Teacher Guide for An Environmental Guide from A to Z

v. Fall, 2009

"*Give students something to do, not something to learn; and when the doing is of such a nature as to demand thinking, learning naturally results*." –John Dewey.

Dear Late Elementary IL School Educators,

At a time when children spend less time outside than in any time in human history, we attempt to aid the educator that wants students to engage with nature *and* to perform, Designed for use with the book *An Environmental Guide from A to Z* , we aim to:

1. Connect kids to the immediate natural world and offer hands-on, relevant activities.

> "*Begin with love and knowledge is sure to follow*" —John Burroughs

2. Help children understand how the world works. Nature teaches us everything we need to know: cycling its' nutrients and running on the current energy of the sun. Guiding your young explorers through the wonders of nature provides them tools for the realities of the 21st century.

> "*To understand everything better, look deep into nature*." –Einstein.

3. Boost Achievement: Use local learning opportunities (place-based education) to provide creative ways to present text to improve student performance on standardized tests across all subjects.

> "*Using outdoor learning leads to increases in test scores*."
> Research Article: Closing the Achievement Gap: Using the Environment as an Integrating Context for Learning. www.Seer.org
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> "*Using the environment as an integrating context (EIC) in school curricula results in wide-ranging, positive effects on student learning*." (Lieberman and Hoody)

This Guide is far from an all-encompassing tool, but rather a device to accompany the willing educator. Each school's habitat offers different opportunities to engage. Whenever possible, choose depth over breadth.

Thanks for what you do to build a better future today.

See you outside,
Tim Magner ☺

P.S. If you have suggestions on improving this Guide, or are interested in me visiting your classroom, email me at guides@greensugarpress.com

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Pre-Reading:
Be a Detective general questions:

- When you think of *nature*, or *environment*, what do you imagine?
- Are we a part of, or separate from, nature?
- How many different ways do we rely on nature and the environment?
- What are some differences with being outside vs. inside? Pros and cons to each?
- Is there anything we can learn from nature?

Make a nature book to be for writing exercises using paper, string, small sticks, scissors, and a hole punch. Cut the paper into quarters to create four pages. Punch holes near the 'spine.' Use string, yarn, or twine to tie the stick to the paper through the holes. For eight pages, use two pieces of paper. Use the book to collect. Tape or glue parts of nature into the book or use it for any of the writing activities.

A is for Amazon Rainforest

Rainforests are distant places on a map, full of exotic plants and animals, but they also influence life here locally.

Be a Detective general questions:

- How are we connected to rainforests? E.g. weather, medicines and sometimes wood and food.
- How are trees and plants different here in Illinois than in tropical rainforests?
  i.e. location, climate, plants, animals, history
- How is the climate different than in Illinois? i.e. temperature, humidity.
- Why are rainforests more humid than our climate in Illinois?
- Could plants and animals of the rainforests survive here?

Activities:

1. Characteristics: We often associate rainforests with abundant wildlife, but how much do we know about the wildlife in our own neighborhood? After a rainforest study, list characteristics of life there versus here. Why is the weather different? How is life for the plants and animals in a rainforest different than here? What are the similarities? What are the differences? Could there be animals in our neighborhood that we don't know about? Go outside and find animals or find evidence of their existence, e.g. seek out animal tracks, check for leaves that have been eaten. Where and how do local animals live? Are they out during the day or night?

2. Compare Animals and Write: Chose an animal living in the rainforest and choose a local animal. Could they live in each other's homes? If they did switch homes, would they survive? Write a story of a local animal transported to the Amazon. What would life be like? Alternatively, write a story of an animal transported from the Amazon to the wilds (or cities/suburbs) of Illinois. Perhaps, write *as* the animal being transported.

B is for Bees and Other Insects:

Bees and insects may seem bothersome, but they, and their work, are necessary for our survival.

Be a Detective general questions:

- How do we benefit from the work of bees and other insects?
- Discuss the seasons as they relate to the activity of insects, e.g. bees pollinating flowers enabling plants to grow seeds, insects as food for migrating birds, insects as decomposers.
- What determines insect populations locally, besides the seasons, e.g. "host" plants, predators.
- What does diversity mean and why is it advantageous? —For plant and insect communities, but also people.

Activities:

Note: magnifying glasses, bug "collectors" or bug boxes can be used for temporary observation or to observe insects in their environment.

1. Pollination Act: Discuss how specific plants depend upon specific pollinators: survey the schoolyard and find pollinators at work. Draw the cycle from plant to flower to pollination to seed to fruit. Divide the students into different actors and act out the process.

2. Bug Hunt: Catch Insects with a trap. Place a cut-off two-liter bottle or a glass jar in the ground (with the lid at ground level) hole and bait it with a little soda and random food. Cover most of the top with a stone or piece of wood. Try different locations. Give it a day or two and see what you've caught. Alternatively, traditional butterfly nets work well in a meadow or lay out an old sheet under a tree for a few hours (or just shake the branch).
    a. Inspect and measure the insects: Make an insect chart and create graphs in centimeters and inches. Which ones transition from egg to nymph to adult? Whose life cycle includes: egg to larva to pupa to adult?

    b. Draw and sketch: Take two different insects and compare their differences. What are their most interesting characteristics? Combine the two bugs in a drawing.

3. Create a "Pest" book: classifying different insects and researching their roles. Dedicate a page to each insect and include a sketch and a description. Act like an insect: Choose insects with easily understandable characteristics (butterfly, ladybug, termite, bee) and perform skits.

4. Bee Flap: Count the number of times each student is able to flap their arms in one minute and then two minutes and compare vs. that of a bee (at 200 times per second). Graph the results.

5. Monarch Butterfly Garden. To live in weather/climate best suited for their survival and reproduction, Monarchs migrate, most more than 1,000 miles to Mexico. Often, Illinois is in their migration path.

Why might they stop near our schoolyard? Why not? Plant a garden for them to encourage them to stop for rest, food and water.

C is for Cycle

Nature has no garbage cans and no landfills. When something in nature is finished with it's waste, it is useful to something else.

Be a Detective general questions:

- What does nature do with its waste? Why doesn't nature have any garbage?
- Name ways nature's cycles impact our lives? E.g. weather seasons, food, clothing
- Where does our waste come from?
- Where does our waste go?

Activities:

1. Explore the local water cycle. Explore an area outside when it's dry, then go outside immediately after rain and make observations. Describe how the area changes during and after a rain. Write about the differences and explain, in writing, what happens to rain water. Observe and document how trees, birds, ants and people react to rain. How does weather impact your mood?

2. Drainage Task Force: What is water runoff? Investigate the water runoff from school grounds. During and after a rain, where does the water go? Map and calculate the area of the parking lot. Calculate the volume of water falling on parking lot and figure out the runoff. Where would it go if not for the parking lot and the sewer? Option: to calculate the amount of rain, make a rain gauge. Note: to find out where it goes, contact the local dept of water/sewer or water company.

3. Green Roof and Rain Barrel: Rather than treat rainwater as a nuisance to be whisked away and discarded into local waterways, more and more urban people choose to harvest this precious resource.

    a. A plant-filled roof is an option. While upfront cost can be prohibitive, there are benefits and cost savings. Calculate the return on investment for a new building that invests in a green roof. E.g. The extra cost of the rooftop garden is $30,000, but the energy saved from lower heating and cooling bills is $3,000 per year. How long to recoup your investment? What is the annual return? Other factors: longer useful life of the roof, cleaner air and water in the community and an ability to grow and sell food —another income source!

    b. Raise money for a rain barrel to save energy use and conserve water. Located next to the building, roof drain downspouts are disconnected from the sewer system and connected to rain barrels. The water is then saved for local irrigation needs. Run a fund-raising campaign to purchase (and, then, paint and install) your classroom's own rain barrel/s.

4. Disappearing Water: a.) Compare water exposed to sun versus water in shade (place equal amount of water on plastic plates. b.) Compare the impact of water falling near trees and plants versus water on

non-permeable surface. Pour a bucket on the parking lot and dump a bucket at the base of a thirsty tree.

5. Water Cycle in a Play: Divide the class into groups where actors play different parts of the cycle, e.g. As raindrops falling from the sky, rolling down a slope into a lake, evaporating and then rising and forming a cloud. Or as a raindrop falling in a woodland to be absorbed into the ground and sucked up by plant roots. Or as raindrop that ends up in the human's drinking water supply, or on a farmer's land. Consider using a student to hold up signs as the action is happening so the rest of the class can more easily understand what is happening

6. Demonstrate a Tree Cycling its Nutrients: Divide the class into actors as tree/plant, leaves, branches, soil, water, sun and bacteria and fungi. Take an "N" for nutrient and pass it from child to child in a circle. Extra actors include consumers (animals) and seeds.

D is for Darwin

Traveling around the world, Darwin studied different environments and saw firsthand the results of plants and animals that had succeeded by adapting to their environment.

Be a Detective general questions:

- What was the world like at the time Darwin traveled and why were his travels extraordinary?
- If you were a scientist, how would you collect information? Store it? Share it? How is that different than Darwin?
- Darwin looked at landscapes from varying perspectives. What is a long time for an insect, a leaf, a squirrel, a turtle, an acorn, a stream and a mountain?
- How were Darwin's health concerns different than ours? What was his daily activity like? What about the natives he met?
- We often hear and read about Darwin and other Europeans perspectives and stories of the "New World" but rarely hear the Native Americans recollections of these explorers. Why is that?

Activities:

1. Write in Nature Notebook/Journal. Go outside, find a semi-wild place to sit down and write as Darwin did his entire life—from his trips to exotic places to the notebooks he filled writing about the activities of earthworms in his backyard garden. Write about everything you see, hear, and smell. See how keen your observations can be. Keep track of the place you write and the time you wrote. Make a detailed entry as if you're reporting to someone who has never seen anything like this, describing the environment. Note the soil, rocks, and the plants and animals (don't forget to include the insects). How well can you "read" the landscape? Would it look different at different times during the day? Or on a different day? Or a slightly different place? Remember to record the specific location, time and weather.

2. Plant/Animal Survival: Of the local plants/trees and animals, choose one of each and discover more. How do they survive? What enables them to have enough to eat, drink and reproduce and are those features learned or inherited? e.g. color of flower (to attract pollinators) or the bushy tail of a squirrel (for balance/warmth) vs. language.

3. Exercise: How much daily activity do we get vs. during the time of Darwin? How much is strenuous? How do we feel after strenuous activity? In our journals, keep track, i.e. a "log," of our activities (strenuous and non-strenuous) daily for a month. Option: combine with energy journal in "E is for Energy."

4. Encountering a Native American: Plan, write, rehearse and act-out a chance meeting and a "conversation" between Darwin the European and a native along the coast of South America.

5. Scavenger Hunt: Declare boundaries and discuss ideas of things to explore. Divide into groups of two to four. After returning, discuss: What role does each item play? Why some easier to find than others? Surprises? Anything unimportant? Examples of items to search: a feather, types of seeds, an object shaped like a letter (other than "I"), something partially eaten by an animal, something straight, the most dangerous animals (humans), something beautiful, something to be used for natural dying

6. Adaptability. How do plants and animals work well so they can survive in their environment? Chose an animal in a habitat and write how its traits are suited to survive and reproduce in its environment. How do we? Note: also included as an "H is for Habitat" activity.

7. Beak-and-Feet Poster: Make a bird beak-and-feet poster. Birds use their beaks the way we use a knife and fork. The shape of a beak provides a clue as to what they eat, e.g. developed to tear apart prey, catch insects, crack open seeds. Which birds live in Illinois? Draw their birds and beaks. Include notes on how each is useful.

8. Measurement Hunt: Divide the class in groups armed with different measuring tools: a yardstick, a millimeter ruler; a scale; calipers. Select a variety of items to measure. Have the students come back and develop a measurement chart as a group. Discuss the reasons for using different measuring tools.

9. Maps and Cardinal Directions: One of the primary tasks of Darwin's ship *The Beagle* included mapping these exotic places, which were unknown to Europeans. Take a look at several different types of maps (neighborhood, town, regional, national, world, aerial, topographical, road, political, nature, flood plain). Determine which way is North, South, East and West. How do you know which direction is which way? Why is it important? Note: map making exercise in "H is for Habitat")

E is for Energy

The sun is the main source of the energy we need to function: to move, to read, write, run and breathe. It flows through food to us.

Be a Detective general questions:

- Can you trace how the energy in your bodies originates from the sun?
- What are some different forms of energy?
- Describe interactions and how energy flows, e.g. a plant photosynthesizing, an insect eating a plant, a mouse eating the insect and a hawk eating the mouse.
- How does what we eat impact how we feel? How we look? How long we live?

Activities:

1. Food Chains: With a salad, you are a consumer. A hamburger, a secondary consumer. Add a chicken and you're a tertiary consumer. Chickens eat grass, grains and insects. Draw food chains and energy flows of the foods from your last favorite meals.

2. Energy flows: To add one lb of beef, a cow must eat sixteen lbs of grains. If we need to feed 100 people and all want eight ounces (1/2 lb) of beef, how much grain do we need? What if we need to feed 1,000 people? Now, calculate the above, but instead of eating all beef, we're going to eat half vegetables and half beef.

3. Lightening: Where is lighting striking? Thunder and lighting often accompany rainstorms. Electrical charges build up in clouds and create lightning. Thunder happens when the air around the lightning heats up quickly and explosively, creating shock waves. Next time you see lightning, count the seconds until you see the resulting thunder. Divide that number by five. Five seconds is the time it takes for sound to travel one mile.

4. Food Energy Experiment. Time yourselves doing an exercise that requires a great deal of energy, e.g. running up four flights of stairs, running around the track. Perform it twice, during different parts of the day, e.g. right before lunch and after an energy-packed snack/lunch. Time each student with a stopwatch, add up the totals and compute the average of each activity. What is the difference? What variables also might impact the results?

5. Energy in Action. Choose areas near the school property and find things in the area that consume energy, where the energy originated and where it went. Draw pictures tracing the energy cycles. e.g. an ant pushes dirt. The ant gets energy to push dirt from the sugars in the plants it eats. The plants produce the sugars from the energy received from the sun.

6. Food Journal: Keep a journal of what you eat. Compare the diet to what the USDA food pyramid recommends. Why might it be difficult to characterize some of the food we consume? What do we eat what we do? Who and what influences our choices? How do different foods make you feel? As you eat them? An hour later?

7. Pyramid of Life Game. Use children to build a pyramid in groups of five. Based on what they've learned, each group must first choose three types of plants, two herbivores that eat those plants and a predator that eats those herbivores. The three plants (the largest children) makes up the base, the two herbivores climb on top of the plants and one prey is on top. Play on soft ground outside!

F is for Fossil Fuels & G is for Greenhouse Gases

Fossil fuels are also sun energy, but a finite amount of ancient sun energy stored underground, e.g. Coal is a rock that formed when huge fern-like plants decayed millions of years ago and were pressurized. Petroleum, or oil, is mostly comprised of single-celled marine animals. These fossil fuels, coal, oil and gas power the modern world. When we use them to tap into their stored energy, they release gases that trap in heat from the sun.

Be a Detective general questions:

- What are fossil fuels and where do they originate?
- Where are fossil fuels located and why does it matter? What is the extractive industry?
- When did we begin using fossil fuels, and how has the world changed since?
- Discuss Illinois/Chicago and how coal helped fuel it's growth, i.e. 19th century transportation
- Why do many gardeners (including in Illinois) use greenhouses? How do they work?
- What would the world be like without any greenhouse gases? *Freezing!!*
- How can little changes, i.e. temperature, cause big changes?
- What is public transportation? What forms have you taken? How does it help reduce pollution?

Activities:

1. Fossil Fuel Uses: List ways we use fossil fuel energy in a typical day. What did humans use for energy five hundred years ago, before we figured out how to use coal, oil and gas? Test Electric vs. Manual: How can fossil fuel energy help us do some things faster than just using human power (powered by current sun energy)? To sharpen pencils, use a manual one and then try an electronic one. Time it. What is the difference in the energy use? How much faster is the electric one? As a percentage? Trace the energy required to power the electrical sharpener (likely coal) vs. the manual sharpener (human energy powered by current sun through food). Can you think of other examples to test?

2. Transportation Calculation: What distances and what forms of transportation does your family use during the course of a week? Have the students interview family members and calculate the totals on a spreadsheet of the number of trips, distance traveled and mode of transportation traveled, e.g. Bike/Walk/Bus/Car/Train. How does it depend on where we live? Does it change during the seasons? Do the price we pay for fossil fuels make a difference?

3. Cost/Benefit Analysis: When most of the world flips on a light switch or plugs in a computer, we burn lumps of coal energy. Can you make the connection? Do we turn off lights and electrical devices when we're not using them? The technology inventor Thomas Edison invented 100 years ago, incandescent bulbs, burn more energy and don't last as long as newer technology, compact fluorescents (CFLs). Calculate energy and cost savings from switching light bulbs. i.e. estimate upfront costs of bulbs and reduction of electric bills. Note potential disadvantages of CFLs: mercury and disposal. Mention the next technology likely to replace both: LEDs (used in our portable electronic devices, but still expensive upfront!). Separately, can you find out from your electrical provider where your energy comes?

4. Reduce fossil fuel waste:
    - List ways your school, home and city might use fewer fossil fuels for energy, e.g. recycling program, composting, adding bike paths, improving insulation, strategic tree planting, promoting locally grown food. List benefits associated with each, e.g. more exercise, less pollution, save money, less often sick, etc., but also challenges.

H is for Habitat and N is for Native

An animal or plants' habitat is the place in which it lives; where it can find food, water, cover and a place to raise young. When it's there, it's native. The study of the relationships of plants and animals within their habitat is *ecology*.

Be a Detective general questions:

- What is a climate and what are the characteristics of the climate in IL? How is our climate different than that of the Inuit Eskimos? How does climate impact habitat?
- What are the nearest semi-wild areas to you? Which ones are closest and how well do you know them?
- Which peoples were native to Illinois?
- How have we changed our habitat over time? What did the area we live look like 50 years ago? 100? 500? What brought about the changes? i.e. Illinois is the Prairie State!
- Why are maps important? What are they used for? How do we "read" maps?
- Are the plants and animals living near us, native to the area? Why? If not, how did they arrive and what is the impact?
- Why might choosing native plants make more sense than choosing exotics from far-away?

Activity:

1. School Land History: Study the history of the school property. What was the area like before the school was built? Why was your school built? What about the oldest school in the area? Are there old photographs? Interview any longtime members of the community or the town historian for assistance. Create a timeline poster, with pictures and captions to hang in your classroom.

2. Map Making: Create a map so someone new to the area can locate all the area's highlights. Before beginning, determine: How large is the area to be mapped? What details will be included, and what legends (symbols) will be used? Will it be to scale? Consider drawing from memory first. Does it make sense to bring a compass?

   a. "My Life": Create a map big enough to include all the important places in your life, e.g. home, food, water, school, entertainment and friends.

   b. "Directions Map": Write directions of a walk you take often to give to someone who has never been there. Note nature highlights along the way. Learn to define and identify the difference between: savanna, prairie, wetland and woodland. Imagine you were giving the directions to the same walk 100 years ago? What has changed? What will the walk be like 100 years from now?

   C."Our School": Create a map of the schoolyard: consider habitats, water, traffic, sun/shade, vegetation, water-flow/topography. Could you construct it in 3D? Might you have any suggestions for places to improve the habitat, e.g. expand vegetation?

3. Tour Guide: If you welcomed a first time visitor to the area, what would you suggest doing? Create a brochure of your community and play the role of tour guide, highlighting all the different areas.

4. Native American Story: In conjunction with researching pre-European history in America and the prairie-lands of the Midwest, write a story as a Native American child five hundred years ago, e.g. "A Day in the Life," or, "A Year in the Life." Describe their relationship among local resources?

5. Field Guide: Determine the number of habitats on the school property, making note of the plants and animals found in each and create a schoolyard field guide. Why are the habitats suitable to support specific plants and animals, i.e. food, water, shelter, place to raise young? Are there ways to add to habitats, helping local animals? E.g. create a pond/provide drinking water, slightly bury the top of garbage can lid upside down, grow a native plant garden. Set-up bird feeders in easy to observe locations.

6. Habitat Role Play: Have students act out different parts of habitats. Split the class into teams of about five children per habitat. Assign them habitats and have them choose animals, plant and physical features to act as. Habitats can be as large as a desert, mountain or ocean or could be as small as a nearby prairie, woodland, river or the school garden. E.g. Swamp, turtle, rock, frog, insects, hawk. Or oak tree leaves, acorn, insect, squirrel, child. Each group may have a narrator to describe the action.

7. Life as a wild animal: Write and describe your life if you were a local wild animal including all the different parts of the habitat (living and non-living). What does it ("you") need to survive, i.e. it's food and water sources, and shelter? Who does it ("you") compete with? Cooperate with? Now, take that animal and remove it from the community. Who benefits? Who suffers?

8. Need vs. Want: All our needs, including air, water, food and shelter, are met. What members of the community have unmet needs? What is it like to feel cold, hungry, thirsty or lonely? As a person? As a wild animal? Have students choose animals to act out. After the drama ask the student to explain why the animal felt that way. Note: the "L is for Lugari" contains a Need vs. Want exercise.

9. You as Native: The United States is a land full of immigrants (except mostly for the Native Americans). Ask the students to interview family members to trace back their roots. In what communities did your grandparents or great-grandparents live? Why did they immigrate? How was their life different there than here? Where do the community members/town population originate? How do you feel "native" to the community you live?

10. Animal Migration: Research which local animals migrate, e.g. Monarch butterflies. Who, when, why and how far? Track on a map. Calculate miles traveled, the time it takes and the speed they travel.

For a visual display of our weather characteristics as it relates to growing seasons, check out the USDA Hardiness Zone: http://www.usna.usda.gov/Hardzone/ushzmap.html

I is for Inuit Eskimo

While winter weather in Illinois may seem cold, the Inuit Eskimos survive in a habitat far harsher: the Arctic. There, animals adapted to survive in a place with so much snow and cold weather. In fact, the Inuit language has more than fifty different words for "snow," e.g. pukaq ("crusty snow") and masak "mushy snow."

Be a Detective general questions:

- How do animals stay warm in the winter? In the Arctic? In Illinois? i.e. mice, squirrels, cardinals. Which make changes to help them survive? e.g. extra fur, camouflage, slow heart rate.
- How do we stay warm in the winter? Cool in the summer? What about the use of fossil fuels?
- Explain why and how icicles form?
- Explain how we make clouds with our breath when it's cold outside!
- How do "green" homes here consider the local environment? e.g. insulation, south facing windows with deciduous trees (to let sun in during winter, keep the sun out during summer).

Activities:

1. Make a Snow Gauge: Use any container, preferably something clear, i.e. ½ cut off plastic soda bottle. Mark in inches and centimeters. Hold sturdy with rocks on the outside. Place several in different locations for best results. A yardstick may also be used, but is less accurate due to variables like wind drift. Track and graph results during winter weeks and months.

2. Measure Snow Bank Temperature: Many animals, including mice understand snow insulates. Place a thermometer at the base of a snow bank (place on the ground, in the bottom, and give it a little room so it's not "packed" in). Check back several times and compare the reading to outside air temperature. Discuss the role of temperature on the properties of water as a solid, liquid and gas.

3. Build a Snow Structure: Historically, our homes were constructed with local materials, e.g. Native Americans in the southwest used clay and mud, while European settlers in the Midwest may have used Oak from the prairie as the main building material. The Inuit usually built homes from snow and use the word "igloo" to describe any house. While rarely built today, "snow homes" still make ideal temporary shelters. Split into groups, and, using a straight edge of a metal shovel, create an igloo snow house by cutting blocks of snow and creating "bricks" to build walls. Unless you have expertise and ideal snow conditions, it may be necessary to use a tarp to cover the roof. Alternatively, cave like openings in a pile of snow will work. Be careful of collapsing snow!

4. Feed birds and animals that remain during the winter: Split into groups and create snowpersons. Dress with treats for birds like dates for eyes, raisins for mouth and a carrot for a nose. Use popcorn garlands for a necklace and branches for arms.

5. Draw or paint a snow scene: Using white chalk on colored paper, sketch a nearby winter scene. For snow, put down watered-down white glue and sprinkle powdered laundry soap.

Jacques Cousteau

Not long ago, we knew little about life under the any large bodies of water. With the S-C-U-B-A gear he helped to invent, Cousteau explored the depths of the ocean (mostly) and brought his discoveries to our living rooms through underwater video cameras.

Be a Detective general questions:

- How did Cousteau and his invention help change what we thought about the ocean?

- What is the role of the government as it relates to pollution? (15E.2b)
- If we don't live near the ocean, what does the ocean matter? E.g. food, imports, weather.
- How is the ocean different than lakes and rivers?
- Why is fishing so much fun?

Activities:

1. Technology Changes: Cousteau and his technologies enabled us to see life under the sea for the first time in history. It also exposed connections between modern technology, industrialization and damage to natural resources. Make a list of technological changes and their impacts. E.g. agriculture/farming. Which of these have happened in the last 250 years? e.g. Watts and the steam engine. What impacts did John Deere and the metal plow have on life in the Midwest?

2. Effecting Change: By exposing the problem, Cousteau and his crew provide an opportunity to improve the situation. Discuss why individual rights are important. List different ways individuals can be influential in the conservation movement.

3. Local Waterways: Humans have always valued proximity to water for good reasons, e.g. food, drink and transportation. The Industrial Revolution was no different, with businesses leveraging waterways to grow and expand. How are Lake Michigan and the Chicago River different than 200 years ago? What are the closest bodies of water to you? Do you have local organizations, like Friends of the Chicago River, who work to restore the waterways? Research the history of your local waterway/s, gather information and place on a poster, making a "story" from past to present to future.

4. Swim and Heart Rate Measurement: Swim fast for 25 yards and what happens to your heart rate? What if you have on a snorkel? And fins? Or if you swam to the bottom of a pool with a SCUBA tank instead of doing it by just holding your breath?

Kilimanjaro

At the base of Mount Kilimanjaro stands a tropical rainforest, while the summit is a snow-capped peak. The area below is full of animals and people and they all rely on the snow-capped peak, especially during the summer months.

Be a Detective general questions:

- How does one mountain contain multiple different habitats/vastly different living conditions? How does height impact climate?
- What's the tallest mountain area in your area? The tallest building?
- How we get our fresh water? And how does that compare to people near Mount Kilimanjaro and in the western United States?

Activities:

1. Set up a Weather Station: Track Track temperature, rainfall and other elements over time at the weather station and at different areas around the school (and at different times of the day). Compare to seasonal averages and display in a chart.

2. Find a Local Topographical Map (See "D is for Darwin"): Search out the highest and lowest places in our region and compare the differences (and contrast with Kilimanjaro and the tallest buildings in the area). If there aren't wide temperature differences, how are the areas impacted by weather, e.g. rain storms, wind? How does the lowest point compare to sea level? What about the school? Where does the rainwater go? How do the results compare to what you'd expect to find at Mount Kilimanjaro?

3. Climbing Exercise. Climb multiple floors of stairs. Check heart rate at the bottom and then after a couple of loops, at the top. See Food Energy Exercise in "E is for Energy."

Lugari, Paolo

Lugari was able to turn a deserted place (with little water and little food) into a community re-growing a rainforest by learning about the local habitat and understanding connections. Their community improved nearly everything by looking at everything, never forgetting that everything is connected. So, when they worked to make one thing better, i.e. improved soil, it helped everything else, i.e. allowed trees to grow, trees provided shade so more plants could grow, more trees meant more more food and more rain in area, etc.

Be a Detective general questions:

- How are food, water and our health connected? And population?
- How can making one change in an environment end up changing a lot of other things?
- What are a few benefits of riding a bike?

Activities:

1. Web and Connections: An ecosystem describes an entire community of living things, non-living things and their interrelationships. Nothing exists in isolation and is impacted by multiple other pieces and parts. To demonstrate a web, divide into groups of 10-12 and designate students, or have students chose, different parts of a giant local web. Write the part the child will be representing on color-coded cards so each student has one, punch holes in the cards and use string so it hangs from each student's neck. Gather in a circle and have each student say a few words about what she/he represents. To begin, hand a ball of yarn to one of the students who declares what she/he represents. At that time, any student connected to that part of the habitat can declare such and then receives the ball of yarn (while the original student holds on to her piece-tightly). E.g. the beginning student is a leaf, the next a caterpillar, to the bird to the tree to the water to the soil, etc. Play the game several times as each will play out differently. At the end of a game, decide to remove one of the parts and discuss the ramifications.

    Forest Web parts e.g.: sun, wildflower, oak, pine, insects (bee, butterfly), reptiles, small, medium-sized and large mammals, decomposers (fungi, worm, dung beetle) and water, soil and/or rocks.

2. Find and Write the Connection: Head outside and ask each student independently write down everything they see for sixty seconds. Take the writings and randomly pull out subjects and have the students discover links between them and write sentences describing the connections. Note: some are straightforward and directly connected, e.g. house and tree, while others are less so, e.g. butterfly and rocks (water washes off rock to sink into ground to be absorbed by roots of milkweed plant caterpillar eats).

3. Picture Story: Go outside and hunt for a picture story that could be posted in the daily newspaper. Take a camera (real or imagined) for pictures of natural interactions you see or evidence of a natural interaction, e.g. a squirrel eating an acorn, two birds playing, leaf with holes in it. Print out pictures and write captions describing what happened and what you don't see in the picture that helps make this happen.

4. Need vs. Want: Lugari lives in a country, similar to the USA, where there are a lot of people who don't have all needs met, e.g. food, water, shelter. His goal was to create a community that provides everything necessary for humans by considering nature in all decisions. He ignored many "wants" to ensure he could supply the "needs" of everyone. Asking each child for a contribution, compile a first list of what we do every day. If eating, drinking, breathing, and clothing ourselves don't make the list, coax it out of them! Next, have the students divide the list in two: what we need versus what we want. The list of the "needs" ought to include everything we need to not get sick and survive. What are some factors which affect why we feel like we "need" so much?

Muir Woods/John Muir

The Muir Woods are named for a man who spent most of his life outdoors observing nature and then working to protect it. John Muir wrote letters to elected officials, articles for publications and founded a nonprofit organization named The Sierra Club to continue his work.

Be a Detective general questions:

- List challenges of walking across the country (now versus the 19th century)
- Why did John Muir work to protect forests and vast natural areas?
- Who might have challenged Muir? Why? How was he successful?
- What is the nearest semi-wild area to you? Why does it remain undeveloped?
- What are the state bird, flower and tree of Illinois?
- What are benefits to protecting, and expand, the remaining prairies of Illinois?
- What are "non-profits" and why do they do? Why do people work for them? Would you?
- Is it a citizen's responsibility to stay involved in decisions about their hometown? What are some reasons people don't?

Activities:

1. Web Balance: At one point, conservationists shot and killed wolves to protect deer. They learned, however, when humans protect deer by shooting wolves, the deer's natural predator, the number of deer explode. Bcause deer feed largely on leaves of young trees (and kill them), few trees were able to grow to replace mature trees dying naturally. In a play, assign students parts of the web to play: deer, human hunter, young tree, older tree, wolf and sun. Choose a narrator to describe the action.

2. Local Conservationists: Research local people and organizations in our area that have worked or, are working, to protect the environment and nature? E.g. Daniel Burnham, Aldo Leopold, Carl Sandburg, The Sierra Club, Jane Goodall Roots & Shoots, Steve Packard.

3. Land-Use Debate: Imagine there exists nearby a large piece of land (with a small prairie, wetland and woodland) near school sitting idle. You contact the owner and she is open to suggestions for allowing the land be used by the school or someone else. Divide the class into small groups to develop different ideas to present to ownership. Assign each group a different idea for development. Ideas include: houses, sports field, a nature center (mostly, leaving it in its state), a factory. What will the owner choose? Why? Why not? What might the local government be in favor of? E.g. the property zoning may be restrictive and the town may need tax revenues.

4. Debate Local Environmental Issues: What are the main environmental issues in the place you live? Water or air pollution? Budget cuts forcing parks to close down? How can you find out? Are there any local groups that work to protect nature? What are the various opinions? Debate. Split the class into groups, e.g. developer, conservationist, town officials, unemployed worker, local family, neighbor, etc. with each given a chance to represent their viewpoints.

5. Local Politics. Our democracy is "for the people, by the people" so learn about what impacts you and make your voice heard.

    a. Guest Interview: Invite those involved in the local issue to visit the classroom. What side is she/he representing and what are their goals? Are you able to invite in more than one side? E.g. City Planner, Developer, Alderman, non-profit, environmental organization. Prepare questions to ask. Do follow up. Contact the local newspaper to cover the story.

    b. Write Local Officials: Who are some of the elected officials that make decisions that impact the place you live? Once you've researched and debated the existing issue, write local officials and express your viewpoint.

    c. Attend a City Hall Meeting: Take a local issue concerning the well being of your community and prepare a statement. Research is necessary, but, if the children are mature enough, the impact of informed school children speaking to policy makers is powerful.

Ocean/Plankton

The world's ocean for a long time kept most plants, peoples and animals separate. The ocean itself is diverse and full of life near the source of those who absorb the sun's energy: plankton.

Be a Detective general questions:

- How has our relationship with the ocean changed over the last five hundred years?
- If we live in Illinois, do we need the ocean? Do we need a healthy ocean? Why?
- How can the biggest animal rely on one of the smallest to survive?
- How is the ocean different than Lake Michigan?
- How was Lake Michigan formed? When?
- What do we use Lake Michigan for?
- Where does our drinking water come from?

Activities:

1. Water Flows: Draw connections of the water flows to ocean from Illinois. What are the nearest rivers to us? Where did the water originate? How can something arrive in Chicago via boat from overseas? Draw the map. Note: a topographical map may be helpful.

2. List Imports: Not that long ago, e.g. the time of Darwin, items from overseas were rare. Today, with the use of fossil fuels and technology, we use the ocean as a transport highway. List items we use everyday from overseas (and what else the ocean is used for). What might travel via plane instead of ship? e.g. fruit. What type of energy did it use to arrive versus if it had traveled 150 years ago? List both advantages and disadvantages of being so connected.

3. Salt Water: The ocean covers nearly 70% of the earth, but is not drinkable. Removing the salt is difficult and requires enormous amounts of energy. Why is the ocean salty? With tap water and salt, make salt water. What floats? What doesn't? How much salt does it require? Who can drink or live in salt water. Why? How?

4. Local Water: Of your nearest body of water, how well do you know it? How can you learn more? What lives in it and what relies on it for life? How is it used by humans? Research it's uses and history over time.

5. Food Web Game: Food chain and food webs. Photosynthesis. Predators. Game showing numbers. Start, where everyone in the class, except one child, is plankton or fish……

Que, Vo

Vo was a strong man who didn't let destruction from foreigners waging war deter him. He understood the value of trees, and he inspired men, women and children to plant trees and help restore the land where he lived.

Be a Detective general questions:

- Why do countries wage war? Historically, and in the 21st century.
- What happens when we damage or remove trees and plants from areas they traditionally grow? Besides the trees, who, and what, is impacted?
- How can planting trees help people?

Activities:

1. War in Illinois!: Write an account of a fictional war and the aftermaths. Who is impacted and what are the effects? Consider it impacts both your "needs" and your "wants."

2. News Flash: In your journal, make a list of wildlife in your area, perhaps just the plants and animals in your schoolyard habitat. Divide the list into producers, consumers and decomposers. Now, remove one of the groups so it disappears. What happens? As a journalist, write an account of the result. Now, have students exchange their drafts and offer feedback. Finally, the students should edit their accounts and prepare it to publish.

3. Tree Uses: List all the ways we rely on trees and plants here in Illinois, and how it has changed since early USA settlers moved westward and began further populating the Midwest. e.g. from prairie

grass/oak savannahs with natural occurring wildfires, to crops for export, capture carbon pollution, filter water, habitat for wildlife

4. Find a seed or seedling a home: Find an area that would benefit from a tree (e.g. a conifer on the north side of building, a deciduous tree on the southeast side of a building). Contact local tree expert for advice. Note: Similar activity in "T is for Tree."

5. Community Clean Up. Do some of the surrounding parks and community areas appear as though they were in a war? Have you ever considered being part of a clean-up crew to beautify the area? Are there local community organizations you could partner with? "Adopting" a local park to keep clean regularly. Plan and divide up into different groups to tackle different tasks. Publicize and wite a story on the event, submitting to a local news organization.

6. Local Hero Biography: Find a person from the local area who has worked to help nature locally. Find the time to interview her or him. Prepare a list of questions upfront.

Reduce, Reuse, Recycle, Rethink, Redesign

We consume and produce a lot of worthless waste and rarely consider the waste created during the production and transportation process. There are better ways to live well without producing worthless waste: Nature shows us the way.

Be a Detective general questions:

- What are the differences between reduce, reuse and recycle?
- What do we consume each day and where does it originate? What is the breakdown of our household and school trash and where does our trash go?
- What are some issues involved with recycling? E.g. pick up, sorting, some things not made to be recycled, chemicals
- If companies had to accept what they sell as returns after their use, e.g. computer, washing machine, car, how might they make them differently upfront? Do "take-back" laws make sense?
- What do we learn from nature to help us rethink and redesign what we produce and consume? E.g. can you think of biomimicry examples? The 'velcro' product is derived from burrs that stick to animal fur. Helicopter wings are modeled after the hummingbird.

Activities:

1. Tree vs. Building Comparison: How does a tree work versus how a building or home works? i.e. tree runs on current sun energy and cycles it's nutrients and most buildings today extract material from the ground and consume fossil fuels. Draw and compare the two on a poster-board. Next, design a "green" home/building that works like a tree, i.e. produces as much energy as it consumes. Note: "zero-energy" homes do exist, even in Illinois!

2. Our Trash, Now vs. Then & Recycling: Compile lists, include types of garbage a family or school has today, might have 200 years ago and 200 years from now. Discuss the differences. Now, explore our trash. Carefully empty out the trashcan, separating, examining and documenting the findings. Where did it originate? What is it made of, how was it produced and transported? Where will it end up? Can you weigh it and figure out how much might be recycled? Explore the issue and the school's current

recycling program with the school administrator, or custodian. What are the town's policies? Can you think of ways to impact?

3. Recycling Issues: Can you find products that aren't currently designed to be recycled, e.g. computer, juice box, and redesign them? i.e. parts to either be used again or put into the ground to decompose (see vermin composting!).

4. Re-Gift: Go through your home and find something your family no longer needs or wants that might be valuable to someone else. Is it OK to give gifts that have already been used? With parental approval: bring in items that are no longer wanted/needed and either a.) create a "swap" market, b.) put prices on the item and have a classroom sale, choosing a charity to donate part, or all, the money raised, or c.) compile bags of used goods for a local charity donation.

5. Design a Town: Build an entire community from scratch (or rebuild your existing town) and draw a map explaining how it works, e.g. where people live, work, shop and play. What do they consume and where does it originate? Plan how they move around and get their food. Remember to consider energy and resource use, using nature as a model. How is your new community different than your existing community? What ideas might be useful for your current community? Is there anything you can do about it?

Sun

The star at the center of our universe provides energy for earth- as plants produce food only with the help of the sun. It also determines our weather, i.e. temperature, wind and rain.

Be a Detective general questions:

- How do we rely on sun energy, even if we don't *see* the sun all day?
- Why does the weather change during the seasons in Illinois?
- How do you think we'll be using sun energy 25 years from now?

Activities:

1. Measure Effects of the Sun:
    a. Temperature with a thermometer: To highlight the effects on temperatures with exposure to sun, find different locations to measure temperature: in the shade vs. in the sun, underground, vs. above ground and in the morning vs. in the afternoon. Make charts to highlight the differences. Remember to note the time of day.

    b. Measure Evaporation: To highlight the effects of water with exposure to sun, compare water in the sun to water in the shade. Choose non-permeable objects, like plastic plates, and place one in shade and one in sun. Measure and weigh before and after. Compare the differences. Alternatively, study a northern facing parking lot after snow or rain versus a southern facing lot (assuming drainage ability is similar). Why does the time of the year matter?

    c. Produce a wind vane. The sun is responsible for creating wind. As air is warmed by sun, it rises. When air cools (from less sun) it descends. Mountains, water, deserts, forests play a role in determining the speed and direction of the wind. In Illinois, what are factors

determining our weather? Make a weather/wind vane, with a straw and two small triangles cut from paper. Glue in place. Pin into eraser on top of a container.

2. Measure Plant Growth. To demonstrate the role of the sun's energy in growing plants, conduct a plant growing experiment with seedlings. Give half the seedlings exposure to classroom sun and keep the other half in a closet. Chart the results over time. Note: list variables other than the sunlight.

3. Create a weather journal: Maintain a weather journal. Choose a location and visit consistently year-round for ten minutes at a time with a goal of sharpening observation and writing skills. Draw small pictures along with each report to help describe the scene. Be as descriptive as possible, e.g. if it's raining, how large are the drops? How many are there? Are they cold? Making puddles? The sky may be cloudy, but what do they look like? What else is going on around you? If it's cold, how does the chilly weather make you feel?

4. Who uses Wind?: Find evidence of plants and animals using wind and document, e.g. seeds dispersal for dandelions, maple helicopters, plant pollen, mushroom spores, thistle, milkweed, animals using scent to locate prey or spiders using wind to catch a meal. Produce a local seed brochure. Glue seeds on paper. Describe the type of seeds and then draw the full-grown plants and trees of which they originated.

Trees (and Plants)

Trees and plants are necessary for our lives. Not only are they the producers of the world's food energy, in the process of photosynthesis they absorb the air we exhale and release oxygen we need to breathe. Note: Plants and trees differ only in that trees have trunks.

Be a Detective general questions:

- How does a tree change itself through the seasons? When it's hot out? i.e. transpire. How does that compare to you?
- Why do some trees grow tall and some grow wide?
- For the first time in history, the majority of the world live in urban settings. Why are trees often described as the "lungs" of the city and how do they help? e.g. regulate temperature, improve air quality (capture pollutants), capture and filter water.
- Why do people pay more for houses with trees near them than homes without trees near?

Activities:

1. Adopt a local tree. Count the number of trees found on the school property. Assign trees to individual students or choose just a few and study them as a class. Calculate the tree's height and age. Determine its' species. Make rubbings of its bark. Press its' leaves. Use a ribbon, or yarn and tie it on a low branch to help note specific changes through the seasons, e.g. bud, leaf, snow. Sketch the tree, in different seasons. From up close and from faraway. Add in other living things impacted by the tree. Take photos. Draw illustrations. Record observations in notebook through the seasons. Write a story as the tree, e.g. "My Life as a Tree."

2. Tree Ring Study. Find a recently cut-down tree and examine the annual rings with a hands lens or magnifying glass. Make a rubbing of its stump (or take a photograph up close and print out a blown up

photo). How old is the tree? How does it grow in both height and girth? Plot significant events and your lives on the annual rings. Can you "read" its life story? Why are some rings wider than others? E.g. temperature, rainfall, sunlight, soil nutrients, shade competition, etc. How will the rings be different than if on a tree living near the equator?

3. Build a Tree. Divide the class into the various parts of a tree, i.e. heartwood, taproots, lateral roots, sapwood/xylem, cambium/phloem, roots, leaves and bark. Once assembled, shout directions so the tree "works," i.e. "Heartwood: stand tall and strong, roots: slurp, leaves: make food, sapwood: bring the water up, phloem: bring the food down, and, roots: protect us!

4. Tree vs. You Comparison: Sketch pictures of a child vs. a sapling and make comparisons. How does each "work, " e.g. breathe, grow, and what is required to remain healthy? What is harmful or dangerous? What outside influencers/players are necessary? What is the life cycle of each and what happens with the changing of the seasons? Are the traits inherited or learned? Compare mobility.

5. Tree-Planting Strategy: Develop a long-term plan for your school. Which areas on the school property could benefit from trees? E.g. the faculty parking lot to shade cars (and absorb water), a sports field to help athletes cool down in the shade, strategically placed trees near a building to reduce heating and cooling costs in Illinois (deciduous trees to the south and east provide shade during warm months and let the light in during cold months. Evergreens planted near the north facing walls protect the building from cold winds.) Consider contacting a local arborist, nature center or landscaper to partner with. Assign students to develop a written plan to submit to administration. Don't forget the obstacles, e.g. upfront costs, maintenance.

Us/ Urban Farming/Vegetables

For most of human existence, we were hunters and gatherers. Then we farmed. Today, relatively few farm yet, yet there are advantages to small, local farms: better tasting food, less energy consumed, cleaner air, water and soil.

Be a Detective general questions:

- How many people lived in your town 100 years ago? 1,000 years ago?
- Do you know any farmers? What about your great grandparents?
- Who has visited a farm? Driven by a farm? What was grown there?
- Where does the food you eat come from? Where did your great-grandparents food originate?
- How do we eat food from all corners of the globe while we couldn't 100 years ago?
- Are there benefits to eating local food from a small farm? Taste? Health? Energy use? Jobs?
- How many areas does a farmer have to be an expert in? E.g. business manager, weather, scientist, engineer, mechanic, veterinarian, plants, bugs, soil, water.

Activities:

1. Population Changes: Locate a census and chart the population in your city and state over time. Discuss possible explanations for the changes (since US westward movement of European settlers?). What will the future bring?

2. Our Food: Where does your food come from, geographically? How did it arrive on your plate? Choose a meal and see if you can track each of its ingredients origins. Describe the different roles each individual/company played in the process.

3. Farmer's Market Vs. Grocery Store: Plan two trips, one to the farmer's market and one to the chain grocery store. With a set amount of money, buy ingredients for a day of meals for your family. What are the differences? Similarities? What do the labels on the fruit and vegetable packages say about their origins? Why do some shop at one versus the other?

4. Food Visitor: Invite those connected to our food to the classroom for a visit. E.g. local farmer, school food provider, local grocery store manager. Arrange a trip to visit the farm. Prepare a list of questions. Send thank you letters. Remain in correspondence.

5. Food Drive: Why is it humans produce more food than ever before in history and there are nearly 1B that go hungry every day? Who in your community go hungry? Collaborate with a local organization to collect food to donate to a food pantry. Research foods to determine which are healthy and appropriate to collect. Count the food collected, weigh it and determine how many people and meals the food will serve. Write personal notes to the potential recipients.

6. Create a Virtual Farm: You are a local farmer. What will you grow? Where does it grow? How much land do you have, what was there previously and what do you grow? Consider climate, seasons and water sources! Do you need to hire anyone? Calculate costs and expenses. Who do you sell to and why do they buy it from you instead of the competition? What is the income?

Worms, Water, Xeriscape

Worms: Most don't think highly of worms, but they work wonders: eating organic waste and depositing their waste, a fertilizer, to provide nutrients plants use to grow.
Water: We may take it for granted in the Midwest, but as a solid, liquid or gas, water is always precious.
Xeriscape: Dry areas exist naturally, but deserts emerge when we misuse land and vegetation disappears.

Be a Detective general questions for Worm:

- Why does a worm need moisture?
- Why did Darwin refer to worms as "perhaps the most important animal to the advance of civilization"? e.g. more food on farms led to an increase in population and those who could spend more time on Industrial Revolution technology (or sailing on British ships around the world).

Be a Detective general questions for Water and Xeriscape:

- Can you name examples of when and where you see water as a gas? As a solid?
- Why did Europeans choose the specific areas in the Midwest now known as Milwaukee, St. Louis and Chicago to settle?
- Why do so many people choose to live near water?
- Where does our drinking water originate?
- How many different ways do you rely on water every day?
- When water goes down the sink, or you flush the toilet, where does it go?
- What about the water down the storm drain sewer in the street?

- Who, and what, is responsible for using the most water?
- Why do so few people, traditionally, live in deserts?

Activities:

1. Eat like a worm: Without any arms or legs, how does a worm move? Can you move like a worm? i.e. short and stubby to long and skinny. Can you eat like a worm (with no teeth)? Most worms eat about 50% of their bodyweight each day. Weigh your food and drink at lunch, multiply by three (meals) and, using the total weight, figure out the percentage a child eats in his/her bodyweight each day. Compare that to a worm.

2. Make Rain: Water is in the air as water vapor, an unseen gas. When liquid water warms it evaporates, or changes to a gas and rises in the air. When the conditions are right, clouds form. When the cloud cools, the water as gas vapor changes back to water (droplets join together) and falls to the ground. Catch water vapor to prove this: Tie a plastic bag around a tree branch with leaves for a few hours. Tree condensation. Transpired. Or visit a local body of water on a cool morning.

3. Local Water Detective and Writer. After (or during) a rainstorm, explore and identify what happens to the rainwater. Who does it impact? Write the story of "My Life as a Raindrop" imagining you starting as a raindrop and traveling through several different environments. Who do you impact? How? Do you always help? What different forms might you take?

4. Sapwood Transporting Water Experiment: Demonstrate how a tree/plant absorbs water using a celery stick, food dye and water in a glass. Discuss the cycle of water and how removing a part of the environment can impact other parts.

Yvon Chouinard

A man who not only loves being active outdoors, but also someone who has applied what he learned from nature to his business, e.g. taking "waste" and turning it into something useful he can sell.

Be a Detective general questions:

- Do you think you'll be taking part in strenuous outdoor activities when you're old enough to be a grandparent? Why? Why not? What can you do to improve the likelihood?
- What are some of the challenges of trying to do something differently, e.g. running a clothing company that tries to be good to nature?
- Why would someone want to buy from a company that tries to do less harm to nature? Or even tries to emulate nature (and make no waste)?
- What does it take to be a leader? Will you grow up and work for a company, or start a company, which is a leader?

Activities:

1. Engage the Senses: The more time you're engaged with nature, the easier it is to understand what is going on around us. Yvon spent much of his life paying attention to nature. Divide the students into teams of two with one child wearing a blindfold while the other plays the guide. Have the leader take the blindfolded child outside to a place to sit down where it will be required to take in the world without your eyesight.. Once back inside and without the blindfold, write out as much as you can

from what you remember. Now, go outside again, this time without the blindfold and see if you can find the place you sat. Extra: Add in an examination of a tree. Alternatively: Use samples of bark, buds, sticks, flowers, leaves and roots. Blindfolded, what observations can the students make with their touch and smell?

2. Local Leaders: Research and locate companies in your area that consider nature and their impacts on nature, e.g. companies who recycle, use current sun energy (wind, solar), take another's "waste" and produce another product to sell. Are they new? Why are they risk takers?

3. Create New Companies: Develop businesses of your own and develop advertising campaigns for your company. What product will you produce? Where will you produce it? Who is the competition? Why will people or companies buy your product over your competition? What will your advertising say?

Zoo/Botanic Garden

Zoos and botanical gardens offer visitors a chance to see animals and plants we might not otherwise see, but are often more than just fun and beautiful places to visit; both help animals and plants in ways we don't immediately see.

Be a Detective general questions:

- How do some zoos benefit animals?
- What do zoos do to help protect nature?
- Where do the zoos' animals originate?
- How can botanical gardens benefit plants and trees?
- How do we feel when we're visiting zoos and botanical gardens? Why?

Activities:

1. Zoo Animal Debate: Often animals in zoos originate from faraway lands and live in homes far different than their home habitat (but still have access to some of what they have at home). How do animals feel about being in zoos and being watched by humans? Stage a classroom debate. Do some animals have better lives in zoos than others? Give students an opportunity to be either zookeepers or (well-behaved) animals from all over the world, from all ecosystems. If zoo animals could speak the human language, what would they say?

2. Our local zoos/gardens: What zoos are near us? E.g. Lincoln Park, Brookfield Zoo, Henson, Cosley, and what do they do to protect wildlife? . What is difference between a wild animal and a pet animal? A wild plant and a house plant? What is being done to protect plants and animals, local and exotic/far-away?
    a. Research various sources. Books/magazine/their websites/
    b. Interview: Bring in a local botanist/zookeeper to visit the classroom. Prepare questions for an interview.
    c. Write a story.

3. Visit Zoo. Research which animals you'll see ahead of time. Classify by habitat. Upon returning, create a class animal book. Each child contributes one page which includes a drawing of the animal, a description of what's necessary in it's habitat.

Post Reading Activities:

Be a Detective general questions:

- Why did the author write the book?
- How did he choose the topics?
- Did it change what your view of the environment?

Write a Book. Write your own *Environmental from A to Z* for your local area.

"Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it's the only thing that ever has."

Additional Reading for bringing more of the classroom into nature:
School Garden= Junior Master Gardener
Vermi Composting= Worms Ate My Garbage

References:

National Wildlife Federation, Schoolyard Habitats
The Kids Nature Book
Sharing Nature with Children II, Joseph Cornell
Edens Lost and Found: How Ordinary Citizens are Restoring our Great American Cities, Harry Willard and Dale Bell