Diversity: An Exploration of Plant Classification, Variation, and Changes

Target Grades: 3rd-4th
Subject: Environmental Science, Life Science, Math, Art, Writing, Reading

Unit Overview:

This cross-curricular unit is intended for a either 3rd or 4th grade. Students will focus on diversity as they explore different types of plants where they live, how these vary from plants living on other parts of the globe. They will learn how the differences among the same plants help them to adapt, survive and reproduce, especially if there is an environmental change. Since I teach in a Montessori school, I have organized the unit according to Montessori philosophy—big picture first, then zoom in on the details. I have also incorporated the ideas used in Montessori materials, namely botany nomenclature cards and labeling. Naming and labeling helps students develop the language and observation skills and connections necessary to talk about plants in an educated and accurate way. The students' diversity exploration will occur in the form of hands-on inquiry, data collection and analysis, educational games, stories, writing, and a final presentation.

To better explain the Montessori style of starting with the large picture and then go "small," I will go through the organization of the unit. Students will start with a basic exploration/lesson in the diversity of biomes across the globe (diversity of ecosystems). On day two, they will work in teams to explore the major ecosystems of North America. This will give them an opportunity to learn more about the specific animals and the traits they possess that give them an advantage for surviving in their particular habitat (diversity among animals). Day three will involve looking in our own backyards and into the microhabitats that exist there (diversity within ecosystems). On day four, they will look more closely just at plants. They will classify and categorize specimen, seeing the characteristic and trait variations among plants, and also within the same species (diversity among and within species). Day five is a student-created extension & presentation of all the skills & information learned.

Sources/References:

American Forest Foundation. (2009). *Project Learning Tree: Pre-K-8 Environmental Education Activity Guide.*

Council for Environmental Education. (2008). *Project Wild: K-12 Curriculum & Activity Guide.* Activities: "Who Fits Here?" & "Move Over Rover"

Fife, Dale H. & Arnosky, Jim. (1996). *The Empty Lot.* Sierra Club Books.

http://www.flashearth.com/ "Aerial Map of World." Accessed 8/21/11

Jenkins, Steve & Page, Robin. (2003) *What Do You Do With a Tail Like This?* Houghton Mifflin.

Michigan Department of Education. "K-12 GLCE's." <http://www.michigan.gov/mde/0,4615,7-140-28753_33232---,00.html>

Penny, Malcolm. (2004). *Life Under a Stone.* Reed Elsevier, Inc.

Penny, Malcolm. (2004). *Life in a Rotten Log.* Reed Elsevier, Inc.

Pfeffer, Wendy. (1997). *A Log's Life.* Simon & Schuster, Inc.

**"Various references about biomes, adaptations, etc" is mentioned several times in the activities below. Please use materials in your classroom and your local library for help finding books appropriate for the subject and particular students you have.

Michigan Benchmarks Addressed

Science:

K-7 Standard S.IP: Develop an understanding that scientific inquiry and reasoning involves observing, questioning, investigating, recording, and developing solutions to problems.

K-7 Standard S.IA: Develop an understanding that scientific inquiry and investigations require analysis, and communication of finding, using appropriate technology.

S.RS.04.11 Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities

L.OL.03.41 Classify plants on the basis of observable physical characteristics (roots, leaves, stems, flowers)

L.EV.03.11 Relate characteristics and functions of observable parts in a variety of plants that allow them to live in their environment (leaf shape, thorns, odor, color).

L.EV.03.12 Relate characteristics and functions of observable body parts to the ability of animals to live in their environment (sharp teeth, claws, color, body coverings).

L.EV.04.21 Identify individual differences (color, leg length, size, wing size, leaf shape) in organisms of the same kind.

L.EV.04.22 Identify how variations in physical characteristics of individual organisms give them an advantage for survival and reproduction.

L.OL.04.15 Determine that plants require air, water, light, and a source of energy and building material for growth and repair.

S.RS.04.18 Describe the effect humans and other organisms have on the balance of the natural world.

Math:

M.UN.04.01 Measure using common tools and select appropriate units of measure.

M.UN.03.02 Measure in mixed unit within the same measurement system for length, weight, and time: feet and inches, meters and centimeters, etc.

Language Arts:

L.RP.03.03 Respond to multiple text types listened or viewed knowledgeably, by discussing, illustrating, and/or writing, in order to reflect, make connections, take a position, and/or show understanding.

S.DS.04.04 plan and deliver presentations focusing on a key question using an informational organizational pattern (e.g. descriptive, problem/solution, cause/effect); supportive facts and details reflecting and emphasizing facial expressions, hand gestures, and body language.

Day One (2 sessions)—Biomes Across the Globe

Learning Objectives:

Students will

- access & share prior knowledge of different ecosystems across the globe
- compare & contrast two different types of maps, inferring where certain biomes likely exist
- describe general characteristics about biomes based on their position on the planet
- utilize dictionaries & reference materials to define terms associated with biomes and use them accurately in conversation and writing: *biomes, diversity, tropics, torrid, temperate, taiga, tundra, desert, arctic, equator, grasslands, rainforest, aquatic, savannah, adaptations*
- organize different species of plant and animals according to various characteristics & environments in which they are found

Benchmarks:

L.EV.04.22 Identify how variations in physical characteristics of individual organisms give them an advantage for survival and reproduction.

L.EV.03.11 Relate characteristics and functions of observable parts in a variety of plants that allow them to live in their environment (leaf shape, thorns, odor, color).

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S.RS.04.11 Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities

Materials Needed:

- World biome map—color coded with key (can be found on internet, copy of image found in below)
- Aerial map of Earth from space—physical map
- Aristotle's Climate Classification Chart
- Globe
- Colored pencils
- Pencils
- Science journals
- Chart paper/white board
- Dictionaries/encyclopedias/science reference books

Activity Outline:

Session One

1. Ask the students to imagine that they were taking a trip from the North Pole to the South Pole, through North America. Show them the globe to help them visualize the geography. Ask them to describe the types of clothes and transportation they would need as they travelled southward. List the ideas vertically on chart paper or on a white board.
   Possible outcome:

North	Clothes: • Parkas, hats, gloves, scarves • Sweatshirts, jeans, t-shirts (depends on the season)	Transporation: • Snow mobile, dog sled, snow shoes • Car, truck, bike, bus
Equator	• Bathing suit, tank top, sundress, shorts • Pants, long sleeved shirts, t-shirts (depends on the season)	• Boat, car, horse • Car, truck, bus
South	• Jackets, hats, gloves, scarves	• Dog sled, snow shoes, ice breaker boat

2. Present the two maps (world biomes & aerial photo of earth, see below) to the class. Ask them to compare, contrast, and make observations. They should notice that on the aerial photo map there is a section of green along the equator, a section of white in the arctic zones, and variations of green and brown on the other portions of the globe. Guide students in drawing parallels between the two maps (ie. Sahara desert can be easily seen on both).
3. Cover up the names of the zones and show students Aristotle's Climate Classification Chart (see below). Explain to the students that this is an extremely simplified categorization of the climate zone. Using the globe, explain the Tropic of Cancer & Capricorn, the equator, and the Artic & Antarctic Circles. Ask students to attempt to name the three zones. They can refer to dictionaries & encyclopedias to help them "guess." Pictures or photos of each zone could help the visual learner. Peel off the coverings as students guess correctly. Tell the students a more appropriate name for "torrid" would be "tropics." Students will replicate the chart in their science journals, coloring the "tropics" red, the "temperate" zones green, and the "frigid" white or light blue.
4. Using dictionaries or other reference materials, students will research & write down definitions for *tropics, temperate, torrid,* and *frigid*.
5. Explain that more detailed climate classification maps exist, including the world biome map shown earlier. Distribute blank copies of the world biome map for students to color and glue into their science journals. Definitions will be recorded into their journals as a follow-up assignment.

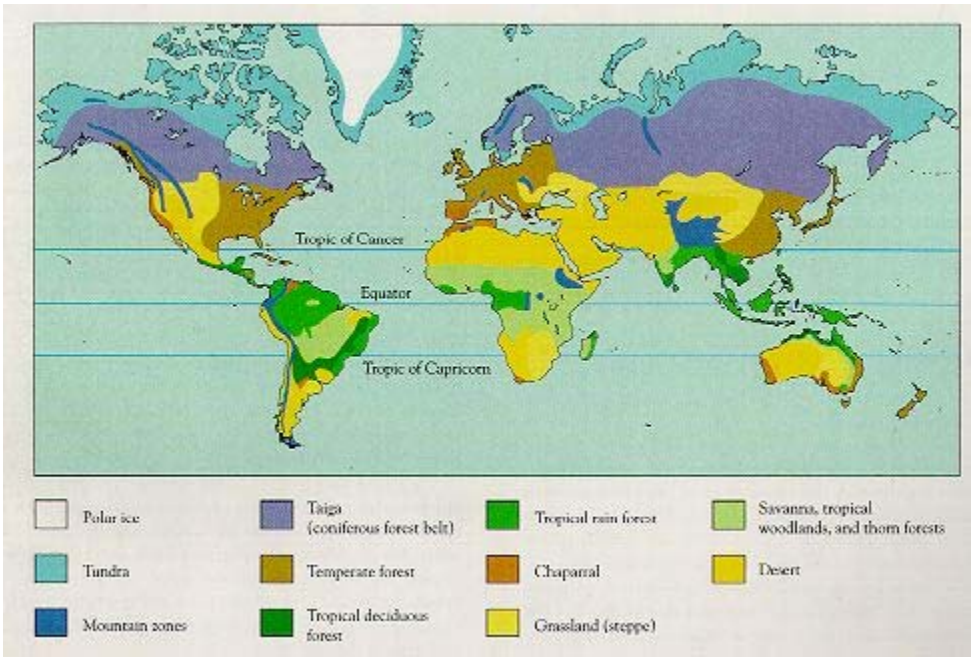
Session Two

1. Tell the students, "Just as we need special clothes and transportation to *adapt* to each part of globe, so do other living things. Animals have traits or *adaptations* that help them survive in their environments." To study this more in-depth, do the "Charting Diversity" activity from Project Learning Tree (p. 50).
2. Start the activity in class and have the kids work on it throughout the unit. Incorporating the "Variation" is advisable as it will help the students think about plants as well as animals.

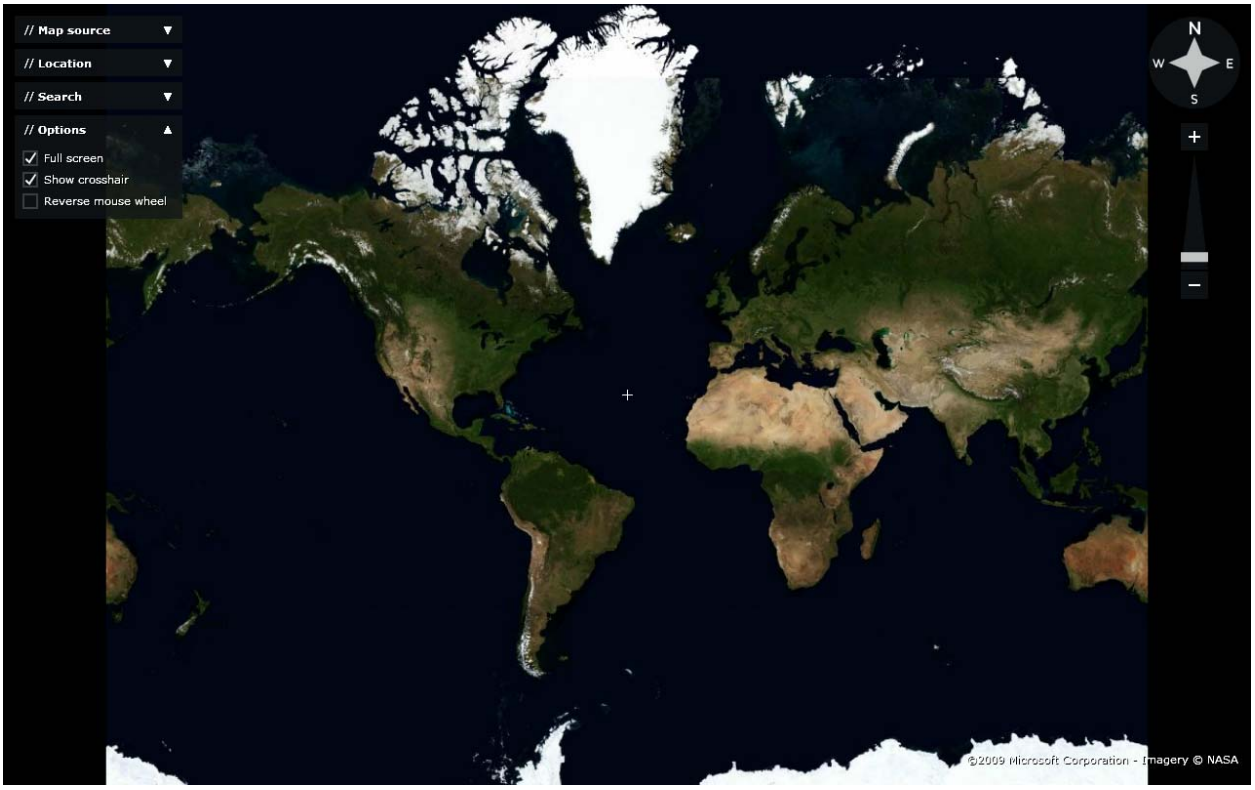
<u>Assessment/Follow-up:</u>

- Students should work individually, in pairs, or in small groups to define the words on the climate zone chart (ie. *taiga, polar, desert, tundra,* etc.) and record them in their science journals.
- The "Charting Diversity" chart in their science journals should be filled out by the fourth day of the unit. Assess accuracy, ideas & research skills when the chart is presented by students in "Pair & Share" style.
- Accuracy of Aristotle chart & world biome map coloring & definitions

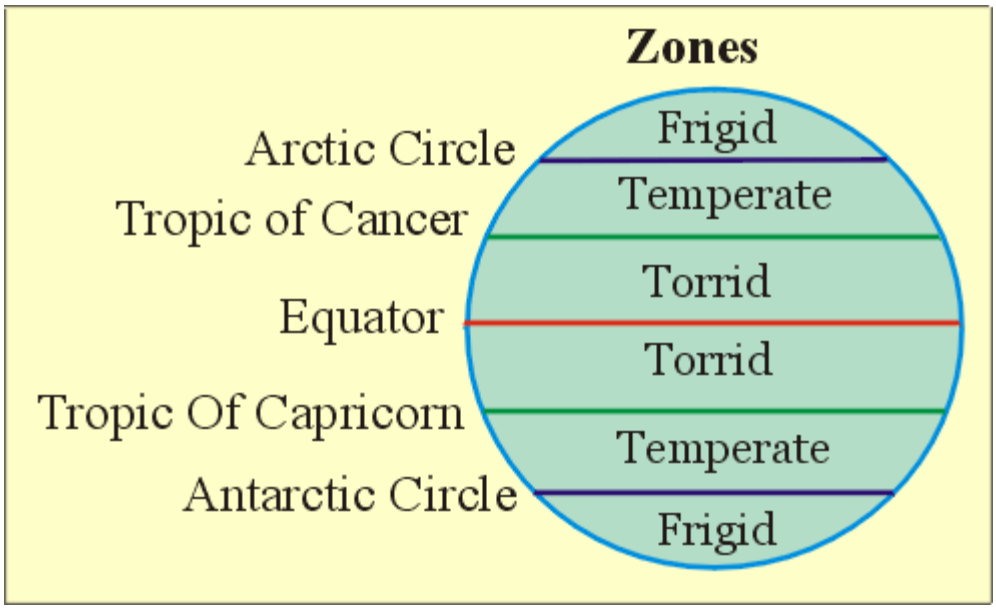
World Biome Map:



Aerial Image of Earth:



Aristotle's Climate Classification Chart:


Zones
Arctic Circle
Tropic of Cancer
Equator
Tropic Of Capricorn
Antarctic Circle
Frigid
Temperate
Torrid
Torrid
Temperate
Frigid

Day Two—Move Over Rover

Learning Objectives:

Students will:

- Cooperatively work in teams to create a poster of an ecosystem
- Cooperatively work in teams to research and write a paragraph about their ecosystem
- Use clues to determine which ecosystem is best suited for particular animals
- Respond orally and in writing to comprehension questions about ecosystems, adaptations, and the activities done

Benchmarks:

K-7 Standard S.IP: Develop an understanding that scientific inquiry and reasoning involves observing, questioning, investigating, recording, and developing solutions to problems.

K-7 Standard S.IA: Develop an understanding that scientific inquiry and investigations require analysis, and communication of finding, using appropriate technology.

L.EV.04.22 Identify how variations in physical characteristics of individual organisms give them an advantage for survival and reproduction.

L.EV.03.12 Relate characteristics and functions of observable body parts to the ability of animals to live in their environment (sharp teeth, claws, color, body coverings).

S.RS.04.11 Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities

Materials Needed:

- *Project Wild K-12 Curriculum & Activity Guide Book*
- 8 poster boards (can be cut to half the regular size)
- Old nature magazines
- Markers, colored pencils, pencils
- Ruled paper
- Variety of resources about adaptations and ecosystems of North America

Activity Outline:

1. Review day one activities. Possible questions to ask students: If you live near the equator, what is the climate like? What type of biome would I likely find there? In general, as you travel north or south away from the equator, what happens to the climate zones? Describe a temperate climate. What is another term for "frigid zone"? Where does the taiga exist? Where does chaparral exist? Has anyone started the "Charting Diversity" research? Can anyone share an animal or plant that meets all the selected criteria?
2. Explain to students that they will be learning more about the animals that live in certain biomes—namely those of North America. Play "Move Over Rover" from Project Wild (p. 144).

Assessment/Follow-up:

- Poster, paragraph, and participation in the game, as well as in the discussion at the end of the game, will provide assessment opportunities
- Students will do the "evaluation" at the end of the game as a follow-up assignment. They will choose 3 leftover animal cards (or animals of their choice that live in the ecosystems researched today). In their science journals,

they will describe the ecosystem in which each animal lives and describe which adaptations help it survive there. They will also explain how the habitat itself meets the animal's needs. They can use the provided resources to help them investigate.

Day Three—Biodiversity in Your Backyard Microhabitat

Learning Objectives:

Students will

- reevaluate their views on the biodiversity that exists in their own backyard
- listen to a read aloud attentively
- participate in a discussion about the book & biodiversity
- respond to the book & biodiversity in writing in their science journals
- use their observation skills to list species found in their backyards at home
- use a digital camera to document organisms found in their backyard
- infer adaptations needed to live in a backyard/urban environment
- discuss how human activity may impact the organisms in their backyard

Benchmarks:

S.RS.04.11 Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities

L.EV.04.22 Identify how variations in physical characteristics of individual organisms give them an advantage for survival and reproduction.

L.RP.03.03 Respond to multiple text types listened or viewed knowledgeably, by discussing, illustrating, and/or writing, in order to reflect, make connections, take a position, and/or show understanding.

S.RS.04.18 Describe the effect humans and other organisms have on the balance of the natural world.

Materials Needed:

- *The Empty Lot* by Dale H. Fife & Jim Arnosky
- Variety of reference materials (some options are listed below):
    - *Life Under a Stone* by Malcolm Penny
    - *The Gift of the Tree* by Alvin Tresselt & Henri Sorenson
    - *Life in a Rotten Log* by Malcolm Penny
    - *A Log's Life* by Wendy Pfeffer
    - Non-fiction books about microhabitats, encyclopedias, trade books, textbooks, magazines, etc.
- Science journals
- Pencils
- Digital camera & printer (optional)

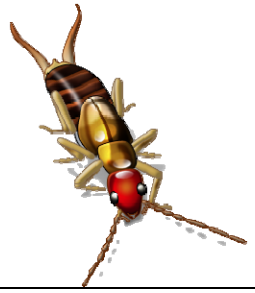
Activity Outline:

1. Gather students for a read aloud. Ask them what kind of animals & plants are in their backyards at home. Are there lots of animals? What types? Are there lots of plants? What types? What else lives back there? Do you consider your backyard to be a habitat? Do you consider your backyard to be biologically diverse?
2. Read the book *The Empty Lot* by Dale H. Fife & Jim Arnosky.

3. Have the students discuss what the main character discovered and how his feelings about the lot changed.
4. Have students write a response to the book in their science journals: How did the character feel about the lot before exploring it? How did he feel afterwards? How do you feel about your own backyard (or insert "playground" or "school ground")? Do you think there is more life in your backyard than you thought? Predict you think you will find if you explore more.
5. Introduce the concept of microhabitats. Have students list microhabitats they already know. Show them the variety of resources that you have provided. They can use these to help them develop background knowledge or use as a reference when trying to identify organisms they find in their backyards.
6. As an art component, have the students choose a resource and/or prior knowledge to draw a microhabitat scene in their journals.
7. Explain the follow-up work (below). If many students live in apartments, encourage them to use any common outdoor area for their exploration—even a small patch of grass!

Assessment/Follow-up:

- Students will explore their own backyard, identifying life and answering the following questions for each plant or animal found. Encourage students to use their digital camera (if available to them) to document the organisms. A chart like the following can be used:

Photo/Drawing & Name	**Where was it found? Be specific!**	**Adaptations needed to live there (at least 2). Tell how the adaptation helps it.**	**How human activity may affect this organism (positively or negatively)**
Example: Earwig 	Under a rock	Strong sense of smell because it's dark under there & pincers to protect itself from enemies	We may spray insecticide to kill them (negative) We provide lots of microhabitats for them to live (ie. the woodpile and the landscaping rocks) (positive)

- Students will share their results with peers (choose: Pair & Share; whole class presentations; small groups; have each kids contribute one row of info on a class chart)
- Assess the accuracy and thoroughness of the chart, photos, and info.
- Assess the response and reflection written in their journals

Day Four—Plant Parts and Classification

Learning Objectives:

Students will

- work cooperatively in medium sized groups
- categorize plants and plant parts based on observable characteristics
- label these categories and the plants in them
- measure length in centimeters & inches, rounding to the nearest cm and the nearest quarter-inch
- use artistic skills and attention to detail to draw & color the plant specimen
- record data in an organized chart
- share results with the class, providing reasoning for their categorization

Benchmarks:

M.UN.04.01 Measure using common tools and select appropriate units of measure.

K-7 Standard S.IP: Develop an understanding that scientific inquiry and reasoning involves observing, questioning, investigating, recording, and developing solutions to problems.

K-7 Standard S.IA: Develop an understanding that scientific inquiry and investigations require analysis, and communication of finding, using appropriate technology.

L.OL.03.41 Classify plants on the basis of observable physical characteristics (roots, leaves, stems, flowers)

L.EV.03.11 Relate characteristics and functions of observable parts in a variety of plants that allow them to live in their environment (leaf shape, thorns, odor, color).

L.EV.04.21 Identify individual differences (color, leg length, size, wing size, leaf shape) in organisms of the same kind.

Materials Needed:

- Variety of plant specimen—actual are better but photos/pictures can be used too—try to get different types & sizes to help students rethink previous misconceptions (i.e. black radishes, purple carrots, red maple, Japanese maple)
    - Box #1—Roots: TAP v. TUBEROUS v. FIBROUS
        - Possible examples of taproots: beets, carrots, jicama, radishes, parsnips, parsley roots, dandelion, turnips
        - Possible examples of fibrous roots: grass, wheatgrass, marigold
        - Possible examples of tuberous roots: sweet potatoes, cassava, (NOT regular potatoes, though!)
    - Box #2—Stems: WOODY v. HERBACEOUS
        - Possible examples of woody stems: shrubs, saplings, trees, ivy, roses, geranium, mature asparagus
        - Possible examples of (easy to obtain) herbaceous stems: tulips, dandelions, daisies, geranium, immature asparagus, most annuals…
    - Box #3—Leaves: LOBED v. ENTIRE v. EVERGREEN
        - Possible examples of lobed leaves: maple, oak, mulberry, dandelion
        - Possible examples of entire leaves: iris, apple, aspen, birch, blades of grass
        - Possible examples of evergreen/modified leaves: fir, pine, tamarack, cedar
    - Box #4—Seed Dispersal: WATER v. HITCH-HIKERS v. WIND v. ANIMALS EAT THE SEEDS
        - Possible examples of water dispersed seeds: coconuts, mango, oak acorn (provide a bucket with water for the kids to test float-ability)
        - Possible examples of hitch-hikers: cockleburs, burrs of all types
        - Possible examples of wind dispersed seeds: dandelion, maple seeds (“helicopters”), cattails,
        - Possible examples of seeds eaten by animals: apples, oranges, melons, other fruits
- Labels for the categories & plant names (see attached document)

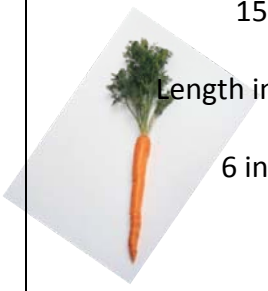
- Science Journals
- Pencils & colored pencils
- Rulers (metric and U.S. customary)
- Various references and plant identification books
- Dictionaries (for unfamiliar words on the labels)

Activity Outline:

1. Start by reviewing the "Backyard Diversity" activity from the previous day.
2. Divide kids up into 4 groups & give each group a box of plant specimen/parts. Explain that they will work together like scientists to categorize the items according to a "rule" of their choosing. The important thing to explain is that the rule should be dichotomous (ie. "with leaves/without leaves" NOT "purple/green/orange/white").
3. When done, they share their items and "rules" with the class, explaining how they came to choose that "rule" and how they determined which item fit where.
4. (Optional) Rotate groups to a different box of items and challenge them to categorize the items using a different "rule." (You'll find that kids think very differently when it comes to putting items in groups. One group might choose "things that taste good/things that taste bad" while another chooses "long & pointy/short & rounded.")
5. Distribute the labels that go with each box of items and tell the students that they will rearrange their items according to these new labels & categories. Go around and check for accuracy. (You might want to have early-finishers help you with this, especially if the kids know the parts of plants very well.)
6. Students record their categories and more data in their science journals. Make sure they fill in the functions of the parts and the advantages of each variation. Show them the chart outlines to help guide them (see below). Encourage students to use the resources available to help them identify and place labels appropriately.
7. Have students share their charts and data. Discuss the following questions (add more or vary them according to the specimen used): What are some of the major parts of plants? (roots, stems, seeds, leaves) Are they all the same? How are some seeds different from others? What advantage does wind dispersed seeds have over animal dispersed seeds? What type of ecosystem or habitat would you find water dispersed seeds? Were all the carrots the same? What was different about them? (size, length, color) Where all the leaves the same? What was different about them? How does their shape, texture, size, color help them survive? Were all the maple leaves the same? How would having a tap root help you survive?

Assessment/Follow-up:

- Have students choose from the following types of plants and animals: *maple, lily, canine, beetle, shark, eagle, turtle, snake, sunflower,* or *spider*. In their science journals, they will list and draw (or use photos) 5 examples of each group.
- They will also respond to the following question: Why are there so many different variations of your animal or plant? How does it help it survive? How did different environments make different variations?

Roots Purpose: (draws water & nutrients from the ground, stabilizes the plant, stores food)		
Taproot Advantage: (can reach deep water)	Fibrous Advantage: (holds tightly to the ground)	Tuberous Advantage: (stores lots of food, good for times of drought)
Picture  Length in cm 15cm Length in inches 6 in Name of plant: carrot	Picture  Length in cm 5 cm Length in inches 2 in Name of plant: wheat grass	Picture  Length in cm 20 cm Length in inches 8 in Name of plant: sweet potato
Picture  Length in cm 27cm Length in inches 10 ½ in Name of plant: carrot	Picture  Length in cm 7 cm Length in inches 2 ¾ in Name of plant: wheatgrass	Picture  gth in cm 5 cm Length in inches 13 ¾ in Name of plant: cassava
Picture  Length in cm 30 cm Length in inches 11 ¾ in Name of plant: beet	Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:

Leaves Function:		
Lobed Advantage:	Entire Advantage:	Evergreen Advantage:
Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:
Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:
Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:

Stems Function:	
Woody Advantage:	Herbaceous Advantage:
Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:
Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:
Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:

Seeds Function:			
Wind Dispersed Advantage:	Water Dispersed (float) Advantage:	Animal Dispersed Advantage:	
		Hitch-hikers	They eat the fruit/seeds
Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:
Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:
Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:	Picture Length in cm Length in inches Name of plant:

Roots	Stems	Seeds	Leaves
Tap	Woody	Wind Dispersed	Lobed
Fibrous	Herbaceous	Hitch-hikers	Entire
Tuberous	Rose	Animals Eat Seeds	Evergreen
Carrot	Tulip	Water Dispersed (Float)	Maple
Beet	Ivy	Coconut	Iris
Wheatgrass	Aspen	Burr	Oak
Grass	Carnation	Apple seeds	Aspen
Jicama	Lily	Mango	Pine
Sweet Potato	Dandelion	Avocado	Spruce
Cassava	Asparagus	Watermelon	Fir
Parsnip	Geranium	Dandelion	Mulberry
Radish	Oak	Yew Cones	Dandelion
Dandelion	Yew	Peach pit	Geranium
Marigold	Sunflower	Papaya	Cedar

Day Five (2 sessions)—Who Fits Here? Poster Presentation & Game

Learning Objectives:

Students will

- Share drawings, writing, and knowledge with each other
- Listen attentively to a read aloud, drawing connections to past learning
- Cooperate in small groups to create poster of ecosystems/biomes and make animal cards
- Expand their knowledge of adaptations, ecosystems, and organisms and habitats work together in harmony for maximum survival
- Engage in a game where they determine which organism belongs in which ecosystem

Benchmarks:

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K-7 Standard S.IA: Develop an understanding that scientific inquiry and investigations require analysis, and communication of finding, using appropriate technology.

S.RS.04.11 Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities

L.EV.04.22 Identify how variations in physical characteristics of individual organisms give them an advantage for survival and reproduction.

L.EV.03.11 Relate characteristics and functions of observable parts in a variety of plants that allow them to live in their environment (leaf shape, thorns, odor, color).

L.EV.03.12 Relate characteristics and functions of observable body parts to the ability of animals to live in their environment (sharp teeth, claws, color, body coverings).

L.RP.03.03 Respond to multiple text types listened or viewed knowledgeably, by discussing, illustrating, and/or writing, in order to reflect, make connections, take a position, and/or show understanding.

Materials Needed:

- *What Do You Do With a Tail Like This?* By Steve Jenkins & Robin Page
- *Project Wild* "Who Fits Here?" Activity (p.64)
- Poster board
- Crayons, markers, colored pencils, pencils
- Old nature magazines
- Scissors & glue
- Index cards (for 50 adaptation cards)
- Various resources about adaptations, ecosystems, & biomes
- Science journals

Activity Outline:

Session One

1. Review yesterday's activity. Have students share their homework—drawings and explanations of the different types of various animals and plants.
2. Have students "Pair & Share" their "Charting Diversity" assignment that they have been working on throughout the week. As a whole class, have students discuss their resources (how they found the creature that fit all the criteria) and support why they think the organism is right for its habitat (suggestion: perhaps explaining why it could not live somewhere else would help the students formulate clearer responses).

3. Remind them of the "Move Over Rover" activity played on day two of the unit. They will now play the game again, only they have to research different biomes and create the animal cards themselves. Plus, they have to make plant cards too!
4. To get them thinking again about how characteristics of an organism helps them adapt to the their environment, read aloud *What Do You Do With a Tail Like This?* By Steve Jenkins & Robin Page. This books covers a variety of animals from biomes across the globe.

Session Two

1. Do the "Who Fits Here?" activity in *Project Wild*. Require that the students have to do plant cards in addition to the animals cards (explained in step 4).
2. Show students the world biome map. The groups must choose a biome from the key on the map or microhabitat not yet researched (ie. tidal pools, abyss, temperate rainforest, marsh, lake, ocean).
3. Allow students plenty of time to complete their posters & make the plant and animal cards.

Assessment/Follow-up:

- The questions listed in step #9 of the activity provide assessment opportunities.
- Students can answer these in written form (independently or as pairs) or as part of a class discussion.
- Participation in the poster and card making
- Ability to articulately explain why an organism fits in its appropriate ecosystem

Overall Unit Assessment:

- The overall unit assessment is a culmination of all the activities done in class as well as for homework. Students will be assessed on the following:
    - Accuracy, thoroughness, and neatness of the entries in their science journals
    - Cooperative participation in the activities, solving problems with peers, and achieving their final task together
    - Thoughtful, accurate, and neatly organized posters for both the "Move Over Rover" and "Who Fits Here?" activities
- This unit is designed to provide children with opportunities for lots of independent research, peer teaching, team building, presentation skills, and building of knowledge of diversity—in all its ecological forms!
- Students should also be given the chance to critique the unit and their own learning (metacognition). Provide them with an opportunity in writing, as a discussion, or in a survey form to tell what they liked, what they would change/do differently, some of the important/interesting/unbelievable things they learned, and what they want to know more about.