Get Out

Simple, singable and made for dancing, “Get Out” means exactly what it says. Get outside!

Discussion —

1. Listen to two different versions of the song together. How does the first version make them feel? The second?
2. How often do you go outside to play? How does it feel? Can you think of different examples?
3. What’s special about being outside? Are there things that happen outside that never happen inside? Like what?
4. How would you feel if the whole world were “inside,” if you couldn’t get to an “outside”? How would you feel if you had to live the rest of your life in your living room? Do you ever feel like you’re stuck inside? What does that feel like? What could you do to your indoor places to make them feel more like the outside? How do you think your classroom would feel if it had more of the outside in it?

Activities —

1. Dance party! As a group energizer, play one of the versions of “Get Out” and jam together as a class. For an added twist, stop the CD player every so often and play “freeze dance.” Or, bring the CD player outside and dance together on the playground.
2. The artists on the album recorded three different versions of this song. Alone or in groups, have students think of another musical style this song could be sung and played in, and demonstrate it for the class. With more time, they can think up coordinated dance routines.
   
   GROW IT: How are the recorded versions of this song different? Which is the fastest? The slowest? What instruments are emphasized in the different versions? How does the vocal style change? Which one do you like more? Which one would you want with you if you were stuck on a deserted island for 10 years with only that one song to listen to?
3. Draw an outline of a tree on a large sheet of butcher paper, and hang it in the classroom. Instruct students to keep track of how many minutes they spend outside every day. When their minutes add up to an hour, they get to draw a leaf on the tree. See how many leaves you have at the end of a month.
   
   GROW IT: Several classrooms could do this activity together, and have a competition for which class has the most outside time in a month (or a season, or a year).
4. Ask bilingual students to help translate the song into other languages and teach the rest of the class. Have the class sing the new versions together.

GROW IT: Record the class singing in translation and post a video or mp3 then send it to The Biomimicry Institute. Maybe your class can inspire kids in Vietnam, Mexico, Iran or Sudan to get out too!
I Want to be Like a Tree

There is so much to love about trees. They clean our air, hold our soil together, provide us lumber, paper and many other crucial products, provide habitat for countless other creatures, and inspire us with their beauty. This song is a short, spunky ode to just a few of the reasons to try to be like a tree.

Discussion —

1. Listen to the song together. What are some images that come into your mind as you listen? How does the song make you feel?
2. What are some of the things the song says you can learn from trees? What are other things you can learn from trees that aren’t mentioned in the song?
3. What does the word “photosynthesize” mean? Do you think photosynthesis is important? Why?

Activities —

1. Think of one specific tree that you know. What does it have to teach? How could you be like that tree? Write a new verse for the song based on your feelings about this tree.
2. Go on a walk together around the block or around the edge of the playground. How many trees do you find? How many different kinds are there? Bring a piece of paper or your journal, and sketch the shape of the whole tree, as well as the shape of its leaves or needles. If there are some trees that no one can identify, look them up in a reference book or on the internet. How tall can the trees around your school grow? How old can they get? How much water do they need? Do they like a lot of sunlight, or just a little? What animals use the trees? Do people use them? How?
3. This song has many examples of both literal and metaphorical meanings. A literal meaning is something that is a fact. For example, it is a fact that trees give shelter to many different creatures. A metaphorical meaning takes that fact and expands it. For example, a person can be like a tree, and give “shelter” to others by offering a helping hand or a kind word. As a class, in small groups, or individually, can you find things in this song that have both literal and metaphorical meanings?
4. Can trees talk? Some scientists are exploring the possibility that plants communicate with each other by releasing certain chemicals when they are under attack by predators, as described in this Discover Magazine article:

“Ian Baldwin…a biologist and the director of the Molecular Ecology Department at the Max Planck Institute for Chemical Ecology in Jena, Germany…[is] using chemical sensors to
investigate plant communications: cries for help, invitations, even warnings, each in the form of odor molecules that float past human noses unnoticed. The harder biologists look for these signals, the more they find. They have already discovered that plants can send chemical cues to repel insect enemies, as well as signals that attract allies—other insects that are pleased to eat the insects eating the plant. But that is only the start of a more complex scenario, for Baldwin and others have also found that nearby plants can listen in to this conversation and gear up their own defenses.

“In 1988 Marcel Dicke and his colleagues at Wageningen University in the Netherlands... found that when spider mites attack lima bean plants, the plants release a chemical SOS that attracts another mite that preys on the spider mite. Mechanically damaged plants do not produce the cues; most likely, only elicitors in the saliva of the insect can trigger the plant to produce the right molecules. “Today,” Dicke says, “the scientific community agrees that plants talking to their bodyguards is likely to be a characteristic of most, if not all, plant species.” Even the gingko—a species that has been around for 150 million years—can communicate chemically with insects, he adds.

“For example, when caterpillars feed on corn, tobacco, and cotton, the beleaguered plants produce airborne chemicals that attract parasitic wasps. The chemical cries for help are quite specific, attracting only the wasps that lay their eggs in the type of caterpillar infesting the plant. “Plants are not just saying, ‘Yes, I am damaged,’ they are also saying specifically who is damaging them. It is such an intricate and fabulous system,” says Consuelo De Moraes, an assistant professor of entomology at Pennsylvania State University.” < full article >

If trees and other plants can send signals to each other, does this change how you think about them? How? What do you think humans could learn from plant communication? Do you think we could ever learn to speak their language, and understand the messages being sent? What are some ways we could use that information?

5. Trees help keep us cool with the shade they provide, but what do trees store in their bodies which helps keep the whole planet cool? (carbon dioxide) Given that trees hold carbon dioxide in their bodies, and that carbon dioxide is one of the main things making our planet warmer, what do you think would happen if a whole bunch of trees were cut down, all around the world? What if a lot of trees were planted? Would you guess that more trees are being planted or cut down worldwide right now?
The United Nations Billion Tree Campaign website says:

“Worldwide, deforestation continues at an alarming rate, about 13 million hectares per year, an area the size of Greece or Nicaragua. Africa and South America have the largest net loss of forests. In Africa it is estimated that nearly half of the forest loss was due to removal of wood fuel. Forests in Europe are expanding. Asia, which had a net loss in the 1990s, reported a net gain of forests in the past five years, primarily due to large-scale forestation in China.”

Plant for the Planet — Billion Tree Campaign:
If you want to help keep our planet cool, you can join the United Nations campaign to plant seven billion trees worldwide by the end of 2009? That’s right - 7 billion trees!

<Find out how your school can take part here>
Ask the Planet, the title track on the album, gets to the heart of what biomimicry is all about: entering into conversation with the Earth and listening to the wisdom other life forms have to offer. The activities for this song are designed to inspire curiosity and teach inquiry skills.

Discussion —

1. Listen to the song with your students. What does it mean to “ask the planet?” Does the song provide some clues or ideas?

2. The song says “the planet can help you with whatever’s on your mind.” What’s something that is on your mind right now? Where do you go for help with that concern?

3. What are some things that are “on our minds” as a species -- some important problems or questions that are of concern to human beings all over the world? Can you think of any plants or animals that might have special knowledge to help us solve those problems?

4. The second verse of the songs asks four questions, and offers some possible answers:
   
   1. How do I stay warm in the cold and the snow?  (ask a snowshoe hare)
   2. How can I travel over the Gulf of Mexico?  
   3. How can I build a house under the sea?  
      (ask an abalone)
   4. How do I get my friends to listen to me?  
      (elephant call)

   In addition to the snowshoe hare and the abalone, what animals do these or similar things (survive and thrive in freezing temperatures, build things under water). Do humans do these things too? How? How do our methods differ? What could we learn from these other life forms?

And what about that second line, “how can I travel over the Gulf of Mexico?” What organisms do that? What could we learn from them?

(To help stimulate this conversation, share the following excerpt from Janine Benyus’ contribution to Voices of the Bioneers 2000, published by the Collective Heritage Institute.)

Janine writes:
“One of my favorite [natural models] is the hummingbird, an organism about the size of my thumb. It flies about 35 miles an hour, which is faster than you can get around San Francisco. They travel about 2,000 miles a year; they’re long distant migrants. When they go down to the Gulf of Mexico, the lip of the Gulf, they find about 1,000 blossoms a day. They fuel up, and then they
burst across the Gulf, 600 miles without stopping, on 2.1 grams of fuel. In the process of fueling up the hummingbird pollinates flowers, assuring itself that it’ll have fuel next year, and that its offspring will have fuel. It pollinates as it’s fueling up, and of course when it dies, its body decays and nurtures the roots of those flowers. That’s what we’re looking to do, to emulate this amazing ability that life has to fertilize the soil, clean the air, clean the water and mix the right cocktail of atmospheric gasses that life needs to live. What life in ensemble has learned to do is to create conditions conducive to life. The question, “What would nature do here?” is the key.”

Activities —

1. Go for a walk around the block together. Pay attention to all the living things you see – students may want to bring their notebooks and keep a list. Back in the classroom, chose one of the life forms encountered and write a letter to it. Encourage students to think about special knowledge that this life form might have. For instance, if a student chooses a maple tree, she may want to ask what it’s like to be so tall, or how it feels when a squirrel runs across its branches. Students can write responses to their own letters, or responses can be written by the teacher or other students in the class. Emphasize that the point is creative questions, not “right” answers, and encourage them to let their imaginations run wild.

GROW IT: Each student can chose to become “pen-pals” with this plant or animal, writing back and forth over a period of weeks or months. The longer the relationship is continued, the more will be revealed about the organism and its special knowledge. Seasonal changes, lifespan, reproductive cycle and other factors will all eventually come into play. What does a prairie know in the winter that’s different from what it knows in the summer? What does a mother wolf have to tell us in May? In September?

2. The song describes four categories of life forms:
   - something scaly
   - something hairy
   - something slimy
   - something feathered

Divide the class into four groups, the scalies, the hairies, the slimies and the feathereds. Each group thinks of a life form that fits that category (for instance, a scaly tuna fish) and something that the life form does really well (such as swimming). This discussion must take place quietly, in order to keep it secret from the rest of class. Once they have made their choice, each group stands before the class and becomes their chosen life
form, acting out the special skill they discussed. The rest of the class guesses what the animal is and what skill the group has chosen to feature. After all groups have had a turn, you can mix up the categories and have them do it again.

3. In partners, students imagine that they are a non-human life form that they find interesting. Pretend that you (the teacher) are the host of a new TV talk show called “Ask the Planet,” and invite each pair to appear on the show, which will “air” in three days. Tell them that they will be interviewed in front of the class, and assist them in researching their life form in order to prepare for their TV appearance.

On the day of the interview, set chairs next to the teacher’s desk, and introduce each featured species with fun and fanfare. For instance, you could have the interviewees wait outside the door, and then have them enter the “studio” as you play a little bit of the song while the “studio audience” claps. Then you ask each pair of students questions such as:

- Where do you live?
- What do you eat?
- What kind of sounds do you make?
- What are some of your special skills?
- Do you know of a problem that we humans are having that you might help us to solve? How?
- What other things can humans learn from you? Do you do something really well that we humans aren’t as good at?

After you have modeled this inquiry for them, take the “microphone” into the “audience,” and let the students ask questions too. Encourage them to imagine questions that are relevant to their own lives which this species might know about. For instance, if the featured species is an ant, a student might ask, “My little brother is starting kindergarten next year, and he’s scared that he’s going to get lost on the way to school. I know you ants are really good at finding your way to and from home. Do you have any advice that I can pass on to him?”

GROW IT: Have adults or older students videotape the interviews and edit them together into a full show, then watch the show together as a class. With parents' permission, videos could be shown at school fairs or other events, or could be swapped with other schools doing the same activity.

4. Write the lyrics to the third verse of the song on the board, or print them out for each student. Using this as a model, write a new verse for the song. Encourage the students to think about what they want to ask the planet. This can be done as a class, in small groups, or individually.
Keep Our Cool

Global warming can be scary for kids (or anyone) to hear about, but it is an unfortunate reality of our times. “Keep Our Cool” gives them a chance to express a mixture of emotions about climate change, from concern for polar bears and penguins, to determination to come together and make a difference.

Discussion —
1. Listen to the song with your students. How does it make them feel? What are some images that they see in their minds as they listen?
2. What do they think the song is about? When they say “global warming,” ask them to say more. What clues did they use to reach that conclusion? What do songbirds, glaciers, oceans, etc. have to do with global warming? How does a warmer climate affect them?
3. What is global warming, exactly? How and why is it happening? Define it together, and write the definition on the board. Clarify the difference between climate and weather. (point them toward glossary, other resources)
4. Do you think global warming is important? Why, or why not? Does the song make you think about global warming in a new way, or to have new feelings about it?

Activities —
1. The song says, “there’s a lot we can do to keep our cool.” Like what? What can you do, individually and together, to respond to global warming, and help to stop it? Make a list of ideas as a class. Then, write a new verse for the song based on your ideas.

   GROW IT: Record the class singing their verse together, and send the video to The Biomimicry Institute.

2. In groups or individually, have students pretend they are polar bears, penguins, or any other animal whose life is being affected by global warming. Ask them to write letters to the human species, describing what their lives used to be like and how things are changing. What would they ask humans to do – or not do?

   GROW IT: The Biomimicry Institute would love to see what your students come up with for this activity. Please send copies of letters to The Biomimicry Guild.

3. Divide the class into three groups. Tell one group they live on an island in the Caribbean, another that they live high on a mountain in Peru, and the third that they live on the edge of the Sahara desert in ___ . Have them research how global warming is affecting people, animals and plants in those places, and

Connections with —
• global warming
• creative writing
• community action

Objectives —
Students will:
• be able to define global warming
• strategize about to help solve the problem
• deepen their understanding of why global warming matters

Vocabulary —
climate
A description of the temperatures, humidity, rainfall and other weather factors in a certain region over a long period of time (at least 30 years).

global warming
The increase in the average measured temperature of the Earth’s near-surface air and oceans since the mid-20th century, and its projected continuation.

weather
A measurement of all the atmospheric conditions occurring in a certain place at a certain time. We use weather to describe what’s happening in the atmosphere right now, and climate to describe what happens over time.
share their findings with the rest of the class.

GROW IT: Can you reach a class in another part of the world and exchange letters or emails about your feelings and concerns about global warming? Maybe you can trade ideas about how to help keep our cool!

4. Go on a walk around the block together. Which life forms do you see that might be especially sensitive to global warming? Can you see any effects of a warmer climate right now?

5. Trees help keep us cool with the shade they provide, but what do trees store in their bodies which helps keep the whole planet cool? (carbon dioxide) Given that trees hold carbon dioxide in their bodies, and that carbon dioxide is one of the main things making our planet warmer, what do you think would happen if a whole bunch of trees were cut down, all around the world? What if a lot of trees were planted? Would you guess that more trees are being planted or cut down worldwide right now? The United Nations Billion Tree Campaign website says:

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Plant for the Planet: Billion Tree Campaign – If you want to help keep our planet cool, you can join the United Nations campaign to plant seven billion trees worldwide by the end of 2009? That’s right - 7 billion trees! < find out how your school can take part >

6. In addition to planting new trees, allowing old trees to stay standing as long as possible is an important part of reducing carbon dioxide and keeping our planet cool, as described in recent articles in Discover and Nature:

“Forest scientists have come to a surprising conclusion regarding old growth forests and their majestic, mature trees: They’re not just relaxing in their arboreal old age, but are still actively taking in carbon dioxide from the atmosphere. The new study suggests that protecting old growth forests may be just as important as planting new trees in efforts to reduce carbon dioxide levels and fight global warming.” < full article >

- How old are the trees that live near you?
- What can you do to help keep them alive?
School of the Wild 5

Frenetic and fun, “School of the Wild” will get students out of their chairs and into their imaginations. What would it be like to have a shark for a teacher, or to go to class inside a volcano? The song itself goes wild at the end, with pounding drums, chanting kids, and the sounds of a marsh all intertwined.

Discussion —

1. Listen to the song together. How does it make you feel? What does it make you want to do? What images did you see in your imagination as you listened?
2. What do you think “wild” is? What isn’t wild? How do you know the difference?
3. Where’s the wildest place you’ve ever been? How did you feel when you were there?
4. Are humans wild? Why, or why not?
5. Would going to a “school of the wild” be fun? Scary? What might you learn there? What kinds of things can we learn from wild places and creatures?
6. What would the Earth be like if there were no more wild places on it? How would you feel about this? Why? How does a place go from being wild to not-wild (or not-as-wild)? What’s good about a wild place? What can we do to keep a place wild?

Activities —

1. Divide the class into four groups, and have them research answers to these four questions in the song:
   a. How high does a flea jump in comparison to its height? How does it do this? (find clues here)
   b. The Monarch butterfly travels around 3,000 miles when it migrates from Mexico to North America. How does such a tiny creature find its way over all this distance? (find clues here)
   c. What kinds of things could you learn from a speech given by a rock? (find clues here)
   d. What are five different insects currently living on your school’s block? If you could interview them, what might they have to teach you? (find clues here)

2. Congratulations! You have been enrolled in the school of the wild! Now all you have to do is find your classroom:
   The class on the most efficient water use is held:
   - in a rainforest
   - in a desert

Connections with —

• dance
• geography
• wild animals and their habitats

Objectives —

Students will:
• interact with imaginary (and if possible, real) wild places and creatures
• feel and think about the power of wildness
• gain an appreciation for the wild spaces in themselves and in their surrounding environment

Vocabulary —

**junco**
A small sparrow whose habitat extends throughout the United States, Mexico and Central America. The junco nests on the ground or low in shrubs and trees, and mainly eats insects and seeds.

**mandrill**
The world’s largest species of monkey, a mandrill is a primate which is closely related to a baboon. Mandrills are social creatures which live in the tropical rainforests of southern Nigeria, southern Cameroon, Gabon, Equatorial Guinea, and Congo on the African continent.
The class on basic hygiene (keeping clean) is held:
- in a clear, glacier lake
- in a muddy swamp

The class on how to keep cool is held:
- in the tropics
- in the Arctic

The class on how to keep warm is held:
- in the tropics
- in the Arctic

3. As a class, discuss which places near your school (within 10 miles or so) are wilder than others. Vote on which one you think is the wildest. If possible, go there, and spend an hour or so looking for wild “teachers” together. Back in the classroom, create titles for the different “classes” taught by these wild animals, plants or natural systems. Write a paragraph describing what will be taught in these classes, and what students can expect to learn.

**Vocabulary (Continued) —**

**ozone layer**
A layer in the Earth’s atmosphere which absorbs most of the sun’s ultraviolet light. Ultraviolet can damage life on Earth, so a healthy ozone layer is an important part of a healthy planet.

**scallop**
Found in all of the world’s oceans, a scallop is a mollusk, like an oyster, which a two-part, or bivalve, shell.

**serval**
A medium-sized African wild cat which lives primarily in the savanna.
Riddle 6

Kids love a mystery. The answer to the riddle in this song is never spoken or sung, but students will likely quickly guess it. When they do, you can use it to explore one of the most important elements of life on Earth.

Discussion —

1. Listen to the song together. What do you think the answer to the riddle is? (After they guess, tell them it is water.)
2. What sort of living thing needs a lot of water? What only needs a little bit? Are there any living things that never need any water at all? How much water do you think is in you?
3. How many ways did you use water so far today? (If they say only "at the drinking fountain" or "showering" remind them of things like tooth-brushing, drinking juice or milk, ice cubes, possibly a radiator or boiler, or a hydro-electric dam that may provide power to homes or schools in your area.)
4. If we could gather up all the water on the planet (oceans, rivers, clouds, ice, etc.) into a ball, how big do you think that ball would be compared to the size of the Earth? < find a picture here >
What does this picture tell us? Is water plentiful? Scarce? What happens if part of that water gets polluted?

Activities —

1. There are at least twelve different qualities of water described in the song. In pairs, think of examples for each one. For example:

<table>
<thead>
<tr>
<th>Quality</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>water joins places together</td>
<td>people riding in boats from one town on a river to another</td>
</tr>
<tr>
<td>water has many voices</td>
<td>the ocean makes loud crashing noises, small swooshing noises, and more</td>
</tr>
</tbody>
</table>

2. Play the song again, and have students color to the music. Does the music itself feel watery? What does that look like to you? What sort of water do you imagine when you hear it – an ocean, a river, a creek, a waterfall?
3. If possible, go to a local pond, creek, ditch, puddle, or some other natural water source together. Scoop out some water into a bucket. Bring the water back to the classroom, or if you can, have students bring jeweler’s loops out to the water source. Take turns looking at the water through the jeweler’s loops. What do you see? Bring an aquatic insect guidebook and identify as many species as you can. Did anyone think so many things were living in the water? What do you think these animals eat? What eats them? Do these insects and this water...
GROW IT: If you are lucky enough to find a tardigrade in your water samples, explore the amazing abilities of this animal which survive for years in an almost totally dry state, and when rehydrated, come back to life. It can also withstand being heated or cooled to extreme temperatures, pummeled with X-rays, and squeezed by intense pressure. How does it do this? Learn more, including what this amazing animal has been teaching people about creating vaccines which do not spoil, at this website: <commodity ecology blog>

4. A biomimicry case study to share with your students:

The Namibian Beetle lives in one of the driest deserts in the world, the Namib Desert on the southwest coast of Africa. However, this amazing insect manages to get all the water it needs. How?

Scientists have discovered that the Namibian Beetle collects water from fog using microscopic bumps on its back. The ends of these bumps attract water, while the sides of the bumps repel water. In the morning, the beetle lifts its wings and points the water-loving ends of its bumps into the fog. The water droplets are drawn in like iron shavings toward a magnet. Then, because the sides of the bumps repel water, the droplets slide right down the beetle’s backs and into its thirsty mouth!

Mimicking the Namibian Beetle, humans are now figuring out how to make fog-catching nets for use in deserts, at refugee camps, and even on the tops of skyscrapers. These humble insects are saving humans the cost of energy that would normally have been spent pumping water over long distances, and they are also saving the lives of humans who might not get water at all without these beetle-inspired technologies.

Can you think of more uses for fog-catching nets inspired by the Namibian Beetle? What other ways could we mimic the beetle’s bumps to find and use water? Where might you explore to find other organisms that are good at collecting water? If you could look in a rainforest or a desert, which would you choose? Why?

5. Cut a circle into 10 equal pie-shaped pieces. If the whole pie represents how much an average person weighs, how many slices do you think are from water?

- Human newborns: 7 – 8 slices (about 78 percent)
- Human males: 6 slices (60 percent)
- Human females: 5-6 slices (55 percent)
- Watermelon: 9 slices (90 percent)

(When you think about how life first evolved in the oceans, it’s not too surprising how dependent we still are on water!)

6. Outdoor activity: Go outside with eyedroppers, small containers of water and notebooks. In pairs or small groups, put drops of
water on different plants and keep a record of what happens to the drop on each kind of plant. Does the drop stick to the leaf? Does it form a ball? Does it form a ball and roll off when you blow on it? Ask students to make theories about why the water drops do different things on different kinds of plants. Are the plants that form balls of water on their leaves cleaner than the plants that do not? How do they think insects, like butterflies and dragonflies, keep their wings clean? How about ducks? To help stimulate the conversation, read the following article about how lotus plants keep themselves clean (using just water – no harsh chemicals!) and watch the following good video:

< further reading >
< lotus video >

How could we imitate the lotus plant to help keep ourselves clean? (Manufacturers of paints, fabric finishes, plastic food containers, and glass are mimicking the lotus to create self-cleaning products). What does this have to do with water? What do you think happens to the cleaners and detergents humans use to keep things clean? Where does all that soap go?
This song is based on a quote from Janine Benyus, author of *Biomimicry: Innovation Inspired by Nature*: “successful life forms take care of the places which will take care of their offspring.” Hearing children sing this imperative is a wake-up call for everyone who cares about the future generations.

**Discussion —**

1. Listen to the song together. (You may want to dance!) How does it make you feel? What do the words mean to you?
2. Normally when we think of taking care of children we think of people, like parents, grandparents, teachers, and others. How does a place help take care of children?
3. What are some animals or plants in the place where you live that you really love, enjoy or respect. Who takes care of them? How can you help?
4. What kinds of plants and animals are native to your region? What do those organisms do to help “take care” of your place? What are the elements of a “habitat”? What is your habitat, and what else lives in it besides humans?

**Activities —**

1. This song can be sung as a call and response. Make two rows in the classroom. Have one row sing along with the CD, while the other row repeats each phrase back in an echo. When you get that down, you can try adding hand rhythm, such as patting your legs, clapping your hands, and slapping hands with the person across from you. The Missoula Coyote Choir does it like this: *pat, clap, slap, clap* on beats 1, 2, 3 and 4. If you get off, just remember to pat your legs on the word “take.” Feel free to create your own rhythms!
2. Draw a picture of one person, one animal, and one plant that is doing something to help take care of the place where you live. Then add a picture of yourself doing something new to help.
3. What can your class do to take care of your school’s habitat? Could you create a native plant garden? Pick up garbage in your neighborhood? Paint a mural on a blank or ugly wall? Fix something that’s broken?
4. A hummingbird is a great example of an organism which “takes care of the place that will take care of its children.” As it drinks nectar from flowers, it is pollinating them. This pollination process helps to create the seeds for the next generation of flowers, whose nectar will feed the hummingbird’s babies.

Can you think of any other examples of plants or animals whose life processes benefit the environment that their offspring will live in?
Our kids are asked to handle a lot of information at a young age. What a relief for them to know that they can sit at the knees of their elders and learn from their experience, whether those elders are grandparents, or life forms which have been on Earth much longer than the human species.

Discussion —

1. Listen to the song together. How does it make you feel?
2. Some of the lyrics are, “if we sit at your knee will you tell us a story or two.” What do you think that means in the context of this song?
3. Who is the oldest person you know? The oldest animal? The oldest kind of tree? What can you think of that is even older than that?
4. What is the difference between ‘lifespan’ and ‘species age’? (Lifespan refers to an individual organism’s years of life, while species age refers to how long a species has been on the Earth.)
5. What do you think older people have to offer that’s useful to younger people? What might older species be able to offer that would be helpful to younger species?

Activities —

6. Have students make a calendar with a page for each month. Using the timeline on the next page, have students list and illustrate Earth’s geologic evolutionary activities as compressed into a single year. Point out that everything human beings have ever done has happened in the last second of the last day of the last month of that year. What does that tell us about ourselves as a species?
7. Divide the class into three groups, and have them research the three organisms mentioned in the song: tuatara, tortuga and ginkgo. (Tell them tortuga is Spanish for sea turtle.) They can start by looking them up in our online glossary, but students will find information about these species in library books, encyclopedias, and other websites as well. Have each group present their findings to the class, then discuss together what makes these three life forms special, and what knowledge they might have to share with human beings.
8. Ask each student in the class to name a different life form, and then find out when scientists estimate that this organism first appeared on Earth. Then go out to the playground together and have students draw a long chalk line on the concrete. Then ask them to make 30 evenly divided hash marks on the line. When they are through, tell them that the first mark is 10 million years
Wise Like You 8

Vocabulary (continued) —

tortuga
The Spanish word for sea turtle. Individuals can live to be 80 years old or more, and the species has lived on the Earth for 250 million years. They are able to use a special sensitivity to the planet’s magnetic field in order to navigate through the ocean. All seven species alive today are endangered.

tuatara
A kind of reptile which looks like a lizard and is native to New Zealand. Currently classified as an endangered species, the tuatara has been alive on Earth for 200 million years.

Industrial Revolution (150 years ago)

Fish appear (508 million years ago)
Land plants appear (430 million years ago)
Amphibians appear (350 million years ago)
Mammals appear (246 million years ago)
Birds appear (212 million years ago)
Dinosaur extinction (65 million years ago)
Hominids walk on two limbs (4 million years ago)
Homo sapiens sapiens appears (50,000 years ago)

Earth forms (4.6 billion years ago) Jan. 1, 12:00:01 am
Life appears (3.85 billion years ago) March 1
Photosynthesis evolves (3.5 billion years ago) March 27
Multi-celled organisms appear (1.5 billion years ago) September 2
Fish appear (508 million years ago) Nov. 20
Land plants appear (430 million years ago) Nov. 27
Amphibians appear (350 million years ago) Dec. 4
Mammals appear (246 million years ago) Dec. 11
Birds appear (212 million years ago) Dec. 14
Dinosaur extinction (65 million years ago) Dec. 25 8:14:50 pm
Hominids walk on two limbs (4 million years ago) Dec. 31 4:22:58 pm
Homo sapiens sapiens appears (50,000 years ago) Dec. 31 11:54:17 pm

Industrial Revolution (150 years ago) Dec. 31, 11:59:59 pm

ago. Have them count backwards in time, writing where 50, 100, 150, 200, 250, and 300 million years fall. Then walk back up to the 10-million-year mark. Roughly halfway between that mark and the near end of the line, write “humans.” Then have each student write where their species falls on the timeline. You can do this exercise with paint or markers on paper, and hang the finished result on a long hallway wall.
Our kids are asked to handle a lot of information at a young age. What a relief for them to know that they can sit at the knees of their elders and learn from their experience, whether those elders are grandparents, or life forms which have been on Earth much longer than the human species.

Discussion —

1. Listen to the song together. How does it make you feel? What do you think the story is trying to say?

2. Have you ever noticed how much TV you watch? What do you think you might be doing with that time if you weren't watching TV?

3. Imagine that someone invented a very powerful machine. Whenever you touch it, your body goes motionless and you stop having thoughts; your brain becomes empty and useless. You get older and older while frozen there, but you can't do anything with your life because you can't move. Would you want to touch this machine? How about hold onto it for hours every day? What does this machine remind you of?

4. Why do you think the TV rebellion begins on April 22? (April 22 is Earth Day.)

5. Think about some of the people who you consider to be your role models -- leaders who are actively shaping the world you live in (maybe your parents, teachers, or the President of the United States). Do you think these people watch much television? Explain why you think what you do.

6. If you had just one hour left to live, what would you do with that time? Would you watch television? What if you had just one day to live. How about one year?

7. This song is an imaginary story. Do you think there ever could be a “great TV rebellion”? Why, or why not?

Activities —

1. Act out the “Great TV Rebellion” while the song is playing. Perform it in class or at a school event. Parts can be assigned in the following ways:
   - The Kids – the bulk of the students; they start the song acting like bored, lifeless drones, and end it as energized, active, engaged kids
   - TV – 1-2 students, the can become the TV or hold up a cardboard rectangle representing it
   - Shoppers – 2-4 students who shop in a greedy fashion
   - Britney, Joshua, Maria, Mike – 4 students who stand in superhero style when their names are mentioned
   - Pigeons and squirrels – 4-6 students who run throughout
the crowd, whispering the news into the ears of The Kids

GROW IT: Students could write a short script which leads into the song, or which tells the story of the song in dramatic form, rather than musically.

2. This fictional rebellion has similarities to actual events that have shaped American history, including one of our country’s first rebellions, the Boston Tea Party. Drawing on your knowledge of that event, write an essay describing how the Great TV Rebellion and the Boston Tea Party are alike, and how they are different.

3. At home activity: Watch TV for one hour. Have a stopwatch, a piece of paper, and a pencil ready. Starting precisely at the top of the hour (5:00, 6:00, etc.), start the stop watch when the first commercial comes on, and don’t stop it until the program begins again. Do this for every commercial break. At the end of the hour, add up the total number of minutes spent on commercials. Can you express this as a fraction? As a percentage? If this is the number of minutes spent on commercials in one hour, how many minutes of commercials are likely to be in two hours of TV watching? In four hours? As a class, discuss what these numbers mean. Why do you think TV has so many commercials? What are commercial trying to get us to do? Do you think they work? Why, or why not?

GROW IT: As an alternate/expanded exercise (or for students who don’t have stopwatches): watch TV for one hour with paper and pencil handy. Starting at the top of any hour, write down the time. Then make a note of each commercial that comes on, and what it is for. For instance, you might write, Commercial 1, laundry soap; Commercial 2, car tires; etc. At the end of the hour, note which program(s) aired during the hour, and count up the total number of commercials you recorded. Compare notes with other observers. Do different types of commercials air at different times, or with different programs? Why do you think one commercial airs with a kids’ show, and another airs during the news? Did you know you were watching that many commercials in one hour? Do you have thoughts/feelings about that?
This silly song has a serious message: we humans make too much stuff and throw it away too quickly. Inviting kids to imagine a time when “garbage has gone extinct” will help them grasp how atypical the human propensity for garbage-making is when compared with all other life forms on Earth.

**Discussion**

1. What is garbage? How does something go from being valuable to being garbage?
2. Are there different kinds of garbage? How is a watermelon rind different from a used plastic water bottle?
3. Do other life forms besides humans make garbage? Is it considered garbage to them, or just to us? How is their garbage different from ours?

**Activities**

1. Ask the class to choose a piece of garbage together (from a lunchbox, from their desks, from the floor). What happens to this item after it is thrown into the classroom trash can? What happens after that? And after that? Research together where the item goes, and how long it will remain in its current form.

   **GROW IT:** Take a class field trip to the community recycling center, waste incinerator, or landfill. Take pictures of the process of moving garbage around, and make a display together, showing where the garbage from your classroom ends up.

2. Find a medium-sized cardboard box and tell students it is the new classroom swap box. Decorate it together. Anyone can make a deposit in the swap box, and anyone can make a withdrawal. Ideas for contributions include clothes, school supplies, toys, or any other items that one person has no need for, but another may want to use. Help students think of analogous situations in nature – does a forest have a “swap box”? How about an ocean? What sort of deposits are made, and by what life forms? Who makes withdrawals? Of what?

3. Bring in a box containing a combination of naturally discarded items, such as pine cones, tree leaves, snake skins and animal bones, and items discarded by humans, such as soda cans, Styrofoam cups, bolts and screws, shingles, etc. Each student reaches into the box without looking and pulls out a piece of “garbage,” and then writes down a guess for how long the item will remain intact on the Earth. You can research the answers ahead of time, or help them to research it on the internet. Have them compare their guesses with the data they find (or you...
This silly song has a serious message: we humans make too much stuff and throw it away too quickly. Inviting kids to imagine a time when “garbage has gone extinct” will help them grasp how atypical the human propensity for garbage-making is when compared with all other life forms on Earth.

Provide), and then make a timeline showing when each item will eventually disintegrate.

4. Imagine you are living 500 years in the future, and you are visiting a landfill that closed in 2009. What might you find there? What wouldn’t you find

5. A biomimicry case study to share with your students:

Look around — do you have any carpet tiles in your school? Most likely you do. Carpet tiles are squares of carpet which are laid down like tiles to cover floors. It makes sense to use these small pieces of carpet instead of one gigantic roll in places like schools, where the carpet gets a lot of use. That way, if one area gets worn out, a few tiles can be replaced rather than the whole room.

Sounds good, right? The only problem is, when people tried to replace their worn carpet tiles, the new ones didn’t fit in with the old ones. Since people wanted their carpet to look uniform, they were still ripping up the entire carpet and throwing the whole thing away, rather than just replacing the most worn-out tiles.

How did the designers at Interface Carpets solve this problem? They went for a walk in a forest. By studying the ground beneath the trees, they discovered that the leaves and sticks always looked seamless, no matter how much they moved them around. There were no parts that looked weird or out of place — everything always fit in. Why do you think that is?

The secret to this seamlessness was the relative chaos of the elements on the forest floor. Since there was no single “right” way to make a forest floor, no matter how it was rearranged, it didn’t look “wrong.” So, they went back to the carpet tile factory and started making the tiles completely randomly, so no two were exactly alike. The result? The replacement tiles now look seamless when they are inserted into existing carpets. Customers quickly began to purchase only the tiles they needed to replace, rather than the whole carpet. Even better, Interface is recycling the used carpet tiles as well.

Who would have guessed that a forest could teach us how to make carpet? What other design ideas could we get from a forest that would reduce the amount of garbage humans make? From a prairie? From a desert? From an ocean?

Vocabulary (continued)—

*entée du jour*  
French for “meal of the day.”

*fertilizer*  
Chemicals which help plants grow. Many types of fertilizer come from natural sources, such as decaying plants and animal manure.

*fungi*  
Examples of fungi include yeasts, molds, and mushrooms. Neither plant nor animal, fungi are currently classified in a kingdom of their own. A fungus grows and feeds on dead or decaying organic matter.

*insects*  
The most diverse group of animals on Earth, more than half of all known living organisms are insects. The study of insects is called entomology, which means “cut into sections” in Greek.

Other vocabulary —

< *extinct* >  
< *landfill* >  
< *mammal* >  
< *plagued* >  
< *primordial* >  
< *recycling* >  
< *reptiles* >  
< *throweverythingusaway* >
Thanks

Gratitude feels so good! “Thanks” taps into the sheer delight of noticing and appreciating all the natural wonders around us.

Discussion —

1. Listen to the song together. How does it make you feel? When you thank someone, or they thank you, what kinds of thoughts and feelings are likely to occur?

2. It’s pretty easy to feel thankful when you receive something you want, like a cool birthday present or a smile from a friend. But have you ever received something you didn’t want, and ended up feeling thankful for it? Has something ever challenged you or tested you, and even though it was hard, you felt grateful for it? Tell us about it.

3. What are some things about you that other people are thankful for? Are there things about you that animals or plants might be thankful for?

4. Is there any natural thing in the playground (a tree, a patch of grass, etc.) that everyone in the class is grateful for? Does your appreciation for this thing or area cause you to treat it a certain way? How? If people recognized that they were grateful for other natural things on the planet, how might we treat the Earth differently?

Activities —

1. The first and most important step in being grateful is noticing what we are thankful for. What delights, comforts, pleases and helps us? What challenges us to be our best selves? What are some simple things we experience every day that make our lives more beautiful? Write down as many things as you can think of that you are thankful for in the following subject areas. Do the exercise out-of-doors if possible.
   - At home, I’m thankful for...
   - In school, I’m thankful for...
   - Outside, I’m thankful for...
   - Some people I’m thankful for are...
   - Some animals I’m thankful for are...

2. Make a gratitude graffiti wall. Cover the lower portion of one classroom wall with a piece of butcher paper. Make it big enough that many students have room to work on it at once. Give students markers, crayons, and colored pencils, and have them write and draw anything they are grateful for on the wall. Leave the thank-you wall up for a while, and tell students they can add to it anytime.

Connections with —

- observation skills
- foreign language
- creative writing (emphasis on rhyming)

Objectives —

Students will:
- increase awareness of gratitude and its effects on themselves and others
- exercise their “gratitude muscles” in fun ways
- practice writing within a set form

Vocabulary —

tiny bristles
A small lizard found in warm climates which chirps when interacting with other geckos. Tiny bristles on the gecko’s foot allow them to climb walls and even walk across ceilings, seem to defy gravity. Scientists are mimicking these bristles to make a glue-free yet sticky tape.

geyser
A hot spring that discharges or erupts water. The word “geyser” comes from an Iceland word which means “to gush.”
The kids on the CD say “thank you” in several different languages. Listen carefully and see if you can figure out what those languages are. Do you know how to say thank you in any other languages?

As a class, examine the rhyming pattern of this verse of the song:

Stanza 1
- Thanks for the swoosh (a)
- Thanks for the plunk (B)
- Thanks for the stripes (c)
- On the back of the skunk (B)

Stanza 2
- Thanks for volcanoes (d)
- Thanks for earthquakes (E)
- The motion of the ocean (f)
- And the music that it makes (E)

Using that same rhyming pattern, write a new verse (or a whole new version of the song) describing what you are grateful for in the natural world. You can do it as a class, in small groups, or individually. Be creative and use all your senses! You can express your gratitude for smells, textures, tastes and sounds (like “swoosh” and “plunk”), as well as specific animals, plants, places, memories and experiences. You could even write a verse as if you were a dolphin, a mosquito, a river, or a cloud.

Vocabulary (continued) —

**termite tower, or termite mound**
A nest built by termites to house their colonies. Termites structure their mounds so the temperature inside the nest stays within one degree of 31°C, day and night. The mounds maintain this temperature even when the temperature outside varies between 3°C and 42°C. Buildings in Zimbabwe and Sweden have been built modeled on termite mounds, which have resulted in dramatically lower energy costs than conventional buildings.

**wallaby**
An informal name for a marsupial (a kangaroo-like animal) which lives in Australia and New Zealand.
“Do I Belong Here” is an exploration of experiences of isolation and togetherness. We hear individual children singing about feelings of fear, loneliness and separation, and the whole group joining together to offer a way out of those hard places: “Open your door / Come outside / Take a deep breath / Open your eyes / Every creature, every leaf, every stone / Is singing this, this is your home.”

**Discussion** —

1. Listen to the song with your students. How does it make them feel? Is it possible to feel both happy and sad at the same time?
2. What does it mean to belong? How does it feel when you belong? What about when you feel like you don’t belong?
3. Has someone ever reached out to you and helped you to belong? How did that feel? Have you ever done that for someone else? What did you do? Are there certain places in the world where you feel like you belong? Where are they?
4. Do you think animals fit in on this planet? How so? Do you feel like humans belong on this planet? In what ways yes, and in what ways no? Why do you think that is?

**Activities** —

1. In the classroom or outside, students stand in a circle. Tell the students that you will be calling out a series of questions (ideas listed below). All those who can answer yes to the question should rush to the center and hold hands. When the next question is asked, those in the inner circle need to quickly make room for the newcomers. When everyone has come to the middle, sit down together and talk about how the exercise felt. How did it feel to leave the outer circle and join the inner one? What was the experience of the first ones to leave the outer circle? The last ones? Once the inner circle was established, how did new people get included? What worked? What didn’t? How did it feel when others made space for you and helped you join the circle? If it was hard to break in to the inner circle, how did that feel?

Possible questions:
- Are you wearing anything red?
- Do you have any sisters?
- Do you have any brothers?
- Does a dog live with your family?
- Does a parrot live with your family?
- Are you taller than the person on your right?
- Does your first name start with L, M, N, O or P?
- Do any of the clothes you are wearing today have zippers?
2. Using crayons, markers, colored pencils and/or paint, create a picture of an outdoor place where you belong. It can be a real place, or an imaginary one. Besides you, what lives there (trees, animals, people)? Use different colors to show how you feel when you are there.

   **GROW IT:** Write a poem about this place. Describe how it sounds, how it smells, what activities take place there. Most importantly, describe how you feel. If your place is imaginary, you can describe how you might feel if you could go there.

3. Make a human knot. Ask the students to stand close together in a circle (you may need to make two or three circles of 7 – 10 people each). One brave volunteer begins by saying his/her name, and something he/she is interested in. Another student who shares that interest grabs the first person’s hand, says her/his name, and states another interest, and so forth. As the group of “unattached” students grows smaller, the “knotted” students must work hard to think of something that will cause their remaining friends to latch on. Once everyone is holding hands, the group must work together to untangle themselves **without breaking the chain**. Refrain from offering guidance unless absolutely necessary. When the exercise is over, talk about how it felt to join the knot, and how it felt to watch others join before you. What did it feel like to watch the knot form? Did you want to be part of it? Why, or why not? What was hard about getting untangled? What was fun about it?
Sometimes it’s easy to get overwhelmed by all the work that needs to be done. This song is a reminder that the best place to start is always right where you are, in the place you call home, with whatever challenges it presents. “A journey of a thousand miles begins with a single step.” ~ Confucius

**Discussion —**

1. Listen to the song together. How does it make you feel?
2. Three different types of places are described in the song. What are they? (creek/forest, desert/mesa, city/vacant lot)
3. The song says, “I have a dream of the human family / Living clean and healthy / All nations, all creeds and all races / Learning and loving our places.” What do those words mean to you?
4. Do you ever feel helpless to change things? Do you ever feel too small to make a difference? Do you think others feel that way sometimes too? What can you do to help yourself and others move out of that overwhelmed feeling?

**Activities —**

1. Make a list of all of the things you can think of that are BIG (like a river), and next to each item, write down how that thing starts (e.g., a drop of rain).
2. As a class, come up with as many descriptive words as you can for the place in which you live. Consider things like weather, climate, altitude, longitude and latitude, and population, as well as human history, culture and attitudes. Think of everything you know about the natural history and current state of natural systems, plants and animals in your place. Have every person in the class make a small drawing or painting representing one of these words or ideas. Then glue them onto a strong piece of wood or cardboard, making a mosaic of your home.

   **GROW IT:** You can also use these words and ideas, to write a new verse for this song together, an entirely new song, a poem, a mural, or some other work of art.

3. What can you and your class start doing right now that would make your classroom a better place? Your school? Your town? Your state? Your nation? Your world? Chose something, and do it. Don’t be afraid to start small, like trying to recycle just one type of material (paper, Styrofoam) for a week, or picking up all the garbage on the playground. Then, dream a little bigger if you want.
4. Chose an animal that lives (or used to live) in the natural habit...
of your hometown. Imagine what that animal would ask the humans to do, to make its life easier. Can you implement that wish, even in small ways?

5. At the end of the song, Janine Benyus names a bunch of interesting places:
   - In the fork of a tree
   - On the ocean
   - In a spider web
   - On a lotus leaf
   - On a whale flipper
   - Stuck on a gecko’s toe
   - On the wing of a butterfly
   - Hoppin’ on a beetle’s bumps
   - On the tip of a shark’s tail
   - In the spark from an electric eel
   - Sliding on the scales of a skink
   - Between the fins of a fungi
   - In the cilia of a bacterium

What do you think is special about these places? (Some links to related articles are included to help get you started.)
Raucous and ridiculous, “What Kind of Animal Are You” will get kids thinking about the animals that surround them, as well as the animals they are.

Discussion —
1. Listen to the song together. Sing along with the choruses if you want to. What animal do you think is being described at the end of the song?
2. In your opinion, what are some of the coolest animals on Earth? Why?
3. If you could be any animal you wanted to be, what would you be? Why?

Activities —
1. This song begs for dancing. Make six small groups of students and assign each group to come up with dance moves for a different verse. Then have them teach their moves to the rest of the class. The teacher can create moves for the choruses, or the whole class can create them together. Singing along with the CD or local musicians, perform the completed song for the school.
2. Listen to the song as a class and write down every animal you hear mentioned. Can you answer the three basic questions this song asks about each of these animals?
   1. What kind of animal is this?
   2. What does that animal do?
   3. Where is that animal found?
   4. How does that animal sound?
3. Put pieces of paper in a hat with an animal written on each piece of paper. Make sure there are two pieces of paper for each animal in the hat. Many dugong populations are close to extinction. Students pick an animal from the hat, and then have to find their partner without using words – only sounds and body movements. When they think they’ve found their match, they stand together and wait until the end of the game.
4. Some animal-related biomimicry case studies to share with your students:
   Human beings are learning from and imitating animals every day. Check out these amazing examples:
   - Earthworms can make their own electricity when they move. This tiny negative electrical charge attracts positively-charged water molecules precisely where friction with the soil is greatest, helping to lubricate the worm as it moves. Using this same technique with bulldozer blades has reduced soil resistance by up to 32% over conventional
blades, which saves a lot of energy.

- Kingfishers (a kind of bird) dive into water making almost no sound or splash, which enables them to catch fish better. When engineers in Japan were trying to get the world’s fastest train to be quieter and more energy-efficient, they modeled the front of the train after the kingfisher’s beak. The result? A train that can go 10% faster using 15% less electricity – and make much less noise doing it.

- Spider silk may someday be imitated to create artificial human tendons, ropes, nets, air bags, surgical thread, wear-resistant clothing, and more! Spider silk is very light (a strand of spider silk long enough to circle the earth would weigh less than 16 ounces); very flexible (able to stretch up to 40% of its length without breaking), and strong (is roughly five times stronger as the same weight of steel). What’s even more amazing is that while we make steel and other strong materials using harsh chemicals, extreme heat and intense pressure, spiders do it inside their bodies! Basically, they take dead flies and water, and turn them into super-materials -- all at room temperature.

Read more about spider silk at:
< Science Daily (2003) >
< National Geographic >

As these and other examples show, animals are amazing inventors. They have all kinds of creative solutions to their problems. Can you think of something an animal does that could be imitated by humans to make our lives better? Write a few paragraphs about it, and make illustrations showing how it works.
Biomimicry is a big word, but this song breaks it down and then explores what it means: "Life runs on some basic principles / Deep patterns, deep deep patterns / We can study and follow those rules / Change our tune, sing along to life’s beautiful song."

**Discussion —**
1. Listen to the song together. Do you know now what the word "biomimicry" means? What?
2. What does it mean when the song says "every species that survives fits in here?" What happens to species that don’t “fit in here?" 
3. The song says “teachers surround us.” Who do you think these teachers are? (Encourage them to think about non-human as well as human teachers.)

**Activities —**
1. Ask students to bring some sort of natural object into the classroom (pine cones, rocks, bones). Make pairs. One person is blindfolded, and is handed the other person’s object, which they must feel and describe it to their partner. Then switch. 
   
   **GROW IT:** The non-blindfolded partner writes down the other person’s observations. Then they make theories together about why the objects are the way they are (the teeth are sharp for cutting meat, the stone is smooth and round because water ran over it for a long time, etc.)

2. Have the class stand in a circle. Ask for a volunteer to go first, and then play the song. The volunteer makes motions which the rest of the class has to follow. After 20 or 30 seconds, call out a different student’s name and switch leaders. Do several rounds, then discuss. What is harder to do – lead, or follow? Why? What makes a good leader? What makes a good follower? Do you think human beings have more practice at being leaders or followers in relation to the natural world? What would make us better leaders? Better followers? What special skills do really good imitators have?

3. Spend 20 minutes outside (as a class, at recess, at home, to and from school) looking for non-human things that you could learn from. Choose one thing to be your teacher. Research what this thing (plant, animal, rock, creek, etc.) “knows." Report back to the class on what you learned from your teacher.

4. View/download the following presentation by Torrey McMillan: < “Biomimicry and the Built Environment” >
Sometimes, we humans act like we are alone on the planet—like we are the only species that matters. At other times, we as individuals can feel very lonely and unconnected to those around us. This rap/chant pushes back against both the arrogant and the disempowered forms of isolation.

Discussion —

1. Listen to the song together. How does it make you feel? Can you relate to some of the lyrics? Which ones?

2. The song says: “a baby can’t survive / all by its little self / and neither can a species -- we all need some help.” What do you think that means?

3. How does being alone vs. being with others affect your behavior? What things are you more likely to do when you are alone? Less likely? Do you think human beings, as a species, feel like we are alone on this planet? How do you think this feeling affects our behavior toward the Earth?

4. How are human beings different from other organisms? How are we like other organisms? Are we alone in the problems that we face, or do other species face similar difficulties?

Activities —

1. Make two copies of your class roster, and then cut them up so each student’s name is on a separate piece of paper. Put a complete list in two separate envelopes. Either outside or in an open space indoors, tell students to stand up and remain silent as you randomly give them one name from each envelope. Tell them not to say which names they have drawn, nor give it away with body language. When you say “go,” each person must try to stand an equal distance from both of the others they have been assigned. The group will shuffle around as they try to equalize. Once everyone stops moving, ask one person to move. The whole group will be sent into motion again. When they have settled, have two people move. After a new equilibrium is found, discuss the exercise as a class. Is the community we created just now like anything you know of in the natural world? Did you think the small change of moving one person could make such a big disturbance? What does that tell us about our connection to each other?

GROW IT: After experimenting with moving students around, choose two or three students to leave the room entirely. (At this point, the exercise will probably break down.) Bring the students back in, and discuss. What happened to the group when the students left the room? How did it feel, to them and to the others? Are there parallels to that in nature (i.e., extinction)?

Connections with —
- group dynamics
- community-building
- metaphor

Objectives —
Students will:
- practice coming into and out of community with each other
- explore the concept of metaphor
- gain awareness of the reality of togetherness, and its implications

Vocabulary —
metaphor
A comparison which asserts that two things are the same. Examples include “all the world is a stage” and “life is art.” Metaphors help us make meaning by inviting us to discover what two seemingly unrelated subjects have in common.
2. Define and explain metaphor. Then give students the following words, and ask them to make metaphors that help us understand what these words mean to them. They might do drawings to illustrate their metaphors.

- alone
- together
- mine
- ours
- right
- responsibility

3. If your class is studying natural cycles of any sort, such as food chains, water cycles, jet streams or ocean currents, you might play this song to spark discussion about human participation in those cycles, and why it matters that we pay attention to our impact. (Since we are not alone here, what we do matters – and not just to us.)

4. Write the word “human” on the board and as a class, make a list of all the things that humans must do in order to survive. Then, choose another animal, and make a list of what it must do in order to survive. How different are these lists? How similar are they?
Ask the Planet

Get Out

Get out
get out
get out
get out

Get outside!

© 2007 Amy Martin

Vocals – The Missoula Coyote Choir, Amy Martin
Drums & Percussion - Allison Miller
Bass – Todd Sickafoose
Keys – Julie Wolf
Guitar – Adam Levy
I want to be like a tree
I want to dig down deep in the dirt
Make my home right here on Earth
That’s what I learned from a tree

I want to be like a tree
In the sun and rain, sleet and snow
I give shelter to everyone I know
That’s what I learned from a tree

Hey, look at me!
I’m wild and free, free, free
I’m reaching out, I’m rooted deep
Hey, I’m like a tree

Chorus
I want to be like a tree
Changing colors right before your eyes
I might even photosynthesize
That’s what I learned from a tree

Hey, I’m like a tree
I can learn how to bend, how to sway
‘Cause I know that I’m stronger that way
That’s what I learned from a tree

Chorus
I want to be like a tree
Even after I fall, after I’m gone
The seeds I made will keep living on
That’s what I learned from a tree

© 2007 Amy Martin
*Vocals* – The Missoula Coyote Choir, Amy Martin
*Drums & Percussion* - Allison Miller
*Bass* – Todd Sickafoose
*Keys* – Julie Wolf
*Guitar* – Adam Levy
Ask the Planet

You got a problem?
Are you having doubts?
You got a question that you can’t figure out?
You’ll find an answer
Or two or four
All you got to do is step out your door and

Ask the planet
Pose a question to a posy
Ask the planet
Don’t worry, it won’t think you’re nosey
Ask the planet
Ask the ocean or the prairie
Ask the planet
Something scaly, something hairy
Ask the planet
It’s been here a really long time
Yeah the planet can help you with
Whatever’s on your mind

How do I stay warm in the cold and the snow? (ask a snowshoe hare)
How can I travel over the Gulf of Mexico?
How can I build a house under the sea? (ask an abalone)
How do I get my friends to listen to me?

Ask the planet
Interview an ibex
Ask the planet
Take a lesson from a T-rex
Ask the planet
Ask the tundra or the desert
Ask the planet
Something slimy, something feathered

Ask the planet
It’s been here a really long time
Yeah the planet can help you with
Whatever’s on your mind

I want to stand out
I want to blend in
I want some time alone
I want to make friends
I want everybody to learn how to get along
I want to sing my own special song

Ask the planet
Get a lecture from a lemur
Ask the planet
Get subliminal messages from your femur

Ask the planet
Ask the swampland or savanna
Ask the planet
Maybe something that eats bananas

Ask the planet
It’s been here a really long time
Yeah the planet can help you with
Whatever’s on your mind

© 2007 Amy Martin

Vocals – The Missoula Coyote Choir, Amy Martin
Drums – Allison Miller
Bass – Todd Sickafoose
Keys – Julie Wolf
Guitar – Adam Levy
Trumpet – Tanya Darby
Also featured – elephant
Ask the Planet

Keep Our Cool

Hey there sunshine  
Are you getting warmer?  
Hey there glacier  
You’re melting too soon  
Hey there ocean  
Are you getting higher?  
Oh what can we do  
To keep our cool, cool, cool

Hey there songbird  
We haven’t heard you singing  
Hey there polar bear we’re worried about you  
Hey there penguin  
Is that a warning that you’re bringing?  
Maybe it’s time to choose  
To keep our cool, cool, cool

La la la...

Hey there sister  
Looks like stormy weather  
Hey there brother  
Here’s a hand to hold onto  
And hey everybody  
We can make it together  
But we need to choose  
To keep our cool, cool, cool

La la la...

Hey there future  
We’re singing for your seasons  
Hey there creatures  
We’re singing for you  
Hey there children  
Do we need another reason  
Than our love of you  
To keep our cool, cool, cool

La la la...

Hey there sunshine  
Are you getting warmer?  
Hey there glacier  
You’re melting too soon  
Hey there ocean  
Are you getting higher?  
There’s a lot we can do  
To keep our cool, cool, cool

La la la...

© 2007 Amy Martin  
Vocals – The Missoula Coyote Choir, Brandi Carlile  
Drums – Allison Miller  
Bass – Todd Sickafoose  
Keys – Julie Wolf  
Guitar – Adam Levy
School of the Wild

There’s a school I know that’s kind of crazy
The principal is a chimpanzee
The teachers are turtles and tigers and storks
And some of my buddies have tongues that fork

School of the wild
School of the wild
Everybody’s living in the school of the wild

I never know what clothes to wear
‘Cause sometimes we have class
in the ozone layer
Then it’s into the ocean for gym
with the sharks
And music in the meadow
with the pines and the larks

Chorus

Have you ever asked a flea
how it jumps so high?
Or studied navigation with a butterfly?
Have you listened to a speech
given by a rock?
Or interviewed the insects
living on your block?

Chorus

Sometimes things get a little loud
What with the juncos and the jaguars and the mandrill crowd
So the sea horse and the serval
and the rabbits say hush
You’ll scare us away
if you talk too much

Chorus

Like the birds and the bugs and
the big blue whales
The scallops and slugs and
everything with a tail
Be like them, get educated, child
Spend your days
in the school of the wild

Chorus

© 2007 Amy Martin
Vocals – The Missoula Coyote Choir, Laura Love, Bill Sims Jr.
Drums & Percussion – Allison Miller
Bass – Todd Sickafoose
Keys – Julie Wolf
Guitar – Adam Levy
Also featured – chimpanzee, ape, meadowlark, baboons, elephant, marsh
Riddle 6

Sometimes I disappear right before your eyes
I fall down to the earth and float up to the sky
I can move mountains with enough time
I join places together
I am also a dividing line

What am I? What am I?

I look through your windows
and come into your home
I belong to no one
everyone can call me their own
I sit very still and I run over the ground
I have many voices but I don’t make a sound

What am I? What am I?

I was just born today,
I’m a billion years old
I live where it’s very warm
and where it’s terribly cold
When there is too much of me
I can make things tough
But you won’t last long
if I am not enough

What am I? What am I?

Every single living thing
depends on me
I’m over half of the planet
over half of your body
I know you will ask for me
when the days get hotter
Do you know my name?
Call me by my name
Do you know my name?
I am ___. I am ___. I am ___.

© 2007 Amy Martin
Vocals – Bruce Cockburn
Drums & Percussion – Allison Miller
Bass – Todd Sickafoose
Keys – Julie Wolf
Guitar – Adam Levy
Violin – Jenny Scheinman
Take care of the place that will take care of your children*
Take care, take care.
Take care of the place that will take care of your children

*This line paraphrases Janine Benyus' statement that successful life forms “take care of the places that will take care of their offspring.”

© 2007 Amy Martin
Vocals – The Missoula Coyote Choir
Drums & Percussion – Allison Miller
Violin – Jenny Scheinman
Cello – Marika Hughes
Wise Like You

Grandma, Grandma and Grandpa sing to me
Grandma, Grandma and Grandpa sing to me
I want to know how to grow wise like you

Tuatara
You are a-mazing
You’ve been here for 200 million years
And you can hear without an ear
You’ve got three eyes
If we sit at your knee
will you tell us a story or two?

Chorus

And tortuga
I know you-a been swimming
In our beautiful seas
since dinosaur times
How do you find your way back home
After you roam the globe
If we sit at your knee
will you tell us a story or two?

Chorus

Oh ginkgo
I think you know a secret
One of your trees lives
for one hundred human generations
While our nations fall and rise
you have survived
If we sit at your knee
will you tell us a story or two?

Chorus

© 2007 Amy Martin
Vocals – The Missoula Coyote Choir,
Laura Love, Dar Williams
Drums – Allison Miller
Bass – Todd Sickafoose
Keys – Julie Wolf
Guitar – Adam Levy
Cello – Marika Hughes
Have you heard the story of the day the kids broke free from the evil oppressor known as the TV? Yes, there used to be these boxes inside every home, that melted kids brains and turned them into drones. The kids they were helpless in front of the tube, whatever TV told them they would go do. They never went outside except to go to a store, and no matter how much stuff they bought, they always wanted more. Until the great TV rebellion of 2010, when all the kids turned off their TVs and never turned them on again. They said enough with all this ya-hooey. I’m going out to play. And all the TVs could do was sit there and watch them walk away.

Well most kids were held captive in this TV-induced haze, except a few of the very wildest ones that no TV could tame. There was Britney of the Badlands and Joshua of the Swamp, Maria of the Desert, and Mike of the Vacant Lot. This noble band joined forces with the pigeons and the squirrels and sent a message of revolution to every boy and girl: “From the bondage of the black box let everyone be free. Kids of the world, rise up! And turn off the TV!”

Chorus

It was planned for April 22nd, 4 o’clock in the afternoon. Every kid in the whole world knew exactly what to do. Act normal, just sit there. Like a lump on the couch. But the when the clock strikes four. Run for the door. And turn the TV OFF on the way out. Oh the TVs tried to fight back but they had been unplugged. And all the kids were out in the wilderness with their toes in the mud. They were climbing trees and scraping knees and making secret forts. They were collecting stones and bruising bones and making sculptures of all sorts. They were acting out their own stories singing songs in their own style. After the great TV rebellion Kids went WILD.

Chorus

© 2007 Amy Martin
Vocals – The Missoula Coyote Choir, Ani DiFranco
Drums & Percussion – Allison Miller
Bass – Todd Sickafoose
Accordion – Julie Wolf
Guitar – Adam Levy
Trumpet – Tanya Darby

The Great TV Rebellion

Ask the Planet
Here we sit in primordial stew
Doing what bacteria like to do
Although there are billions and billions of us
You will notice we don’t make a muss, ‘cause

There’s no such thing as garbage
It hasn’t been invented yet
There’s no such thing as trash you stash
and then try to forget
There’s no such thing as garbage
We make what we need and no more
One critter’s waste is another one’s
entrée du jour*

We are mammals and insects
and amphibians
Birds and reptiles and fungi, man
We’ve no need for landfills
or stinky trash cans
‘Cause what one of us can’t use
another one can

There’s no such thing as garbage
We’ve been recycling all of our lives
One species’ junk is another one’s lunch and
then becomes fertilizer
There’s no such thing as garbage
We make what we need and no more
One critter’s waste is another one’s en-
tréee du jour

Oh remember when humans
were terribly plagued
By the syndrome called
“throweverythingusaway”
For a few hundred years there

they just didn’t think
Thank goodness that garbage
has now gone extinct

There’s no such thing as garbage
We learned it just in time
Back when the planet
could hardly stand it
we started to learn this rhyme
There’s no such thing as garbage
We make what we need and no more
One critter’s waste is another one’s
entrée du jour

* This line, the best in the song, was
written by Adam Levy

© 2007 Amy Martin
Vocals – Adam Levy, Allison Miller,
Amy Martin, Bryony Schwan, Janine
Benyus, Julie Wolf, Jon Miller, and
Todd Sickafoose
Drums – Allison Miller
Bass – Todd Sickafoose
Keys – Julie Wolf
Guitar – Adam Levy
Ask the Planet

Thanks

Thanks for the oxygen
Thanks for the frogs
Thanks for the fleas and thanks for the dogs
Thanks for the sunshine
Thanks for the ice
I gotta say the color scheme you’re using here is really nice

Thanks for the butterflies
Thanks for the laughs
Thanks for armadillos and thanks for giraffes
Thanks for the rain
Thanks for the wind
You’re so dang amazing gotta say it again
Thanks!
Yeah thanks!

Thanks for the swoosh
Thanks for the plunk
Thanks for the stripes on the back of the skunk
Thanks for volcanoes
Thanks for earthquakes
The motion of the ocean and the music that it makes

Thanks for the rainbows
Thanks for the stars
Thanks for what we was and thanks for what we are

Thanks for my belly
Thanks for my heart
For giving every living thing a special kind of smarts
Thanks!
Yeah thanks!

Thanks for bacteria
Thanks for the rocks
Thanks for a little black cat with white socks
Thanks for the geysers
Thanks for the bugs
When I look at all the beauty oh my heart just fills with love

Thanks for the continents
Thanks for the poles
Thanks for the mountains and thanks for the moles
Thank you for gravity
Thank you for night
For weasels and wallabies and eagles in flight
Thanks!
Yeah thanks!

Thanks for the buffalo
Thanks for the tick
Thanks for the way that the gecko feet stick
Thanks for the flippers
Thanks for the fins
The paws and the claws the teeth and the chins

Thanks for the puddles
Thanks for the sky

Thanks for the how and thanks for the why
Thanks for the honeybees
Thanks for the flowers
For cow’s milk and spider silk and termite towers
Thanks!
Yeah thanks!
Thanks!

© 2007 Amy Martin
Vocals – The Missoula Coyote Choir, Erin McKeown
Drums & Percussion – Allison Miller
Bass – Todd Sickafoose
Keys – Julie Wolf
Guitar – Adam Levy
Do I belong here?
Where are my friends?
Who is my family?
Am I one of them?
Sometimes I look around
And I feel so alone
Sometimes I can’t find my way home

Open your door
Come outside
Take a deep breath
Open your eyes
Every creature
every leaf, every stone
Is singing this, this is your home

I am listening
I’m trying to see
A path I can walk down
And the lights to guide me
What I need is a stillness
So I can hear an old song
What I need is to know I belong

Chorus

My heart gets heavy
My mind gets tired
Everyone’s so busy
Everything’s so wired
Where can I lay down?

Where can I rest?
Where is my own safe little nest?

Chorus

I know I have gifts to bring
I can feel them growing inside me
But where do I go
To find my place in things
I need a path
and someone to walk beside me

Open your door
Come outside
Take a deep breath
Open your eyes
Every creature, every leaf, every stone
Is singing this, this is our home
This is our home

I know I have gifts to bring
I can feel them growing inside me

© 2007 Amy Martin

Vocals – The Missoula Coyote Choir
Drums & Percussion – Allison Miller
Bass – Todd Sickafoose
Keys – Julie Wolf
Guitar – Adam Levy
Cello – Marika Hughes
Ask the Planet

Start from Here

I know a place
Down by the creek
Where it’s messy and muddy and free
I sit real still
And drink my fill
Of the silence that speaks to me

We can start from here
Through my hands and feet
I can feel the Earth’s heartbeat

I know a place
Down the block
Full of trash and weeds and junk
But a vacant lot
Could be a garden plot
So my friends and me
We’re cleaning it up

Chorus

© 2007 Amy Martin
Vocals – The Missoula Coyote Choir, Amy Martin
Percussion – Allison Miller
Bass – Todd Sickafoose
Keys, Accordion, Bongos – Julie Wolf
Guitar – Adam Levy
Spoken word – Janine Benyus

I have a dream of the human family
Living clean and healthy
All nations, all creeds and all races
Learning and loving our places
What Kind of Animal Are You

Roll up like a hedgehog
Flap your wings and fling yourself into the air
Like a duck or a goose
Go ahead and let loose
Quack quack quack quack, honk

Sharpen your claws like a tiger
Wiggle and squirm
like a worm working hard in the dirt
Shake your fin and your tail
Like a humpback whale

What kind of animal are you?
What does that animal do?
Where is that animal found?
How does that animal sound?

Paddle around like a dugong
Kick the ground like a kiang
What’s a kiang? (I don’t know!)
We can find out though
Galah and galago
The world is full of critters
that you may not have considered

Stick out your tongue like an echidna
Go for a run like a vicuña
en los montañas de Peru

You’ll be a cutie
When you’re an agouti
Listening for the fruit
falling from the forest canopy

Chorus

Do a somersault like an otter
Or take a dive into the water
like an osprey catching fish
Or just hold really still
Like a wapiti will
When it happens to be trying
not to get noticed by a lion

Read a book and play the banjo
Take a look through a telescope
at a distant star
Paint a picture of
something you really love
Throw the ball in the basket
Think of a question and ask it

Chorus

© 2007 Amy Martin
Vocals – The Missoula Coyote Choir, Bill Harley
Drums – Allison Miller
Bass – Todd Sickafoose
Keys – Julie Wolf
Guitar – Adam Levy
Violin – Jenny Scheinman
Also featured – duck, humpback whale, lion, otter
“Bios” means life
“Mimicry” means imitate

It’s our turn
We can learn
Life is all around us

Life runs on some basic principles
Deep patterns
Deep deep patterns
We can study and follow those rules
Change our tune
sing along to life’s beautiful song

If we listen
To their wisdom
Teachers surround us

Chorus

Every species that survives
Fits in here
Hey Homo sapiens
it’s our time
We might be young
but it can be done

Chorus

© 2007 Amy Martin
Vocals – The Missoula Coyote Choir, Amy Martin
Drums – Allison Miller
Bass – Todd Sickafoose
Keys – Julie Wolf
Guitar – Adam Levy
Tuba – Sam Pilafian
We Are Not Alone

Sometimes I get scared
And I need to cry
Problems of the world
Bearing on my mind
Pressure I can’t take
It’s too much for me
What if I make a mistake
or try to fake it and everyone sees

We are not alone

Everyone was born
Of someone before
It’s a fact of life
It’s a metaphor
A baby can’t survive
All by its little self
And neither can a species
We all need some help

We are not alone

I forget to look
I forget to ask
I forget to notice
Because I go so fast
It’s not all up to me
Guidance all around

We are not alone

Just gotta admit what I don’t know
I gotta humble down

We are not alone

It’s a miracle
A gift that we’ve been given
That we’re here at all
Singing breathing living
I can melt the walls
I make in my head
And remember that together is how it is – and how it’s always been

We are not alone

We have an effect
Everything we do
You matter to me
I matter to you
It’s called community
It’s called relationship
That’s why we clean up our mess
and treat each other with respect

We are not alone

© 2007 Amy Martin

Vocals – The Missoula Coyote Choir
Drums & Percussion – Allison Miller
Bass – Todd Sickafoose
**Glossary**

**abalone** – A medium-sized to very large sea snail, whose exceptionally strong shell is made of microscopic tiles stacked like bricks. When something bangs against an abalone shell, these tiles slide back and forth rather than shattering, resulting in a material stronger than ceramics made by humans. Even better, the abalone makes this super-tough material out of calcium carbonate – also known as chalk!

**agouti** – A rodent that inhabits Central America, related to the paca.

**amphibians** – Cold-blooded animals such as frogs, toads, salamanders and newts which start out breathing water and later grow into air-breathing adults. Amphibian populations around the globe are threatened or extinct, and scientists do not agree on the reason.

**bacteria** – Very tiny organisms with just one cell. Bacteria live in every habitat on Earth, including soil, water, radioactive waste, and in your body. The word “bacteria” is plural; the singular form is “bacterium.”

**badlands** – Badlands are dry regions where rocks and soils have been eroded by wind and water. These formations occur around the globe, but some of the most famous are in the United States, such as South Dakota’s Badlands National Park, and in New Zealand’s Putangirua Pinnacles.

**biomimicry** – From bios, meaning life, and mimesis, meaning to imitate A relatively new science which imitates or take creative inspiration from nature to solve human problems sustainably. In her 1997 book, *Biomimicry: Innovation Inspired by Nature*, Janine M. Benyus introduces biomimicry, presents examples, and explains why the field is important now.

**climate** – A description of the temperatures, humidity, rainfall and other weather factors in a certain region over a long period of time (at least 30 years)

**drone** – A person who does tedious work under the direction of others.

**dugong** – A large marine mammal, related to manatees and sea cows, which lives in the oceans of the Indo-Pacific region. Many dugong populations are close to extinction.

**echidna** – Also known as spiny anteaters, the echidna is related to the platypus and lives in New Guinea and Australia.
entree du jour – French for “meal of the day.”

extinct - A species becomes extinct when the last existing member of that species dies. There have been at least five mass extinctions in the history of life on earth, in which many species have disappeared in a relatively short period of geological time. The last mass extinction, which happened around 65 million years ago, wiped out most of the dinosaurs and many other species. According to a 1998 survey of 400 biologists conducted by New York’s American Museum of Natural History, nearly 70 percent believed that they were currently in the early stages of a human-caused mass extinction. Biologist E. O. Wilson estimated in 2002 that if current rates of human destruction continue, one-half of all species of life on earth will be extinct in 100 years.

femur – The thigh bone. It is the longest and strongest bone in the human body, longer than any of the other bones in your limbs.

fertilizer – Chemicals which help plants grow. Many types of fertilizer come from natural sources, such as decaying plants and animal manure.

fungi – Examples of fungi include yeasts, molds, and mushrooms. Neither plant nor animal, fungi are currently classified in a kingdom of their own. A fungus grows and feeds on dead or decaying organic matter.

galah – A common bird in Australia, also known as the rose-breasted cockatoo.

galago – A small African primate, also known as a bush baby.

gecko – A small lizard found in warm climates which chirps when interacting with other geckos. Tiny bristles on the gecko’s foot allow them to climb walls and even walk across ceilings, seem to defy gravity. Scientists are mimicking these bristles to make a glue-free yet sticky tape.

geyser – A hot spring that discharges or erupts water. The word “geyser” comes from an Iceland word which means “to gush.”

ginkgo – A large deciduous tree which can live up to 2,500 years or possibly longer. Ginkgo tree fossils from 270 million years have been found.

glacier – A large river of ice, made out of many compressed layers of snow, moving very slowly. The Sierra Club writes: “The glaciers of Glacier National Park, like glaciers all over the world, are shrinking. Slowly, inch by inch, warming temperatures are melting them away. On any given day, or any given year, the changes are not dramatic. But over decades, the impact rising temperatures have had upon the park is truly awesome. If nothing is done to curb global warming, by the year 2030 Park scientists predict there may not be a single glacier left in Glacier National Park.” {http://www.sierraclub.org/globalwarming/articles/glacier.asp}

Pictures of the receding glaciers of Glacier National Park
{http://www.livescience.com/php/multimedia/imagegallery/igviewer.php?imgid=626&gid=42&index=0}

global warming – The increase in the average measured temperature of the Earth’s near-surface air and oceans since the mid-20th century, and its projected continuation.
**Homo sapiens sapiens**—Latin for “wise human,” this is the species name of human beings. Humans are primates which walk on two legs, use complex tools and language, are extremely social, and feel strong emotions. The over 6.7 billion members of the species currently live on every continent on Earth, including seasonal habitations in An

**ibex**—Any of several species of wild mountain goats, commonly called bouquetin (French) or Steinbock (German), and found in Europe, Asia and Africa. Male ibex have large curved horns.

**insects**—The most diverse group of animals on Earth, more than half of all known living organisms are insects. The study of insects is called entomology, which means “cut into sections” in Greek.

**junco**—A small sparrow whose habitat extends throughout the United States, Mexico and Central America. The junco nests on the ground or low in shrubs and trees, and mainly eats insects and seeds.

**kiang**—Related to the onager, the kiang is a large horse-like mammal that lives on the Tibetan plateau.

**landfill**—Also known as a dump, a landfill is a place where human-generated waste is buried. According to *Scholastic Science World*, close to 100 landfills in the U.S. closed in the year 2000 because they were too full to take more garbage. And, the magazine goes on, “within 50 years, the approximately 2,216 landfills that exist today will reach full capacity.”

**lemur**—A kind of primate found almost exclusively on the island of Madagascar. The word “lemur” is derived from the Latin word *lemures*, meaning "spirits of the night" or "ghosts". Look at a picture to try to guess why. {http://en.wikipedia.org/wiki/Image:Lemurs.jpg}

**lifespan**—The typical length of time that any particular organism can be expected to live.

**mammal**—A vertebrate animal which has sweat glands (including sweat glands modified for milk production), hair, three middle ear bones used for hearing, and a special region in the brain called a neocortex. There are over 5,000 species of mammals, including dolphins, whales, bats, cats, rats, donkeys, cheetahs, camels, pigs, bears, hyenas and humans.

**mandrill**—The world’s largest species of monkey, a mandrill is a primate which is closely related to a baboon. Mandrills are social creatures which live in the tropical rainforests of southern Nigeria, southern Cameroon, Gabon, Equatorial Guinea, and Congo on the African continent.

**metaphor**—A comparison which asserts that two things are the same. Examples include “all the world is a stage” and “life is art.” Metaphors help us make meaning by inviting us to discover what two seemingly unrelated subjects have in common.

**oppressor**—One who keeps down others by severe and unjust use of force.

**osprey**—Found on all continents except Antarctica, the osprey is a large fish-eating bird of prey.
ozone layer — A layer in the Earth’s atmosphere which absorbs most of the sun’s ultraviolet light. Ultraviolet can damage life on Earth, so a healthy ozone layer is an important part of a healthy planet.

photosynthesis — The process plants use to turn sunlight into food. Plants use the sun’s rays to “cook” carbon dioxide and water, which produces oxygen and carbohydrates. Oxygen is a key part of the air that animals breathe, and carbohydrates are the sugars and starches that animals eat. So, without photosynthesis in plants, we couldn’t breathe the air and we’d have nothing to eat!

plagued — To be afflicted with, pestered or annoyed by.

primordial — Happening first in a sequence; part of the earliest stage of development of an organism.

recycling — The processing of used materials into new products. In nature, everything is designed to be reused or to decay, but humans create most of their products without thinking about what will happen to them when they are no longer useful. Many scientists and designers are suggesting that humans begin to manufacture products the way nature does.

reptiles — Cold-blooded animals with scales and no hair or feathers. Examples include crocodiles, caimans, alligators, lizards, snakes, turtles and tuataras.

savanna — A woodland ecosystem in a tropical or subtropical zone which has season rainfall, a variety of grasses, and widely spaced trees.

scallop — Found in all of the world’s oceans, a scallop is a mollusk, like an oyster, which a two-part, or bivalve, shell.

serval — A medium-sized African wild cat which lives primarily in the savanna.

snowshoe hare — A type of hare which turns white in the winter and reddish brown in the summer. Its big back feet help keep it from sinking into the snow in winter — like snowshoes.

subliminal message — Derived from the Latin words sub, meaning under, and limen, meaning threshold, subliminal messages are received under the threshold of your normal perception. For instance, an advertisement showing smiling people eating a certain kind of food sends a message that eating this food will make you happy, even though that idea is never stated directly. For extra credit, find the “subliminal message” in this line of the song. Hint — it’s a pun, and there’s a clue in the definition for “femur.”

termite tower, or termite mound — A nest built by termites to house their colonies. Termites structure their mounds so the temperature inside the nest stays within one degree of 31°C, day and night. The mounds maintain this temperature even when the temperature outside varies between 3°C and 42°C. Buildings in Zimbabwe and Sweden have been built modeled on termite mounds, which have resulted in dramatically lower energy costs than conventional buildings.

throweverythingusaway — A word made up for this song to describe the current human “disease” of making products that are used for a very short time, and sit around cluttering up the planet for a very long time.
**tortuga** – The Spanish word for sea turtle. Individuals can live to be 80 years old or more, and the species has lived on the Earth for 250 million years. They are able to use a special sensitivity to the planet’s magnetic field in order to navigate through the ocean. All seven species alive today are endangered.

**tuatara** – A kind of reptile which looks like a lizard and is native to New Zealand. Currently classified as an endangered species, the tuatara has been alive on Earth for 200 million years.

**tundra** – A cold region with short growing seasons in which the only vegetation is dwarf shrubs, sedges, grasses, mosses and lichens. The two types of tundra are Arctic tundra (which occurs at both poles) and alpine tundra (which occurs in high altitudes).

**vicuna** – A relative of the llama and the alpaca, vicuñas live in South America and produce small amounts of extremely fine wool.

**wallaby** – An informal name for a marsupial (a kangaroo-like animal) which lives in Australia and New Zealand.

**wapiti** – A sub-species of elk which lives in Siberia, China and North Korea.

**weather** – A measurement of all the atmospheric conditions occurring in a certain place at a certain time. We use weather to describe what’s happening in the atmosphere right now, and climate to describe what happens over time.