

Get Your Game On!

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Sample Themes for Ecosystem Programs:

- All members of an ecosystem, including humans, are connected to each other.
- Ecosystems are like a bicycle: when you leave parts out, it quits functioning.
- This ecosystem is the sum of all its living parts plus the non-living things that support it.
- Like a recipe for cookies, the recipe for this ecosystem includes all the right ingredients in just the right proportions.



Sample Activities

All these games teach ecological concepts of connectivity and interdependence. Many can be quickly inserted into any nature program at the drop of a hat!

Circle of life: This is my favorite activity to start an ecosystem hike. I can use it as an overarching metaphor during the entire program.

Every participant chooses an element of your ecosystem to represent: favorite plants, animals, fire, air, water, etc. If

possible, try to make sure that humans and sun are part of the group, even if you have to choose one for yourself. Everyone forms a circle by holding hands. Stretch the circle to its very greatest extent. Everyone in the circle then leans back **on their heels**. They would fall on their butts except for the pull of other members in the circle. Ask participants what would happen if the water is polluted, and can't be in circle anymore. Yank the person representing water out and let the circle collapse. Repeat with a few other examples: "What if forest fires are taken from the circle?" or "What if all the mountain lions are shot?"

Note on including humans: Some people will argue that removing humans from the circle should have no effect on its function (or will make it function better.) I disagree! It is vital that our species comes to see itself as a member of the circle of life, not the axle about which it rotates. Without humans who care, wild places would not be protected and the circle would shatter. Unlike other members of the circle of life, we have a choice about our relationship with the earth.

Solar Energy Pulse: A very nice add-on to the previous circle of life activity. Everyone should already be in a circle holding hands, and have chosen elements of the forest ecosystem to represent. The person who represents the sun squeezes her left hand on the right hand of the person next to her; that person passes the squeeze on, and so forth until the squeeze has been passed all around the circle and back to the sun and that all of us are solar-powered. Explain how all members of the ecosystem depend on the sun for energy. Try to get the pulse going as fast as possible: time with a stopwatch. “We can do better than that! The record was 2.5 seconds.” People get very excited by the challenge.

Find your own rock: Have a bag of nearly identical rocks (or ask everyone to bend down and pick up a rock from the ground). Each person takes a rock, studies it for a minute or two then puts it back in the bag. Dump the rocks out in a heap, and have them find the rock they had. Twists: Have them study the rock blindfolded, or describe their rock to a blindfolded or back-to-back friend who has to find it (use simpler rocks). You can substitute other objects for rocks depending on your program: colorful autumn leaves, similar feathers, unshelled nuts or sunflower seeds, etc.

Human Knot: This old classic cooperative game can be adapted to show how all members of an ecosystem must work together and cooperate to make a whole. Everyone forms a tight circle, shoulder to shoulder. Reach out with both hands and grab the hands of anybody across from you; avoid giving both hands to the same person. Then, without letting loose, untangle the human knot. At times the resulting shape is a single large circle – a circle of life -- other times two or three separate circles or interlocking rings. I have never seen a human knot that, with patience, was unsolvable. Conclude the activity by restating the ecosystem cooperation theme.



Food pyramid (apologies to Joseph Cornell): Without explaining the game, have everyone pick the name of a favorite plant or animal in your area. Then make a food pyramid, plants on bottom, primary and secondary consumers on upper levels. (Have plants kneel, 1st lean on their backs without standing on them, 2nd lean on 1st from behind. Try to keep anyone from getting hurt or falling!) Clearly, the pyramid won't work since most participants want to be a top predator. Explain how there are many more plants than animals since plants collect energy (your participants can verify this: how many plants can you all see from where you are standing? How many primary consumers? A lot less!).

Then ask your participants how you would re-do the activity to make the pyramid work. Some of those who chose to be animals will figure this out, and reassign themselves to become plants. You can also show what happens when there are not enough plants in the ecosystem -- pull out a few, watch pyramid fall down! Many, many plants are needed to support a very few top predators.

Human Sculpture (modified from Joseph Cornell): Participants work together to build a model of something out of all their bodies. The model must accurately represent the subject. That is, an insect model must have the correct number of legs, wings, antennae, etc.; a model tree needs roots, branches, bark, a trunk, leaves, etc. A model flower needs pistil, stamens, petals, etc. Add to it by making the model have to move, or have each part have a special message they must shout out. Leaves say, “Yum yum,” bark says “Tough defense!” roots say, “Slurp slurp.”

Paint Chip Colors: Paint sample cards from the hardware store make great free props to teach observation skills. Give each child a sample card and encourage them to try to find that color in nature throughout an outdoor activity. Great to help preschoolers learn their colors!

Hiding Hibernators: This activity needs to be done outdoors on a cold day, and if possible when there is snow on the ground. Many animals survive the winter by hibernating. To be successful, the right conditions are needed...temperature, humidity, etc. This activity shows how hard site selections can be. First explain that animals that hibernate must put on a lot of fat in the fall in order to survive the winter. When it hibernates, an animal’s breathing and heart rate slow down, as does its metabolism. Finding the right hibernation spot is important because if the animal is too warm, it may use all its stored fat before winter is over and starve to death. If it gets too cold, it can freeze to death. Also explain how snow can act like insulation to help keep heat in, which is why people who are lost in winter build snow caves to stay warm! Ask participants where they think good places to hibernate might be.

Right before going outside, make a batch of Jell-O (using only hot water), and put it in a thermos to keep it hot. Take small (2 oz) paper cups with you. Give the participants 5 mins to locate a good hibernation spot for their “animal.” When everyone has found a spot, give each person a cup filled half full of hot liquid Jell-O. They will then take their “animal” and put it in their hibernation spot. Go for a short 10-20 minute walk to look for tracks, etc., then return to each spot to see how many of the animals survived hibernation. If the Jell-O is solid, it did not survive. If the Jell-O is still liquid, the animal made it through hibernation. Discuss why some made it when others did not.

National Parks for Ants: Divide participants into groups of 3 or 4, and give each group a hula hoop. In a natural open space area, allow the groups to spread out and place their hula hoop where they want their National park for Ants to be. Using only the natural geography (no digging, bringing in rocks, etc), have them design a national park. You may want to give them “signs” made from a toothpick wrapped with a mailing/address label, to make signs for their visitors. (Like Big Stone Mountain for a rock, Little Dry Creek for a crack in the ground, Giant Grass Forest, etc). After 15-20 mins, let each group give the other groups a tour of their “National Park for Ants”. This activity really gets everyone to observe and look closely at the “micro” world around them!

Come to Your Senses: Have kids sit in a circle with their eyes closed and their fists in the air. Every time they hear a “nature” sound, they raise a finger. After 30 seconds or a minute have them open their eyes. What did they hear?

Who Eats Whom? Scatter poker chips “food” (plankton, nectar, grass, etc.) inside the boundary of your ecosystem (lake, woods, plains, etc...you can use a rope, or the basketball court at your school, etc.)...approximately 10-15 chips for every person playing. Give each participant a cup or baggie to be used as their stomach. When the activity starts, each child will try to fill their stomachs with as much food as they can. The rules of the ecosystem are NO RUNNING, everyone must stop feeding when time is up, and everyone must remain within the ecosystem boundary (unless they die).

Round one...all the kids are prey feeding on food (mosquitoes feeding on nectar, small fish feeding on plankton, insects feeding on plants, etc.) Give the kids 30 seconds to fill their stomachs with food. They must gather at least 15 poker chips (food) in order to survive. Once they have their 15 chips, they may leave the boundary and stand at the edge. Give a signal, verbal or whistle, to end the round. Have kids count their chips. Most should survive. If some kids did not get 15 chips, take their cups, give them a larger cup and a predator necklace with a picture of the animal on it (for mosquitoes, a bat...for fish a bigger fish...for insects a bird or snake). With 30 kids you need to have 4-6 predators. At the end of each round, have the kids sprinkle (not throw or dump) their poker chips back around inside the boundary.

Round two...introduce the predators to the other kids. Predators don't eat the poker chips; they eat the kids picking up the chips by tagging them. When tagged, the prey then must empty the contents of their stomach into the predator's stomach (cup) and then go sit outside the boundary for the rest of the round because they are dead. Once the prey have gathered their 15 chips (and not been tagged by a predator), they can leave the circle. Prey may not jump in and out of the boundary to avoid being eaten, they must collect all 15 chips before exiting and becoming “safe” from the predators. The predators must get 25 chips to survive, so they may not want to tag the prey too early in the game. Play the round and give the STOP signal after 30 seconds. Ask the prey “how many of you were eaten?” How many of you survived? How many of the predators survived? (They will count their chips to know if they survived or not). You may want to do this round again and give the kids some strategy ideas if too many predators died. (If the predators tag the prey too early, their stomachs won't be full and they won't get enough chips/food to survive).

Round three...choose from the “dead” students/prey for 1-3 kids to be top predators... (an owl or hawk for the bats, a human or eagle for the fish, a hawk or coyote for the bird or snake), and give them a necklace with a picture of their animal on it and a bigger cup (stomach). These top predators only eat the other smaller predators (bat, bigger fish or bird or snake) and must get 30 chips to survive. Play the round and give the STOP signal after 30 seconds. Ask the prey “how many of you were eaten?” How many of you survived? How many of the predators survived? (They will count their chips to know if they survived or not). You could play this round again too.

At the end ask students/kids what would happen to the prey if they ate all the food there was in the ecosystem? What would happen if the predators ate all the prey and none were around to reproduce? What would happen to the ecosystem if there were no predators? What would happen if someone sprayed the plants or mosquitoes to get rid of them?



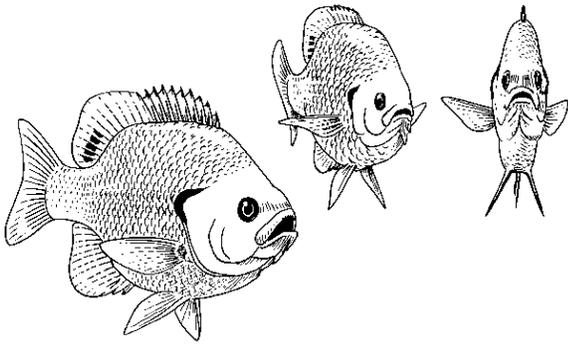
Site Maps & Sound Maps: In a natural open space area, have participants spread out and find a “site” of their own (with young kids this should be where you can see them, but they can’t see/hear each other). Give each person a piece of paper and a crayon/marker to draw with. Have them first draw their “site”...include trees, rocks, grassy areas, etc. Then have them sit quietly for 3-5 minutes and draw the sounds they hear into their map in relation to where they heard them...bird on a tree branch, wind in the branches, grasshopper in the grass, etc. (For teachers, if this area is close by, have students visit their “site” at different times of the year and make a map for every season).

Listen for Your Mate: Birds, crickets and frogs all use songs to attract mates of their own species. Simulate this by whispering a secret code word to each member in your group to represent a species’ specific song – but assign each word to two people. For example – the first kid gets “tomatoes,” the second kid gets “lemons,” the third kid is “peaches,” the fourth kid is “tomatoes,” (to pair with the first kid), the fifth kid is “peaches” (to pair with the second kid) etc. When everyone has their secret code word, count to three and everybody shouts out their code word as many times as they can. In the pandemonium, everyone tries to find their mate, who is “singing the same song.”

Variation: You can fill pairs of opaque film canisters with small noise-making objects like water, sand, bells, paper clips; then each participant shakes her canister and listens to the canisters of other people to find her mate. Or fill pairs of canisters with scented materials, like cinnamon, cloves, peppermint extract, aftershave, etc. etc. to demonstrate how animals find their unique mate with unique scents.

Camouflage Relay: This is a fun game to teach how camouflage helps animals hide from predators. Gather 20 or so plastic hangers in various colors, including good camouflage colors like tan, brown, and green. To make them more easily camouflaged, color or spray paint black or brown blotches on the tan, brown, and green hangers. Find a large area with taller grass to play in. Have the kids turn their backs while you hide the hangers in the field (or hide them before taking the kids to the area). Put the kids in two groups and form relay lines on each side of you. The first person in line for each team runs out and tries to find a hanger. When they find one, they run back and give it to you, then the next person on their team goes. Repeat until all hangers are found. Keep the hangers in the order they were found (usually the more camouflaged hangers are found last). At the end show the kids the hangers, and talk about the benefits of camouflage for animals like snakes, lizards, coyotes, owls, insects, etc. (Variation...this can also be done with various colored paper snakes that you make beforehand, or pipe cleaner caterpillars of different colors, etc).

Secret Stalker: Kid in the middle is blindfolded, becoming the "prey". He can't see the others, who stalk him....but if he hears them, he must point, and the stalkers who are pointed at must freeze. See if anyone can tag the prey. A trustworthy adult must be the referee. Kids will figure out the most successful hunting strategies that are used by real animals: sprinters (sneak up close, then make a sudden dash before prey can react), packs (one member distracts while others close in), diversions (throwing a stick or rock to spook the prey), soft stealthy pads on the feet (some may want to go barefoot if appropriate).



Camouflage Hide and Seek: (Works into programs about insects, birds, wildlife). One kid is "it", a predator that hunts by sight. She closes her eyes/counts to 30 and the other kids hide within a circle of about 40 m radius (it's a pretty big area. Make sure all kids know the boundaries). **They must be able to see the predator at all times!** (prey need to know where the predator is to escape, right?) When

predator opens her eyes, she looks for prey. You may want to give a time limit (about 3 mins). If she sees anyone, she must point and call the person in, but must describe something about the person (color of clothing, name, etc.) A person called in is caught, and will become a predator too next round. But they can't help the predator during the round they are called in. When no more prey can be seen, start the next round. Predators close their eyes, count to 30, and all prey items must move at least 10 feet closer and find a new hiding spot where they can see the predator. Play about 3 rounds, then have the prey that escaped stand up to show their hiding spot. Kids **LOVE** this game and never seem to get tired of it.

Bat and Moth (from Joseph Cornell): A blindfolded "bat" must tag two or three "moths" inside a circle of "trees." The bat can say, "bat" as often as she likes; and the moths must immediately answer, "Moth." The bat hears and catches prey by echolocation, just like real bats do. (Younger children will have to be reminded how to play sometimes, which can make the game drag on. Often the moths cheat and have to be reminded to say moth; often the kid playing the bat doesn't remember to say bat and just flails around silently.) At the end of the game, tell how you heard bats once on a special bat detector. As they zeroed in on a moth to make the kill, the frequency of their pulses went up greatly: "Bat.....bat.....bat...bat...bat...bat.bat.bat.bat.batbatbat," giving them a very accurate picture. Every once and a while a kid will discover this, or you may model it yourself at the end. Incidentally, this game can also be adapted to marine ecosystem for whales and dolphins that use sonar to hunt, e.g. "Dolphin!" "Fish!" "Dolphin!" "Fish!"

Dinner Bells (from Joseph Cornell): This game is similar to the previous one. Both the predator and prey are blindfolded and the other participants make a large circle around them with just fingertips touching. The predator (coyote) has a big cow bell tied around his/her ankle, and the prey (1 or 2 other people) have smaller "tinkly" bells tied around their ankles. The idea of this game is for the participants to see what it feels like to be hunted, and how hard it can be for the predator to find food. The predator moves slowly around the inside of the circle trying to find prey (rabbit, vole, mouse, squirrel, etc). The prey can hear the predator, and try not to be captured. Usually, the prey will sit tight until the predator is very close...then try to get away. The tinkly bells on their ankles make noise when they try to move, allowing them to be heard and possibly captured by the predator. (Caution is needed when playing this game. Participants should be different heights to keep from bumping heads, and there cannot be any running! A variation would be to blindfold just the predator, and the prey are only allowed to hop to get away).



Down at the Waterhole: One person is the predator and the rest of the participants are prey. The predator stands in the middle of a circle (a small piece of rope can be used to make the circle) and is blindfolded. The predator also has a squirt bottle filled with about 2 squirts for each “prey” that is playing the game (the teacher needs to count). Near the feet of the predator are small (2” x 2”) slips of blue paper, pebbles or some other tokens to indicate water. The prey are in a circle around the predator and should be at least 20 feet away from the predator (a large rope can be used to outline the circle...the kids must stay behind the rope until the game starts, and make it past the rope when they get their water card). The prey try to sneak up to the “watering

hole” at the predator’s feet and get a water card/blue slip without being heard by the predator. If the predator hears the prey, he/she squirts in that direction. If the prey gets hit with water, they have to sit down. The game ends when all the prey have either been “killed” by the predator, have made it back from the watering hole with their card, or the predator runs out of squirts. (The kids sitting down need to be very quiet so as not to confuse the predator).

Oh Deer (Project Wild): This game teaches about the number of deer the habitat can support. (Other animals may be substituted for your area). Every area has a carrying capacity, and in this game participants learn what happens when that capacity is exceeded. Divide the participants into 4 groups...group 1 stays put, groups 2, 3, and 4 are together. Mark 2 parallel lines on the ground. Group 1 is behind one line, and the others are behind the other line facing group 1. The 1’s are all deer, in need of habitat to survive (food, water, shelter & space...for the game assume they have enough space). Show the participants the symbols for food (hands over stomach), water (hands over mouth), shelter (hands over head like a pointed roof). Have everyone turn so their backs are facing each other. Ask the “deer” to each make a symbol. Then ask the “habitat” to each make a symbol. Then say “Oh deer!” The deer and habitat turn to face each other displaying their symbols. The deer then run to a person making the same symbol they are, “capture them”, and lead them back to the deer side of the lines. (To keep participants from changing symbols, colored pieces of paper can be used for habitat...green squares for food, blue squares for water, brown squares for shelter. Each person picks a new colored square before each round). Capturing habitat means the deer was able to meet its needs and successfully reproduce. Any deer that does not find its food, water, or shelter dies and becomes part of the habitat in the next round. Record the number of deer in each round for several rounds. At the end, bring everyone together to discuss what they experienced and saw. (E.g...there was plenty of habitat in the beginning until the deer population expanded and exceeded the carrying capacity. At that point deer started dying from lack of habitat). *Variations:* Whisper to habitat players that there is a drought and no one can use the water symbol for one round. Or, no shelter or food due to a forest fire. Or introduce a predator that must hop or skip to catch the deer when they are going for habitat...then lead them off to “eat” them. That deer then becomes a predator in the next round.

Pollination Puppets: To show how pollen may be transported from one flower to another (and hence start seed production), use a fuzzy puppet of a bee, butterfly, fly, bat, hummingbird or other pollinator. Choose two volunteers, who stand in front of the group with one hand outstretched, flat, palm upward. Sprinkle some flour or dust into one person's palm. It is the pollen. Explain how the hungry bee searches for nectar by placing its face into the flower, and demonstrate. Be sure to cover the puppet's face with the dust. Then the bee flies to the next flower--the other outstretched palm with no dust on it. As the bee visits the second person's hand for nectar, some of the dust will be dislodged. Have the puppet fly away, and then have the second person show their hand so all can see the dust that was transferred. Be sure and point out that pollinators don't carry the pollen on purpose to help; it happens inadvertently.

Carrying Capacity Jam: Find a stick and draw a circle about 4 feet across on the ground (or find a small delimited area, like a step on a trail). Then talk about limiting resources (in this case, space). Competition for limiting resources is very tight in the natural world, and many plants and animals exist right at the edge (hungry most of the time). Many others don't make it. "So let's imagine that this circle represents all the resources available for your species in this ecosystem. When I count to five, anyone who doesn't have both feet inside that circle is dead. One! Two! Three! Four! Five!" There will be a sudden mad, surprised dash for the circle, with much pushing and shoving and squabbling, and some participants won't make it. Try to restore order and discuss what it's like to live with limited resources. Was there competition to get into the circle? Yes, a lot. Point out how all the plants and animals around are competing: "Do you hear that bird singing? He's telling rivals to stay out of his share of the circle."

Variations: I use this activity to illustrate the overcrowding of forests in the absence of natural wild fires. Start by having three participants representing three pine trees stand in the circle. There will be room and space for all. Give them a cookie or snack bar to share. Then pack the circle full of participants – an overcrowded dog-hair stand of trees – and give them another cookie. There are only crumbs to go around.

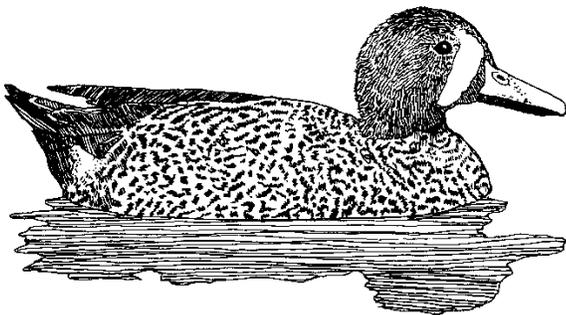
To illustrate how noxious introduced species are destroying Colorado's ecosystems, ask everyone to imagine that they are a rare plant in your area. After they have crammed into the circle, point out that everyone with a blue shirt or jacket is really a knapweed plant, and show how many of the rare plants ended up outside the circle because knapweed got in first. Or starlings pushing woodpeckers out of tree cavity nests.

Scavenger Hunt: An easy way to get kids to notice their surroundings is with a scavenger hunt. Check the rules of the area where you will be for regulations on collecting. Most areas don't have a problem with picking up things already on the ground (a small pink stone, a yellow leaf, a pine cone, etc). These things should be returned to the ground when the hunt is over. *Variations:* Kids bring digital cameras and have a virtual/digital scavenger hunt where they take pictures of things on the list (an animal track, a nest in a tree, a grasshopper, a cattail, etc). The first one/group to find everything on the list wins! You can even download their pictures to use for other nature activities! You can also make up Bingo cards, a grid 5 squares across by 5 squares tall. Each cell has something to look for. First one to get a complete Bingo! wins, or they can play solitaire.

Animal Charades: Have a small cup, tin, or box with several slips of paper inside. On each slip of paper is written the name of an animal. Participants draw a slip of paper out and then act like that animal (flap wings, make noise, hop, etc). The rest of the group tries to guess what animal they are. *Variations:* they only act like the animal, but do not make noises. Have a group act out an animal, a tree, a wave on the ocean, etc.

Pollination Game (from Project Food, Land, and People): To play this game, you will need several small paper (or plastic) bags, and some popped popcorn. Designate a third of the group as apple trees (or whatever plant you want them to be). Each tree gets a paper bag, and 30 pieces of popcorn in a cup. Have the trees stand apart from each other outside (or in the room). The rest of the group are honey bees, who should all stand together at the place designated as the hive. Each honey bee flies to any one of the trees and gets a piece of popcorn **from the cup** (picking up pollen as they collect nectar). They then fly to the next tree and deposit the popcorn they have into that **tree's bag**, and pick up a piece **from the tree's cup** (transferring pollen from one tree/blossom to the next). One minute represents one growing season. At the end of one minute, all the honey bees return to the hive leaving their popcorn with the last tree they visit. The trees count the number of pieces of popcorn **in their bag only**. The popcorn represents how many apples they will grow this season. The trees then return the popcorn to their cups (not the bag), and another round can be played. Play several rounds, graphing the number of apples grown each season. Some challenges that can be added after the first few rounds... The weather is cold, so the bees fly more slowly, at about half their normal speed. The hive was overcrowded and swarmed, so only half the bees are left to pollinate the trees (have half the group sit down for one round). A big freeze killed many of the blossoms on the trees (each tree only has 5 pieces of popcorn in their cup). Half the trees were destroyed in an ice storm (have half of the trees sit down for one round). Discuss the relationship between the bees and the trees and how what happens to them affects the other.

Migration Hopscotch: When birds migrate they must stop to rest and refuel at refuges along the way. For waterfowl, these refuges are ponds, lakes and potholes between wintering and breeding grounds. To simulate the importance of these refuges, line your group up single file. With a stick, draw a series of circles each about 1 – 2 feet in diameter, about 3 – 4 feet apart, in a rough zigzag in front of the first person in the line. Each circle represents a lake or pond along the course of their migration. Each person must jump from pond to pond, like hopscotch, without missing a single step to complete the migration alive. Line them back up for the return migration, but ask them to imagine development that destroys some of the refuges: a farmer drains this pond to make a field (scuff it out with your foot); a parking lot is built on this one (scuff it out). With the chain of refuges broken, they will find the return trip much harder to complete! But then, some humans create or restore a wetland (scuff a new one in). People can do positive things for the environment as well as negative – and that's an important lesson, too.



Resources for Educational Nature Games

Joseph Cornell, 1979. *Sharing Nature with Children*. Dawn Publications, Nevada City, CA. (916) 292-3482.

Joseph Cornell, 1989. *Sharing the Joy of Nature*. Dawn Publications, Nevada City, CA. (916) 292-3482.

Michael J. Caduto and Joseph Bruchac, 1994. *Keepers of the Earth/Animals/Night/Life* series. Fulcrum Publishing, Golden, Colorado. (800) 992-2908

Project Wild: <http://www.projectwild.org/resources.htm> A huge collection of curriculum-based games and resources. Project Wild offers a variety of training workshops to show you how to get the most out of their activities.

Project Learning Tree: <https://www.plt.org/resources> Another huge collection of curriculum-based games and activities. The <https://www.plt.org/resourcecy> also offer training workshops.

Steven Van Matre and Bill Weiler, 1983. *The Earth Speaks*. Institute for Earth Education.

Acorn Naturalists. This excellent catalogue includes hundreds of fine educational books (including those listed above), models, replicas, teaching kits, puppets, tapes and videos, cheap but high quality field equipment, and much more. An outdoor teacher's best friend! (800) 422-8886 www.acornnaturalists.com/store/

More resources from Open Space and Mountain Parks
<https://bouldercolorado.gov/osmp/elearning>