Concept Paths

Concept Paths

All right! Today, you are going to take part in a class called "Concept Paths". How many of you can keep a secret? Good, because today we are going to teach you about the "Seven Secrets of Life". However, before we can teach you about the "Seven Secrets of Life", you need to first know about the "Six Needs of Life". These "Needs" represent all of the parts of our ecosystem that work together to provide for the wonderful diversity of living things. They are:

Sun -	Represented by the yellow bead.	Soil -	Represented by the brown bead.
Air -	Represented by the light blue bead.	Plants -	Represented by the green bead.
Water -	Represented by the dark blue bead.	Animals -	Represented by the red bead.

Now, there are "Seven Secrets of Life" that work to bind together the "Six Needs of Life". These are concepts or ideas that teach how all things on earth work together to bring about life. The best way to remember the "Seven Secrets of Life" is through a simple cadence call. (Just for you, Bill.) ☺ It's a simple call, and if you have the students repeat after you, it is a great way to reinforce the central concepts. The "Seven Secrets of Life" are:

E	***Energy Flow***	***Cadence Call:***
C	***Cycles***	EC-DC-IC-A
D	***Diversity***	This is what we're here to learn today.
C	***Change***	Energy Flow – Cycles – Diversity and Change
I	***Interrelationships***	Interrelationship – Communities – Adaptations, aren't they great?
C	***Communities***	Put it all together and what does it say?
A	***Adaptations***	EC-DC-IC-A

All right, let's hit the path!

Teaching Tips:

1. It takes about four hours to do all of the activities below with a gifted and talented group. Since most of your average school groups are not on that level, pick and choose your activities. For example, I think the game of "Root Seller" for "Diversity" is terrible, and so I never play it. (By the way, I will pay a $20.00 reward for anyone who can come up with a game that teaches Diversity in a fun way and that I enjoy!) I simply explain Diversity to the students and make time for the more entertaining games.
2. Many of the concepts build off of each other. If you take the time walking between activity areas reviewing the information that you have covered or chanting the cadence, it will improve your students' retention and allow you to cover information more rapidly.
3. Although many of the Concept Paths have "props" to help you teach the idea, most are unnecessary. If you want to lead "Community Graveyard", but someone is already there, simply step off the path and begin to teach. It will speed you up in your teaching!
4. Fill in your journals as you go, rather than trying to fill in the pages at the end! Believe me, it will make your life easier and your students happier!
5. Marker boards are worth more than their weight in gold! Use your liberally to describe concepts, help provide illustrations and drawings, spell words, etc.

Energy Flow

Key Concepts:
1. The sun is the source of energy for most living things.
2. The second step in most food chains is a ***green plant***.
3. The impact of change on food chains and pyramids.

Activity: Mr. Sun's Restaurant (Round One)
Location: Pavilion
Props: Food Pyramid Discs

Have the students sit down in a semicircle, facing toward the A-Field. Ask if the students know what a "food pyramid" is. For most students, the answer will be "three servings of bread, two servings of dairy, etc." Explain to them that a food pyramid can mean something else, as well.

To begin with, we have to discuss what a pyramid would look like if it were run over with a bulldozer. (A triangle.) At the top of a triangle, is there a lot of room for stuff or little? (Little.) How about the bottom of the triangle? (Lots.) So, in this activity, if we have a lot of something, where does it go? (Bottom.) If we have a little of something, were does it go? (Top.)

Show the students the discs and name the different types. We should have:

Warn the students to beware of unidentified flying objects (UFO's) and then throw them like Frisbees, scattering them across the A-Field and surrounding area. Tell them you are going to time them to see how quickly they can go out, collect all of the discs and assemble the pyramid in the proper shape. Ready? Go!

Questions:

1. Why does this pyramid have an odd shape? (It takes a lot of algae to feed the Water Insects. It takes a lot of Water Insects to feed one minnow. In other words, it is not exactly a one-to-one ratio.) Why do you suppose that it takes so many of the smaller items to feed the larger ones? (Because energy is lost at each step along the way.)
2. What is the bottom row on this food pyramid? (Algae.) Should there be a row below it? (Yes, the sun.) Why? (That is what the algae "eats".) The sun is the source of energy for most of life on earth.
3. What always has to be the second step in a food pyramid that uses the sun? (Green plants.) Why? (They are the only thing that can take in the sun's energy and convert it into food that can then be used by other animals.)
4. What would happen if the bear died out and this food pyramid could not change? (Trout would overpopulate, destroy the minnows and the entire food chain would collapse.) What if a poison killed off half of the algae? (The water insects would eat the rest of the algae, and the entire food chain would collapse.)

Energy Flow

Key Concepts:
1. The sun is the source of energy for most living things.
2. The second step in most food chains is a ***green plant***.
3. The relationship of plants and animals within a food chain.

Activity: Mr. Sun's Restaurant (Round Two)
Location: Pavilion
Props: Food Chain Cards

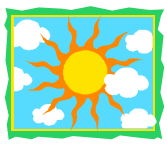
Have the students line up by alphabetical order. Randomly shuffle the food chain cards and begin to pass them out to the students. Students are not allowed to look at their card; they must simply slap it up to their forehead, picture facing out, without looking. Make sure that you have one card of each type on a forehead; if not, swap a card with a student.

Now, the rules to this activity are very simple:

1. You cannot tell anyone what they are.
2. You cannot tell anyone what they are.
3. You cannot tell anyone what they are.

You must now line up, in order of a food chain. You can make statements like, "Okay, you need to move over here. You need to go there." You cannot say, "You are a duck. You need to be over here." As soon as one person says what someone else is, I will stop timing and your chance for fame and glory is done. The current record for lining fifteen children up in the correct order is only 45 seconds. This is actually a pathetic time, however most groups will have someone that says what a person is. Go figure…

As soon as they think they are lined up in the correct order, they are to take the signs off their forehead, in order, and announce what they are to the group. Did they get the order right? More importantly (from a teambuilding/rule-following perspective), did anyone say what someone else was? The correct order, by the way, is:


Sun


Grass


Grasshopper


Frog


Snake


Hawk

Questions:
1. What is the first step to most food chains? (The sun.) Why? (It gives energy.)
2. What do we call something that can take in the sun's energy and convert it into food? (Producer.) Give me an example of a Producer. (Take a list from the students. Stress the concept that it must be a green plant!)
3. What do we call something that has to eat other things to live? (Consumer.) What are the Consumers in our food chain?

Energy Flow

Key Concepts:
1. The sun is the source of energy for most living things.
2. Energy is lost at each level of a food chain.
3. Shorter food chains lose less energy.

Activity: Chain Gang
Location: Trail Building
Props: #10 Tin Cans / Rubbermaid Container

Have the students divide up into two teams. I usually do this as a "boys verses girls" competition, simply because that is the way most groups at a 5th grade (give or take) level automatically will divide themselves out. If you do boys verses girls, have the boys take the longer food chain, this way they are almost guaranteed to lose… ☺

Have one team select "champions" while the other group only has to select three. Set out the coffee cans, in order of their respective food chains, approximately 10 feet apart, and have the champions stand by their can. The coffee cans should be in the following order:

Row One =	Sun	Soybeans	Human (Soy burger)	
Row Two =	Sun	Grass	Cow	Human (Hamburger)

When you yell "start", the person holding the "Sun" bucket runs up to the Rubbermaid container and fills their can with water. The "Sun" then runs to the "Soybeans/Grass" people and pours the water into their buckets. While the "Soybeans/Grass" runs to dump the water into the next link of the chain (either the "Soy Burger" or the "Cow"), the "Sun" runs back up to the water supply for more water. The first line to fill its final bucket wins!

Note: Nobody but the Sun can get water out of the bucket. Make sure you don't let the other buckets move closer to the water supply, otherwise students run into each other and mass chaos and pandemonium break loose.

Questions:
1. Who won? (Soy burger.) Why? (Less steps in the chain, so less energy is lost.)
2. What did the water represent in this activity? (Energy.) What happened to most of the "energy" the sun sent out? (It was lost.) How about most of the energy the green plants received? (It was lost.) Do you see a pattern? (The longer and more complicated the food chain, the more energy that is lost along the way.)

Cycles

Key Concepts:
1. The building materials of life must be used over and over again.
2. Evaporation, condensation, precipitation, infiltration. (Water Cycle.)

Activity: Sun's Bucket Brigade
Location: N/A
Props: Earth filter, buckets and mirrors

Explain to the students that they are about to become the sun and do its work (it's a bright future). Hand each student a bucket.

Questions (Round One):
1. What happens when it's sunny? (It gets hot.) What happens to water in a lake, stream, etc. on a hot, sunny day? (It evaporates - turns into water vapor, droplets too tiny to see with the naked eye, and travels upward to the sky.)
2. What happens if you get a lot of water droplets together in the sky? (It condenses - forms into larger water droplets that are visible, these appear as clouds.)
3. What happens next? (Precipitation - It rains, snows, etc.)
4. Can water droplets carry much "chunky stuff" into the sky with them? (No.) So, if it doesn't get polluted in the air, should the rain be clean? (Yes. This is one of nature's ways of cleaning water. The other one is about to be shown...)

Breathe on a mirror to show how tiny droplets of water vapor in your breath can condense to become a visible "cloud". Have the students run down to the waterfront (or, in our case, a much closer source of water like a garden hose) and fill their buckets. As they run back up the hill, occasionally throw dirt into the buckets. The students then empty their buckets into the earth filter. Keep doing this until everyone has had a chance to carry a bucket of water.

Questions (Round Two):
1. What was I trying to demonstrate by throwing dirt into your buckets? (Air pollution.)
2. So rain and snow aren't pure water? (No.) So how can we get pure water in nature? (By getting it from underground.)

The earth has four layers that concern us for this class. They are:

Duff
(dead organic material)

Soil

Sand

Rocks

Yes, on the Simpson's, Duff Beer would be beer made from formerly living organic material. When water filters down through all of these levels, it becomes purified. The "chunky stuff" is filtered out as it passes through the layers until we are left with clean water. (Demonstrate this by pouring the buckets of dirty water through the filter.)

Cycles

Key Concepts:
1. The building materials of life must be used over and over again.
2. Producers, Consumers and Decomposers. (Soil Cycle.)

Activity: Community Graveyard
Location: Behind Team Wall in Low Ropes Course
Props: Gravestones and eulogies

Have the students assemble behind a line and listen. Stress that this is a "serious" moment (yeah, right). Hand out the eulogies. Have students read the description of the plant or animal. Feel free to discuss how closely you knew each, despite the fact that knowing either of the trees makes you about 96 years old! (Usually, some of the students will catch on.) After each eulogy, say the phrase, "D.I.P [insert plant or animal name here]."

Students will ask what “D.I.P.” means, but don't tell them until the end. When you are done, ask them if they've figured out what D.I.P. stands for. You will get all sorts of answers. Encourage them and direct them toward the proper word, but I usually don't just tell them outright. I think it's better for them to use the word. Then, explain to them that all of the plants and animals are decomposing! They are turning back into soil! These are all fake, of course, because who in their right mind would bury a tree?)

Bob Beech Tree (1851-1965)
Bob Beech was the biggest and best beech tree in the entire forest. Many animals would take shelter in his branches. In his lifetime, he provided shade for all of the forest creatures, and made a lot of oxygen so that the air would be more breathable for those around him. He did not survive the tornado of 1965. D.I.P. Bob.

Susie Squirrel (1985-1990)
Susie was a playful squirrel. She would run and play through the tree branches. Her favorite game was tag. Susie was also very good at collecting and storing food for the winter. It was because she buried acorns and other nuts for food, that a lot of trees could be planted. She taught her children how to be very good squirrels too. She will be missed. D.I.P. Susie.

Pandora Pine (1955-2002)
Pandora was a dear tree. She was very tall and provided homes for many of the creatures in the forest. In her younger days, she and Bob were very good friends. She survived the tornado of 1965 and provided food and shelter for the animals in the tough times that followed the tornado. She would still be around today if she hadn’t been cut down for firewood. D.I.P. Pandora.

Frank Frog (1982-1984)
Frank was the best insect-catcher in the forest. Why, in one day he would eat over 100 mosquitoes! And at night, you could hear his songs from a long ways off. He was a very large frog, and could jump a long ways. He was a very good frog. D.I.P. Frank.

Diversity

Key Concepts:
1. Differences in living things provide for the success of all life.
2. Biological diversity in an ecosystem can help life survive, even during dramatic climatic changes.
3. Diversity within a species allows plants and animals to survive in a wide range of habitats.

Activity: Root Seller
Location: N/A
Props: Water can, sponges, etc. (Make sure you bring your own water!)

Have each of the students stand on a board. Hand each a sponge, except for the student standing on the "special" block (the one with water under it) who gets a sponge and a coat hanger. Explain that you are the rain, and that each student is a different type of plant. Explain that certain plants have surface roots (shallow roots that collect rainwater) and that others have taproots (roots that reach down for groundwater). Their goal is to survive, and to do so they must be able to ring water out of their sponges (you set the amount).

Be generous the first few rounds, but gradually hand out less and less water. Leave the "tap root" person until the end (with two or three others, just to make it interesting). The final round, do not give anyone any water. All will die, except for the taproot that can step off their board, kick it off to the side, and reach down with the coat hanger and bring up water down below. (The lack of rain symbolizes a drought, by the way.)

Because of the diversity of plants and animals, we are better able to live, despite what happens around us.

Note: This activity leads students to believe that the root structure of plants is the only example of diversity. I prefer to talk about Chihuahuas versus St. Bernards. Chihuahuas can survive in warm weather while St. Bernards are better suited to the cold. Feel free to throw out any other examples of diversity that come readily to mind. ☺

Questions:
1. There is a disease called “oak wilt” which kills oak trees. If it came to our forest, would all the trees die? (No. They aren't all oak.)
2. Dutch elm disease kills elm trees. What if both Dutch elm and oak wilt came to our forest. It would all die then, right? (No. We have other types of trees!)
3. What about disease? Do you think we'll all die someday from some killer virus? (No. The most lethal diseases are estimated to be able to kill only 99.9% of the population.) Why not? (Because sooner or later, it encounters someone who is immune. We are all different!)
4. If you were outside for over an hour in -20-ºF temperature could you survive? (Probably not.) Could an Eskimo? (In some places, they would probably think it was warm.) How about in the middle of the Sahara? (No. But the Bedouins do it all the time.) Diversity in humans allows us all to be able to survive, no matter how much the earth may change.

Change

Key Concepts:
1. Everything is becoming something else.
2. The four "layers" of the earth.
3. Erosion and its impact on the ecosystem.

Activity: Soil Sinks
Location: Anywhere
Props: Four buckets with soil layers in them, bags, rubber mallets (optional)

Have the students gather around and try to guess what the four layers of soil are. (Duff (leaves, sticks and twigs), soil, sand and rock.) There are two ways to make soil:

Duff + Decomposer + Time = Soil
or... Rock (Ground to form sand) + Water + Nutrients = Soil

For our purposes, the first one is the most important. Stress that when the duff is decomposed, we create soil.

Fun Fact: The second layer of the earth is "soil", not "dirt". Dirt is misplaced soil. I usually pick up a handful of soil and rub it on my clothes; it is now dirt. If it is on the ground, it is still soil! The students need to appreciate the difference.

Hand out one bag and mallet to each student. Tell them that here and now, they get to make soil. Have them fill their bags with duff. Make sure they do not cheat by adding soil! When they have enough (whatever that is), have them close the bags as best they can, move far apart so they do not kill each other, and begin pounding. I usually allow one-to-five minutes for them to go ballistic on the bags. Feel free to walk around and tease them about how your 103-year old grandmother in a wheelchair can hit harder than they do.

After a short time, have them come to you one by one and empty their bags. Did they make soil? (No.) Why not? (They only broke it into smaller pieces.) What was missing? (A decomposer!) They only took some time off what it would take to decompose it naturally. Have them name some decomposers. (Mushrooms, bacteria, etc.)

Questions:
1. After they have filled out the journal entries, have them walk to the edge of the bluff. Point out the exposed tree roots (not to mention the exceptionally large hole in the ground). Are tree roots normally uncovered? (No.) What's happening? (Erosion.)
2. At the bottom of the ravine, what do we have lining the shore? (Sand.) Do plants grow well in sand? (No.) So erosion takes away... (soil) ... and leaves ... (sand). In other words, we need to control erosion.
3. One final fun fact: How long does it take to make one inch of topsoil? (1,000 years.)

Interrelationships

Key Concepts:
1. All living things interact with other things in their surroundings.
2. Biotic and Abiotic factors in an ecosystem.
3. Producers, Consumers, Decomposers

Activity: Web of Life
Location: Anywhere
Props: Ball of twine, biotic cards

Hand out cards to each student, making sure that the "Sun, air, water, and soil" card is one of the cards being distributed. Ask students where a food chain should start. (Sun, air, water, and soil.) O.k., now what "eats" the sun, air, water and soil? (Green plants.) So, starting with the SAWS card, have them hand onto the end of the rope and toss the ball to a green plant.

Now, what eats green plants? (An animal or insect.) O.k. Now, throw the ball from the plant to an animal or insect. Make sure they always hold onto part of it so that it forms a giant web ("Web of Life", get it?). Once a card has been mentioned, do not let the group throw it to that card again. If it is a small group, feel free to hand out two or more cards per person.

Warning: you may have to stretch things to make it come out so that all the cards are used (i.e. bears probably don't usually eat hawks, but if that's what you have left, they do...)

At this point, every card has been used. Ask what would happen then if one of the parts of the web died. (Whatever ate it dies. Whatever it ate overpopulates and kills off whatever it's connected to before dying off.) Go through the web, step by step, and disassemble it until all that's left is the sun, air, water, and soil. Everything needs each other to survive; if one species is lost and the plants and animals can't adapt to the loss, the whole thing falls apart.

Questions:

1. In any ecosystem, there are two types of things: biotic and abiotic factors. To begin with, there are biotic factors. Does anyone know what a "biotic factor" is? To give you a hint, can you think of a high school class that sounds something like bio-tic? (Biology.) Biology is a science; does anyone know what it studies? (Living things.) Name some biotic factors in the ecosystems around you. (Trees, birds, humans, fish, squirrels, etc.)
2. Okay, if "biotic factors" are living things in an ecosystem, what do you suppose "abiotic factors" are? (Non-living things. By the way, it is "non-living" as opposed to "dead". The sun has never been "living".) There are four primary abiotic factors: sun, air, water and soil.
3. This web began with the sun, air, water and soil. From there, it went to what? (A green plant.) Why green plants? (Because they can produce food from the abiotic factors.) What do we call animals that need to eat other things to survive? (Consumers.) What do we call things that break dead material back down into soil? (Decomposers.)

Interrelationships

Key Concepts:
1. All living things interact with other things in their surroundings.
2. Producers, Consumers, Decomposers
3. Mutualism, Commensalism, Parasitism, Predator-Prey

Activity: Guess Who's Coming To Dinner
Location: Anywhere
Props: Bell (on string), blindfold, mouse ears and tail

Select one volunteer to stand up and try to guess what animal you are thinking of. (A mouse.) When they get it right, turn them away from you, and have them begin to name what a mouse has to help it to survive. (Good hearing, natural camouflage, fast running, stores food, etc.) Show the mouse the clearing that they must stand in during the game, have them put on the tail and ears and then turn to face the rest of the group.

Have them try to guess an animal that might prey on mice. (Wolves. A stretch, I know, but wolves are tremendously adapted animals and tie in well with our later discussions.) As soon as they get it, ask them what adaptations do wolves have? (Keen smell, natural camouflage, stealthy and silent, sharp teeth and claws, and, most importantly, they hunt in packs!)

The rules to the game are as follows:

1. The mouse covers their eyes, counts to ten, uncovers their eyes and shouts "Go!"
2. The mouse is never allowed to leave the clearing. He/she stands there and turns around. If they see anyone, they are to call out the name of the person or, if they aren't sure who it is, they can describe the clothes the person is wearing. If the mouse sees someone it "gets away" and the wolf comes back, sits down and misses a meal!
3. One wolf must ring a bell before any wolf can tag the mouse.
4. No wolf may START in the clearing.

If the mouse is tagged, the wolves win. If the mouse catches all the wolves, then the mouse wins, and the wolves go hungry for the night.

Select a new mouse, have a meeting with the wolves to talk about how wolves hunt (in packs) and can they catch the mouse if they just lay there and hide (no), and then start again. Continue doing this, prodding the wolves until such time as they figure out that if all of them stand just outside the clearing and wait until the game begins, one person rings a bell, and all the wolves charge in at the same time, then they will win!

Questions:
1. What type of a relationship does the wolf have with the mouse? (Predator-Prey.) Who is the predator in this game? (Wolf.) Who is the prey? (Mouse.)
2. When we talk about relationships, we are talking about how living things interact with one another. There are four main types of interrelationships:

Mutualism - Two organisms help each other to survive.

Commensalism - One organism benefits, the other organisms are neither helped nor harmed.

Parasitism - An organism depends upon another organism for its survival. This relationship harms the host.

Predator-Prey - One organism kills another organism for food.

3. Who benefits in the predator-prey relationship of the game we just played? (The wolf.) How? (It gets food.) Who is hurt in the relationship? (The mouse.) Why? (It becomes snarfage.) In what way does the wolf depend on the mouse? (For food.) Does the mouse depend on the wolf? (YES! Without something feeding on mice, they would overpopulate and end up starving to death. Without one, the other dies.)

Note: This can also cross over into adaptations. One lone wolf struggled with bringing down a deer. One day, when it was chasing a deer, his brother-in-law Fred came to help. Well, before you knew it, the whole wolf family was there, brought down the deer, and had a tasty venison dinner. As they sat and munched, they decided that maybe this would be a great way to continue to get food. So, they adapted to hunting in packs. This learned adaptation makes the wolf one of the deadliest land predators there is.

Random Facts:

1. Scientists question whether "commensalism" is a legitimate interrelationship. The argument is that, on some level, this relationship either helps or harms the other living organism. For example, a raccoon eating our trash may not help us, but by spreading the garbage it may be contributing to our exposure to bacteria, thereby harming us. The topic is, as best I know, still being debated.

2. What is the fundamental difference between predator-prey and parasite? In predator-prey, the predator intends to kill the prey and eat it for food. In parasitic relationships, the parasite does not want to kill the host (although that may be a consequence), but rather would like to keep it alive so it can continue to feed. This precept is wrapped up in the lovely phrase:

"Predators kill. Parasites suck!"

3. Parasites that are too efficient at feeding off the host usually end up killing themselves. Although viruses are not technically classified as a parasite, their actions tend to be parasitic in nature. Ironically, the most efficient, lethal viruses can often destroy themselves because the host dies before the virus has a chance to spread the infection.

4. What is the considered one of the top oceanic predators? (Great White Shark.) What is considered one of the top land predators? (Wolves. Their ability to hunt in packs makes them extremely lethal.) But can you name the top predator for most food chains on planet earth? (Humans.) True, we are occasionally munched by other predators, but we have the ability to catch, kill and eat most things on planet earth.

Interrelationships

Mutualism - Two organisms help each other to survive.

Bee / Flower	Mutualism	The bee gets pollen (protein) and nectar (for making honey) and the flower is able to reproduce.
Squirrel / Oak Tree	Mutualism	Squirrels get acorns for food and then bury them. However, squirrels don't remember where they bury all of the acorns, so new oak trees are "planted" by squirrels.
Rhinoceros / Tick Bird	Mutualism	Tick birds get to eat the insects off the rhino (walking buffet), and the rhino benefits from having less bugs on it, and the tick bird has better eyesight and can warn the rhino or approaching danger by shuffling its feet.
Yucca Plant / Yucca Moth	Mutualism	Yucca flowers are pollinated by yucca moths. The moths lay their eggs in the flowers where the larvae hatch and eat some of the developing seeds.
Honey Guide Bird / Badger	Mutualism	Honey Guide birds alert and direct badgers to bee hives. The badgers then expose the hives and feed on the honey first. Then, the Honey Guide birds eat. Both species benefit.
Ostrich / Gazelle	Mutualism	Ostriches and gazelles feed next to each other. They both watch for predators and alert each other to the danger. Since the visual abilities of the two species are different, they each can identify threats the other animal would not easily see.

Commensalism - One organism benefits, the other organisms are neither helped nor harmed.

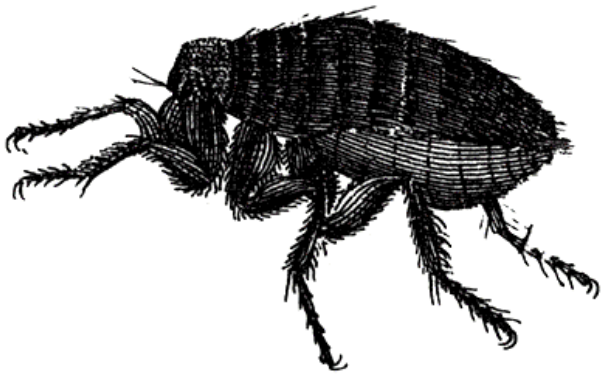
Raccoon / Human	Commensalism	Raccoons eat our garbage. They benefit from having humans around, but this neither helps nor harms us.
Bird / Tree	Commensalism	Birds use trees for their homes. A tree does not benefit and is not harmed by having birds living in its branches.
Barnacle / Whale	Commensalism	Barnacles create home sites by attaching themselves to whales. This neither harms nor benefits the whales
Remora / Shark	Commensalism	Remoras attach themselves to a shark's body. They then travel with the shark and feed on the leftover food scraps from the shark's meals.
Bee / Marabou Stork	Commensalism	The stork uses its saw-like bill to cut up dead animals for food. As a result, the dead animal carcass is accessible to some bees for food and egg laying.
Silverfish / Army Ants	Commensalism	Silverfish live and hunt with army ants. They share the prey. They neither help nor harm the ants.
Hermit Crab / Snail Shell	Commensalism	Hermit crabs live in shells made and then abandoned by snails. This neither harms nor benefits the snails.
Cowbird / Buffalo	Commensalism	As buffalos walk through the grass, insects become active and are seen and eaten by the cowbirds. This neither harms nor benefits the buffalos.

Parasitism - An organism depends upon another organism for its survival. This relationship harms the host.

Mistletoe / Spruce Tree	Parasitism	Mistletoe extracts water and nutrients from the spruce tree. This harms the tree.
Cuckoo / Warbler	Parasitism	A cuckoo lays its eggs in a warbler's nest. The cuckoo's young will displace the warbler's young and be raised by the warbler.

<u>And now, the big list...</u>

Deer Fly
Deer Tick
Flat Worm
Flea
Flukes
Heart Worms
Horse Fly
Lice
Mosquito
Ringworm (Fungal parasite)
Round Worm
Tape Worm
Threadworm
Viruses (Rabies, Herpes, etc.)
Wood Tick



Predators - One organism kills another organism for food.

Lion
Spider
Frog
Human (top predator)
Wolf
Shark
Etc.

Communities

Key Concepts:
1. Plants and animals live together in areas that meet their special needs.
2. Roles of plants and animals within an ecosystem.
3. Human impact on ecosystems.

Activity: On The Street Where You Live
Location: By Communities sign (not yet available)
Props: Communities sign, road signs

Read the front of the Communities Sign and ask the students to tell you what is wrong with it:

"Coming soon to this unimproved acreage, the utmost in modern housing. New homes to be built on this undeveloped and unused land."

There are three wrong words here. What are they? (Undeveloped, unimproved, and unused.) Who or what uses this place? (Plants and animals.)

Read through the job descriptions in the journals. Have the students wander around, staying within sight of a red street sign. They are to find examples of the different jobs listed in the journals; filling in the information in the blanks provided. However, they cannot use the same organism for two different jobs, nor can they use the same job description over and over. They may work together in groups, if they choose. They may also stay by the sign, because everything is within 10-15 feet of the sign.

After a short time, call them back and have them share examples of what they found. Ask again if the land is "unused". Read the back of the sign in closing:

"More communities need to be built, but look before you leap! You could learn a lot from a community you can't even see!"

Communities (Continued)

Job Descriptions

Aerator -
An animal which keeps the soil loose so that water can flow more easily and plants can grow.

Air Conditioner -
Members which make the air more breathable for others in the community.

Fertilizers -
Community members who help make the soil better by adding waste or other materials to the soil.

Food Producers -
Things in the community which take in the sun's energy and make it into energy which other residents can use/eat.

Garbage Men -
Animals which help the community by breaking down dead materials and returning them to the soil.

Population Controllers -
Members which help control the number of community residents and prevent overcrowding.

Sample Journal Page

Citizen's Name	Address	Job

Adaptations

Key Concepts: 1. To survive, everything must fit how and where it lives.
2. Survival of the fittest.

Activity: Peanut Patch
Location: Anywhere
Props: Squirrel gloves and peanuts

What is an adaptation? (The way something changes to meet its environment.) What animals adapt? (All do, otherwise they die.) Do we adapt? (Yes.) How? (When it is cold, we put on extra clothes; when it is hot, we put on less clothes, etc.) Name some animals with adaptations. (All animals have at least one. Quick examples:

Dog - Decided it was much better to stay by a human, get fed, be warm and taken care of rather than hunt for its food.

Giraffe - Realized that with its long neck it would have a heck of a time eating off the ground, and besides, there was too much competition for ground vegetation, so it at off the tops of trees.

Elephant - Trunk makes a dandy hand. (Yes, I did just use the word "dandy".)

Cat - Crouches and waits to pounce on its prey. Makes it less visible and far more effective at hunting!

Special Note: These are all behavioral adaptations; we try not to deal with evolution!

Gee! Can you guess what animal I'm thinking of? (Squirrel.) What adaptations do squirrels have? (No pockets (no clothes, for that matter) so they carry food in their cheeks; no thumbs so they pick things up with both hands; a long poofy tail which predators try to grab only to find out its pure fuzz; etc.) Pick up your "magic wand" and make them all squirrels.

Talk about how squirrels don't live together, so each person must find their own tree. Scatter nuts about and tell the squirrels that when you say go, they must scamper out (on all fours) and gather as many nuts as they can. They will need ___ nuts to survive, but would a squirrel stop there or gather as many as he/she can? (As many as possible.) Remember: There are no friendly squirrel rivalries going on here, this is survival. (Caution them to be nice, however.)

Scatter the nuts and say, "go". As soon as they return to their tree, count the nuts, making sure to reclaim ALL of them (don't let them hoard them for next year). If they don't have the right amount, tell them they starved to death and have them sit on the bench and watch. Keep going, raising the amount of nuts required to survive until either everyone dies or one squirrel is left.

Who lived longest? (The most aggressive.) Why? (They were faster and stronger.) Is this the way nature works? (You'd better believe it.) Welcome to adaptations in nature.