanation of how and why the phenomenon occurs using understanding of 3D science ideas/concepts.	Students ***write 2-3 paragraphs*** about the diversity of life on campus. They need to write what they have discovered about the tools they used, and homeostatic conditions to maintain the species.	Teacher uses the rubric presented at the beginning of the lesson. Teacher may use these guide questions: a. Do they understand the research question? b. Do they understand the tools they used? c. Did they present and discuss academic vocabulary?

Reflection questions after teaching lesson

- What was the level of student engagement indoors? Outdoors?
- To what extent did the students learn what was intended? How do you know? As part of your answer, please indicate:
    - In what ways were your teaching methods effective? How do you know?
    - In what ways were your activities effective? How do you know?
    - In what ways were the instructional materials effective?
    - How did any special considerations of accommodations affect the lesson?
- Identify an individual or group of students who had difficulty in today's lesson. How do you account for this performance? How will you help this (these) student(s) achieve the learning objectives?

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- Identify an individual or group of students who did especially well in this lesson today. How do you account for this performance?

Based on the observation notes and student data analysis... what modifications will increase student learning for the second implementation/*future implementation*? (Once modifications are determined, please revise the original 5E lesson plan for the 2nd/3rd implementation.)

Modification to increase student learning	Evidence from the activity and student data that directly supports the modification listed.

Appendix

Engage

Why should students care? How does it relate to their lives? How will prior knowledge/experience be activated? Place the standards/s into a phenomenon. Reach their emotions and get their attention. The purpose for the ENGAGE stage is to pique student interest and get them personally involved in the lesson, while pre-assessing prior understanding. During the ENGAGE

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stage, students make connections between past and present learning experiences, setting the organizational groundwork for upcoming activities (NASA e-clips)

Explore (is hands-on)

Youth learners have the opportunity to get directly involved with phenomena and materials. As they work together in teams, youth learners build a set of common experiences which prompts sharing and communicating. The lead learner acts as a facilitator, providing materials and guiding the students' focus. The youth learners' inquiry process drives the instruction during an exploration. Youth learners are actively learning through inquiry-based science instruction (NASA e-clips).

Explain (reading info text or article)

The purpose for the EXPLAIN stage is to provide youth learners with an opportunity to communicate what they have learned so far and figure out what it means. EXPLAIN is the stage at which learners begin to communicate what they have learned. Language provides motivation for sequencing events into a logical format. Communication occurs between peers, with the facilitator, and through the reflective process. Use of interactive notebooks, vocabulary, and sentence stems support explain processes (NASA e-clips).

Elaborate/Extend

The purpose for the EXTEND stage is to allow students to use their new knowledge and continue to explore its implications. At this stage youth learners expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways (NASA e-clips).

Evaluate

EVALUATION is done at each stage in the 5E cycle. EVALUATE, the final "E", is a diagnostic process including forms such as rubrics, teacher observation, student interviews, portfolios, project and problem-based learning products. Youth learners will be excited to demonstrate their understanding through journals, drawings, models and performance tasks.

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