

School:	MJSHS	Subject:	Research	Teacher:		Lesson Plan Date:	
OBJECTIVE What will your students be able to learn?				BENCHMARK:			
SWBAT: Identify the abiotic and biotic factors of the world's different ecosystems. Practicing presentation and language skills for communicating scientific ideas as one does in actual symposia. <ul style="list-style-type: none"> • Identify the types of disturbances that ecosystems can recover from. • Explain how succession changes ecosystems over time. 				SC.912.L.17.4: Describe changes in ecosystems resulting from seasonal variations, climate change, and succession.			
REQUIRED MATERIALS Include all copies or supplies required for labs/activities that must be prepared ahead of time.							
Shoebox per group (have students bring in their own; assign groups ahead of time) Glitter glue Craft glue and hot glue Pipe cleaners and pompoms Colored pencils Markers Scissors Paint (red, yellow, blue) and paintbrushes beads Crinkled paper shred (blue, teal, green, white, brown, pearl) Newspaper Construction paper Tissue paper Felt Cotton balls Floral moss Colored foil (blue Foam blocks (green) Foam blocks (white) 200ct toothpicks Powdered sugar Tissue paper (assorted colors) Floral garden natural raffia Clear adhesive tape *Twigs, leaves, grass, rocks from outside?							

ASSESSMENT "Begin with the End in Mind"

How will you know whether your students have made progress toward the objective? How and when will you assess mastery?

Worksheet (4 pages) Need teacher signature of approval before they can begin building

Build An Ecosystem Worksheet

Complete this page FIRST!

1. List Group Members' Names: _____

2. What is your group's ecosystem name? _____

3. Color the regions on the map where your ecosystem is located:



4. List the reputable sources you used to complete your research:

a. Source: _____

b. Source: _____

c. Source: _____

5. Your model must include at least:

a. Label ALL abiotic factors

b. Feature at least 3 animals

c. Feature at least 2 plants

d. This page on the back

6. Attach this page to the back of your shoebox model!

Guided Research Worksheet

IMPORTANT: You will have 20 minutes to research your biome. Use the questions below as a guide for your research process. Once you have completed the questions bring this sheet to the instructor for signature approval. ONLY AFTER APPROVAL can you begin to build your project.

You may use the following sources for research:

- Your Biology textbook pages 112-117
- Open "Google", search "The World's Biomes UC Berkeley", select "The World's Biomes" at ucsb.edu/biomes.
- Open a new tab in Google, search "Build a biome [swtch200.com](http://swtch200.com/games)". Use the simulation to help you navigate your ecosystem.
- You may use other reputable sources, but they need to be approved by the instructor first!

With these sources, answer the following questions:

Abiotic and Biotic Factors in Your Ecosystem

What abiotic factors are within your biome? _____

Typical temperature of biome (in degrees Fahrenheit, not Celsius) _____

Describe the soil: _____

Describe the precipitation: (When does it rain the most? The least? How much annual rainfall?) _____

What biotic factors are within your biome? _____

List 4 animals _____

List 2 plants _____

ALL GROUP MEMBERS NEED SIGNATURE BEFORE GROUP CAN BUILD

Teacher Signature of Approval: _____

ESSENTIAL QUESTION

A higher order question that is directly derived from the benchmark, introduced at the beginning of the lesson, discussed throughout the lesson, and answered by students at the end of the lesson to show understanding of the concepts taught.

How do seasonal variations, climate change and succession affect the abiotic and biotic factors of the world's different ecosystems?

HIGHER ORDER QUESTIONS (3-5)

What questions will be answered to provoke higher order thinking and include Moderate to High EOC Complexity Levels? What would the ideal student response be for each question?

What are the different biotic and abiotic factors that comprise the world's diverse ecosystems? **The answers are diverse and depend on which biome system they use, biotic factors being plants and animals and abiotic factors being climate, soil, precipitation**

What positive or negative consequences can come from succession?

How would your ecosystem recover after catastrophic events?

Students will identify positive and/or negative consequences that result from a reduction in biodiversity.

DO NOW

Should be the first 5-10 minutes of the class period and student directed.

Define an ecosystem and write homework in agenda. Have the class share definitions of an ecosystem

INTRODUCTION

Brief part of the lesson when students learn the objective/essential question and how mastering the objective leads to achieving the bigger goal of the course.

- Provide a hook to motivate students and link to prior knowledge in order to introduce a new concept.
- Explain the relevance of lesson and the importance of learning the concept.
- Introduce important vocabulary using the word wall as an interactive learning tool.

Prezi presentation 10-min introduction reviewing ecology background information, defining the following terms: biome, ecosystem and categories of both; abiotic and biotic factors. Explain the shoebox diorama concept. Show example. Prezi link: <http://classroom.synonym.com/difference-between-biome-ecosystem-6468.html>

http://prezi.com/3zgv5lnvtb0d/?utm_campaign=share&utm_medium=copy&rc=ex0share

MODELING "I DO"

Component of the lesson when teacher explicitly models to students exactly what they are expected to do during guided practice and eventually during independent work.

- Conduct a think aloud while modeling the steps to completing an activity or solving a problem.
- Model the use of a graphic organizer.

Use questioning techniques such as re-directing, wait-time and prompting.

Show Build-An-Ecosystem project model. Give examples of reputable sources and how to find more sources.

Assign each group (of 4-5) a major ecosystem category at random. They will pick a specific ecosystem from within that category. Can use textbook to help them find a topic during the 15 minute research period.

Distribute Group Map & Directions Worksheet with blank maps for students to color in the region of the world where their biome resides. They must complete this worksheet and get a teacher signature of approval

GUIDED PRACTICE "WE DO"

Guide students to independent practice by providing an opportunity to work in small groups and practice what was taught during the modeled portion of the lesson.

- Incorporate the use of a collaborative strategy in small groups.
- Encourage student accountability talk during group discussion.

Perform checks for understanding.

We will discuss these questions: EQ: What are the different biotic and abiotic factors that comprise your group's ecosystem project? What would examples of secondary succession in your ecosystem be like? **Ex. A catastrophic event in rainforest: a forest fire destroys a huge portion of the tree canopy cover.** How would it come back after catastrophic events (secondary succession)? **Lichens and moss do not need soil to grow. Smaller shrubs along the ground could grow because the tree canopy does not block out the sun.** What effect does annual climate change

have on that ecosystem? Which invasive species pose a threat to your ecosystem and why? **Ex. Pythons in everglades eating other native species and their food sources.**

INDEPENDENT PRACTICE "YOU DO"

Differentiate your instruction to reach the diversity of learners in your classroom.

- Assign students independent work that is directly aligned with the "I Do" and "We Do" portions of the lesson.
- Conduct Center Rotations
- Circulate around the room to provide individual support.
- Pull small groups or individuals for more intensive support.

As a group, students will choose their specific ecosystem from their major biome category. Students will then use online and text sources to complete the Group Directions and Map worksheet outlining their ecosystem location and guide their research with questions. This worksheet must be completed by ALL group members before that group can begin building..

Presentations: (15mins.) 3 minutes each group's ecosystem. Have students take notes

CLOSING

Wrap up your lesson and ensure that students can connect what has been learned back to the original objective.

The lesson will be concluded with group presentations.

HOME-LEARNING

How will students practice what they learned? How will opportunities be provided for students to maintain mastery of previously mastered skills/concepts?

HOMEWORK: Write 2 paragraphs about another group's project that you found interesting (it cannot be your own project topic)

Why did you find this ecosystem interesting?

Where is this ecosystem located?

Describe its abiotic and biotic factors

Give an example of secondary succession in this ecosystem. How would this ecosystem recover?

Timeline

1. Prezi Introduction: **7-10 mins** (~2-3 mins for questions)
2. Group Project: **1hr 5 mins**
 - a. Building ecosystem models 50 mins
 - i. 25 min research for information
 - ii. 30 min building diorama
 - b. Presentations ~ 15 minutes (3 mins/group)
3. **Home-learning: Mini-Essay** (2 paragraphs)

4. Textbook references:

- a. Aquatic pg. 117
- b. Biomes p.112

Prezi Presentation Outline: Build-An-Ecosystem (questions for class in purple)

1. DO NOW: Define an Ecosystem & write down HW in agenda
2. Objective: SWBAT...
3. EQ: What are the different abiotic and biotic factors that comprise the world's diverse ecosystems?
4. Let's review abiotic vs. biotic factors. Have kids write list on board of generic terms
5. Go to the slide defining them. Briefly review
6. Where does an ecosystem come in? Go back to DO NOW definitions *Who has a good definition?*
 - a) Define ecosystem= community interactions between the organisms and their physical environment. Organisms (biotic factors) and physical environment (abiotic/biotic)
 - b) Define biome: Textbook definition: **geographical region that corresponds to a specific climate community.**
 - c) There are many types of ecosystems and many types of biomes. You can categorize them as being terrestrial and aquatic. *Which mean what (aquatic and terrestrial Bioblitz words)?*
 - d) ZOOM TO MAP ON SAME SLIDE
7. Slide 8 Map: For our intents and purposes we will think of it in 5 major broad categories: aquatic, tundra, forest, grassland, desert.
 - a) Tundra literally means "treeless mountain tract", very low temperatures, Show **picture**
 - b) Grasslands are ecosystems with grasses as the main vegetation, they have low rainfall—you're not going to see large trees and shrubs here. Show **picture.**
8. Slide 12: We have large classes of ecosystems, but why are there so many smaller divisions/categories of ecosystems?
9. Slide 13: Tilted Earth: *The earth's axis sits at a tilt of how many degrees?* About 23.5. This tilt→uneven distribution of heat (solar energy) across the earth's surface *with the hottest points being around which imaginary line?* (The Equator) This establishes the different climate regions around the globe: Polar Regions receiving the least heat and tropical regions get the most direct solar energy. This is why on the previous map there you saw a different versions of the same 5 major categories. *Can anyone think of any examples of this type of classification?* Ex. Grassland: Temperate Grassland: prairies of the Midwest and tropical grassland: African savanna; polar region of forest→boreal forest (taiga)
10. Slide 15 Project Directions: groups=table; *Have each group pick a topic out of the hat. From that category they can choose a more specific ecosystem*
 - a) Have a plastic bag with strips of 5 major categories
 - b) Slide 17 Instructions: Research your biome either online using reputable sources or textbook. You will have worksheets to complete that will help guide your research. *Pass out worksheets*

11. **Slide 18: Presentation:** Research carefully because when we are done building each group will give a 5 minutes presentation to the class where you will **teach** us about your biome. You need to hit on the abiotic and biotic factors and how they interact within your ecosystem. I want to know about at least 3 animals, 2 plants, and other things like climate, change, seasonal variations, soil. And give an example of the role secondary succession would play in your ecosystem—*how would the ecosystem recover from catastrophic events?*
12. **Assessment:** Take notes because you will have to complete this mini-essay assessment... (Send out instructions on Remind or Edmodo?) put on Board? Have them write it out?
13. **Building:** label all the abiotic and biotic factors. I want at least 3 animals and 2 plants. And use 3 REPUTABLE sources. These directions are on the group handouts
14. **Helpful Online Resources:** These are examples of online resources. Keep that slide up to see the online resources and instructions are on group handout

Questions Rubric for Presenters:

Diorama:

- 3 animals, 2 plants
- List ALL abiotic and biotic factors; color in correct region on map
- Do they describe: precipitation, temperature, elevation, soil, natural disturbances?

Presentation:

- Does everyone present?
- Describe the abiotic and biotic factors
- Describe their interactions
- Give an example of secondary succession after catastrophic events?
- What affect would climate change have on the ecosystem
- Which invasive species pose a threat to your ecosystem and why?
- What are these like: precipitation, temperature, elevation, soil, natural disturbances?

Possible Higher Order Questions

- Describe potential changes to an ecosystem resulting from seasonal changes, climate change and/or succession
 - Reduction in biodiversity from catastrophic events?
 - What would occur with the introduction of invasive and nonnative species?
 - What positive or negative consequences can come from succession?
 - Students will identify positive and/or negative consequences that result from a reduction in biodiversity.
5. The carrying capacity of an ecosystem is the maximum number of individuals of a particular species that can be supported on a long-term basis in a given amount of land.

For example, the carrying capacity of the Florida Panther may be 50 panthers per 10,000 square kilometers of habitat in the Everglades ecosystem. Which of the following determines the carrying capacity of an ecosystem?

- A. the average daily temperature of the ecosystem
- B. the most limited resources required for survival
- C. the number of predators found in the ecosystem
- D. the amount of disease affecting organisms in the

Ecosystem

4. Scientists that study the effects of global warming predict that a change in Earth's average temperature of even a few degrees will have dramatic effects. One consequence of global warming is the melting of the polar ice caps, which will in turn affect polar bears that use sea ice as a platform for hunting seals. What will most likely happen to the population of polar bears as a result of global warming?

- A. It will increase as polar bears adapt to other habitats.
- B. It will increase because polar bears will have fewer predators.
- C. It will decrease as the habitat suitable for polar bears decreases.
- D. It will decrease because polar bears will become easier to hunt.