COLLEGE OF SOCIAL & BEHAVIORAL SCIENCES
Women in Science & Engineering

Bio/Diversity Project
Lesson Title: Ecosystem Diversity / Biotic Community Diversity

Teacher: Sarah Heiman and Mira Theilmann
Grade Level: *7th*
Time: *60 minutes*
Adapted from: Habitat Web

AZ State Science Standard:	*6.L2U3.12* • *Develop and use models to demonstrate the interdependence of organisms and their environment including biotic and abiotic factors*
Content Objective: Math, Reading, Science, Writing, Other:	• *Students will create a web that connects various living and nonliving things within an ecosystem* • *Students will understand how many living things are connected and dependent on one another* • *Students will observe the effect of a broken habitat web (e.g. through pesticide introduction)*
Scientist of the Week:	• John C. Robinson • Biologist and birder • Lives in the US but travels all around the world • Works to involve inner city and minority youth in nature through bird watching • Created a database to document bird sightings throughout the world

Vocabulary	**Materials**
Provide a bulleted, alphabetized list of words that students will hear, speak, write, and/or read about in the lesson. These words are integral to developing content understanding: • Ecosystem • Habitat • Ecosystem services	Provide a bulleted list of relevant materials for the lesson. • Two balls of yarn per class • Habitat web cards • Ecosystem diversity worksheet (below)
Seasonality: (If more specificity is required, please note date/time range under the season) Highlight which season(s) your lesson would be most suited to. When working with the natural world, it is important to keep this in mind for your planning! Some activities are possible for a brief window of time while others may be appropriate during any time of year.	

Monsoons July-Sept.	*Autumn* Oct.-Nov.	*Winter* Dec.- Feb.	*Spring* Mar.-Apr.	*Dry Summer* May-June

Guiding Questions:

- What are some ways that plants, animals, and non-living things are connected?
- What happens to an ecosystem if organisms die out or if a non-living element is altered?
- How are we as humans connected to our own ecosystem?

Engagement/Introductory Activity:

- Ask the students the following introductory questions: Do you know what a habitat is? What about an ecosystem?
- Pass out "Ecosystem Diversity Worksheet"
- Ask students to think about what the terms "eco" and "system" mean separately
- After discussion, provide definitions of habitat and biodiversity with examples
    - Ecosystem: all of the living and nonliving things in an area and their interactions
        - Ex. An ocean, the desert, a swamp
    - Habitat: a place in an ecosystem where a plant or animal lives (its home)
        - Ex. A javalina's habitat is the Sonoran Desert
    - Students will fill in the appropriate blanks on their worksheets for the definitions
- Have students fill in the blank on questions 1 and 2 on their worksheet.
- Watch: biodiversity video

Exploratory Activity:

1. Explain to the students that they will be creating a web of connections between many different living and non-living things found in an ecosystem
    a. The class will be split into two groups of students with one teacher each
2. Have students sit or stand in a circle and hand out habitat web cards to each participant.
    a. Students should understand what their card represents and what role they would play in their ecosystem. If necessary, have each student say a few words about their cards at the beginning.
3. Have one student start the web by holding on to one end of the ball of yarn and passing the ball to another member in the circle.
    a. Before passing the ball, they should think about the connection between their habitat web card and that of the person to whom they are passing the yarn.
    b. When passing the ball, students should explain this connection. For example, a participant with a woodpecker card might throw the ball to a person with a tree card and say, "The woodpecker lives in the tree."
4. The next person holds onto the yarn and throws the ball to someone else, also explaining the connection; "The tree is cover for a deer."
    a. Assist students in coming up with accurate connections, while at the same time encouraging them to be creative
    b. Each time the yarn is thrown, the person throwing it holds onto a piece of it so that eventually, once everyone has a piece of yarn, the participants create a web of yarn. Make sure the tension is tight enough so that everyone can feel the interconnectedness of all the different elements
5. Point to one of the participants and announce that their organism has been wiped out. The cause can include human impacts, such as pesticides or habitat removal, and natural events, such as flooding or disease. When an organism dies, the person should give a gentle tug on the web, and then the next person who feels the tug should give a small tug back and raise their hand. This can continue as different people feel the tug.
    a. Point out each person who is affected by this creature.
    b. This procedure can be repeated multiple times with different examples as time permits

Explain:

- Lead a class discussion on what the students learned from the activity. Ask the following questions and write students' answers on the board:
    - What are some ways that plants, animals, and non-living things are connected?
    - What happens to an ecosystem if organisms die out or if a non-living element is altered?
- Ask students to fill in the answers on their ecosystem diversity worksheet.

Extension Activity/Questions:

- Join the two groups into one (take the yarn but allow the students to keep the cards)
    - Bring out M&Ms to represent resources in the environment.
    - Give a group of 3 students a new card classifying them as a human. Each human will get a card that says they will collect 5 candies from the resource pile.
    - The remaining species will go up one at a time to collect 2 candies at a time until the group runs out.
        - Ask the students if this is fair? Should humans have access to all of the resources in the ecosystem before any other species?
    - What are some of the reasons that humans should protect more resources? (i.e. leading into a conversation about the other ecosystem services regulating, cultural, and supportive)
    - Collect the M&Ms and ask the class how they should be divided up this time and who should be able to get resources first?
        - Write down the order and amount on the board and repeat the activity.
    - Ask the students if they think the new system was more fair.
        - Ask the students to return the M&Ms (unless each student has one bag already)
        - Give each student one bag and conclude the activity with each species sharing the resources equally.
    - Conclude the activity with a discussion of sharing resources to protect ecosystem services and biodiversity for future generations

Evaluation Activity:

- Have students fill in any remaining answers on their ecosystem diversity worksheet.
- Collect student worksheets (with names on top) and review after class.

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Name:_____

Ecosystem Diversity

Fill in the blank:

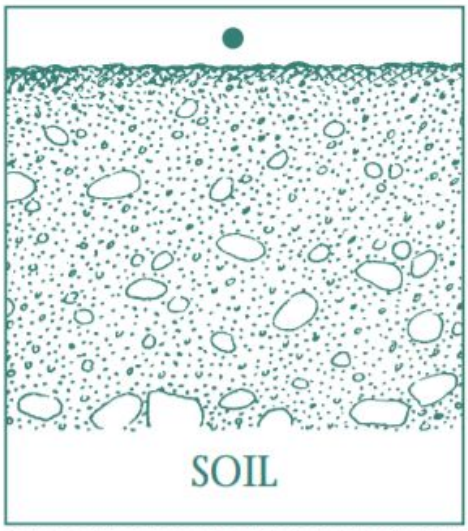
1. _____: all of the living and nonliving things in an area and their interactions

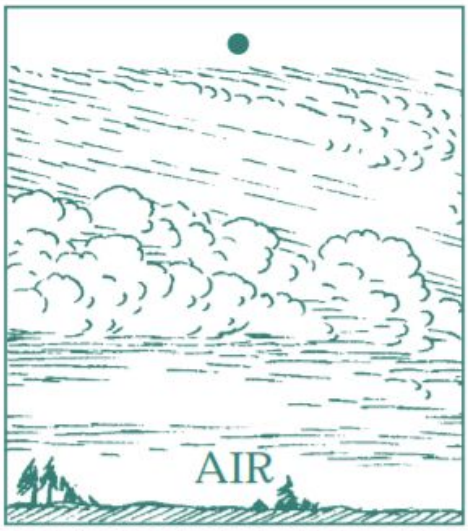
2. _____: a place in an ecosystem where a plant or animal lives (its home)

3. Fill in the blank with connections we made during the yarn activity

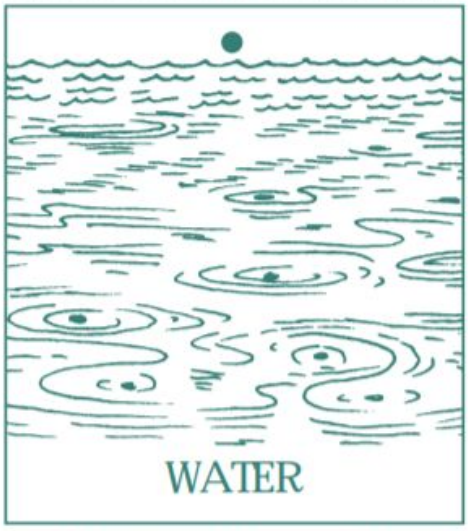
   Sun → _____ → _____

   _____ → jackrabbit → _____


SOIL


AIR


SUN


WATER

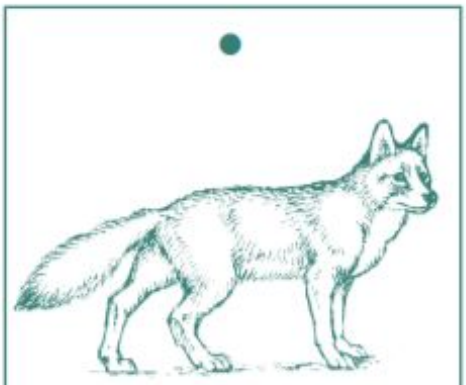

GRASS


WILDFLOWER


SNAKE


GRASSHOPPER


LIZARD



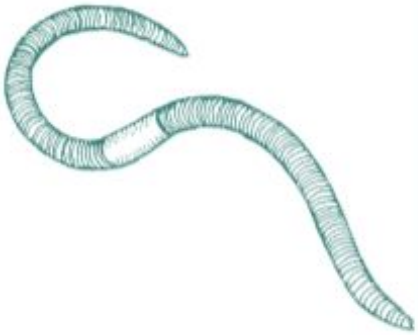
COYOTE

HAWK

SPIDER

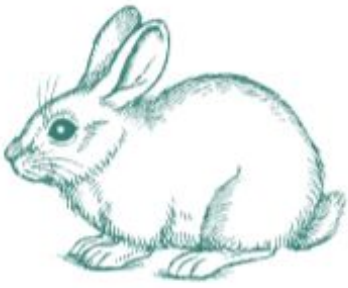
BOBCAT

VULTURE



EARTHWORM

SQUIRREL



RABBIT

MOUNTAIN LION

HUMANS

HUMANS

HUMANS