

Fun Farm Snacks, page 3



Wild, Wild Weeds, page 9

Urban Wildlife Safari, page 19



Water Pollution Solution, page 25



Nature in the City Bingo, page 29

The Greenbelt In Your Schoolyard

Activities for investigating urban nature in the San Francisco Bay Area

For grades 3-8

Created for Greenbelt Alliance's Youth Outings program

and Bay Area educators

Written by Leslie Comnes Edited by Julie Cummins

About Greenbelt Alliance

In the San Francisco Bay Area, we are fortunate to have open space in close proximity to our cities and towns. This greenbelt of farmlands, parks, nature preserves, and undeveloped lands is one of the largest and most productive systems of open space in any U.S. metropolitan region. The greenbelt provides fresh produce, helps to clean the region's air and water, offers recreational activities, and makes the Bay Area a beautiful place to live. It also provides a home for many plants and animals, including more than 100 species on the federal list of endangered and threatened species.1

Greenbelt Alliance is a nonprofit organization working to protect the Bay Area's greenbelt and to make the area's cities and towns better places to live. Since 1958, we have worked in partnership with diverse coalitions on public policy development, advocacy, and education. We are working to draw the line on sprawling development and to encourage smart growth within our communities.

Greenbelt Alliance's Youth Outings program offers opportunities for young people to learn about the Bay Area's greenbelt by experiencing it first-hand. Through this program, youth groups who don't otherwise have such opportunities may take a discovery nature hike in an ancient redwood grove, pick fresh fruits and vegetables at a local organic farm, or explore the unique wetlands of the San Francisco Bay. With each outing, young people have the experience of being surrounded by nature, sometimes for the first time.

¹www.nrdc.org, Based on June 2001 U.S. Fish and Wildlife Service Report

About This Curriculum

The purpose of this guide is to help young people see how they are connected to the greenbelt right where they live. It includes organized activities as well as discussion questions and ideas for taking action. Through these activities, youth will begin to see that the greenbelt is not just "out there," but that elements of it are present in their everyday environment, and that they are dependent on it to live.

The activities in this guide were originally designed as follow-up to field trips in the greenbelt. They also work well as stand-alone lessons to investigate nature as it relates to urban life. They are designed for grades 3-8, and each lesson takes approximately 45 minutes.

If you are interested in learning more about Greenbelt Alliance's Youth Outings program, have comments regarding this curriculum, or would like a copy, please contact the Education Program Coordinator at (415)543-6771 or info@greenbelt.org.

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Credits:

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Fun Farm Snacks



Summary

Using packages from familiar foods or snack items, youth look for key ingredients that come from farms. They learn about farm products grown in the Bay Area's greenbelt and do a taste test of dried, canned, and fresh fruit.

Learning Objectives

Youth will:

- Understand that foods they eat come from farms.
- Learn about farm products grown in the Bay Area.
- Experience first-hand one reason that local farms are beneficial to people.

Materials

For the group

- Several photos of Bay Area farm crops, optional (see Preparation)
- Fresh fruit (preferably grown in the Bay Area), such as apples, pears, cherries, apricots, or strawberries, depending on the season
- Dried fruit, the same type as the fresh
- Canned or frozen fruit, the same type as the fresh
- Can opener
- Sharp knife
- Cutting board
- Three small plates
- Three index cards
- Marking pen
- Toothpicks
- · Paper towels or napkins

For each pair

Snack food wrappers (see Preparation)

For each participant

- Copy of *Bay Area Farm Products* handout
- Copy of *Taste Test* tally sheet
- Copy of *Things you can do for farms* handout

Correlation to California Content Standards

History-Social Science

• Students demonstrate an understanding of the physical and human geographic features that define places and regions in California. (Grade 4)

Science

- Life Science: All organisms need energy and matter to live and grow. (Grade 4)
- Life Science: Living organisms depend on one another and on their environment for survival. (Grade 4)
- Ecology (Life Science): Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. (Grade 6)

Background Information

The Bay Area is home to nearly 7,500 farms. Over 100 agricultural products come from this fertile land, including vegetables, fruits, nuts, dairy products, grain, livestock, poultry, wool, fish, nursery plants, and flowers.

All Bay Area residents probably live within 50 miles of farmlands. The Bay Area's agricultural lands are often tucked into nooks and crannies created by the varied topography. Due to the area's hilly terrain and its proximity to the Pacific Ocean, farms here are also subject to a wide variety of microclimates: the weather in one area can be wildly different than the weather just a few miles away. These microclimates, combined with good soil and an overall mild climate, enable Bay Area farms to produce an unusually wide variety of crops.

In the United States, the food we put in our mouths travels on average between 1,500 and 2,500 miles from farm to plate.² Having farms nearby allows us access to higher-quality food. Not only does fresh food taste better, but many fruits and vegetables begin losing nutrients as soon as they're picked, making fresh food also more nutritious. In addition, when farms are in close proximity to consumers, less fuel and money are spent on transport of the food.

Cities and farms are both important elements of our food system. Just as urban dwellers need farms to produce their food, farmers need consumers who will purchase their crops.

²Brian Halweil. 2002. Worldwatch Paper #163: Home Grown: The Case For Local Food In A Global Market. www.worldwatch.org/pubs/paper/163

Preparation

Step One: Look for dried, canned (or frozen), and fresh samples of the same type of fruit, such as cherries, pears, apricots, peaches, grapes, and plums/prunes. You could also try corn (dehydrated, crunchy corn can be found at some specialty stores). If you can't find three different samples, use just fresh fruit and one other form.

Step Two: Wash the fresh fruit and place it in a clean bag before taking it to the program site.

Step Three: Collect wrappers from snacks such as chips, candy, or crackers. If possible, choose a variety of snack wrappers that have Bay Area farm products as a main ingredient (see Bay Area Farm Products handout).

Step Four: Depending on the wrappers used, obtain photos showing the key farm ingredients. For example, corn



A student hugs the pumpkin she picked at Laguna Farm in Sonoma County.

chips may have corn and corn oil; candy might have sugar (which can come from sugar beets), corn syrup, butter, milk, or almonds. Ideally, find pictures that show the food on the plant. One good source of such photos is www.ars.usda.gov/is/graphics/photos/. See Step Three for conducting the activity without photos.

Step Five: If using paper plates, use the marking pen to label one plate "A," one "B," and one "C." Otherwise, make labels for them with the index cards.

Procedure

Step One: To introduce the activity, ask the youth whether they've ever been to a farm. Ask them about the visit and the farm products they learned about:

- **?** What was your favorite thing about the farm visit?
- ? What farm products did you see?
- **?** Was there anything that surprised you?

Step Two: Take out the snack wrappers and hold them up. Ask the youth if any of the snacks are made from farm products. Tell them they will soon find out the answer. Give each person or pair a snack wrapper.

Step Three: Show the group one of the farm product pictures and talk about what it is. Have them look at the ingredients on their snack wrapper to find out if it is made from this farm product. If so, have them tell the group or raise their hand. Repeat this process with several more ingredients. If you don't have crop photos, have them look through the ingredient list and identify at least three things that come from a farm product.

Step Four: Tell the youth that the Bay Area is unique in the variety of farm products that grow here. In some parts of the country, there may be only a few crops that are grown nearby, but here, we are lucky to have so much fresh produce to choose



Gardening is one of the best ways to learn where food comes from.

from. Some of the corn, sugar (from sugar beets), oats, nuts, and fruits that are used in snack products may come from the Bay Area. Hand out copies of the *Bay Area Farm Products* sheet. Explain that the list shows many of the farm products that are grown in the Bay Area and give them a minute to look it over.

- ? Which of these foods do you like?
- ? Are there any foods on this list that you aren't familiar with?
- **?** Why do you think the Bay Area is able to produce so many different kinds of foods?

Step Five: Explain that the group will have a chance to compare fresh farm produce with dried and canned produce.

Step Six: Give each youth a copy of the *Taste Test* tally sheet and have them label the top of the sheet. Go over the questions listed on the sheet. Have the students work individually or in pairs to write their observations on their sheet. Explain that they will smell and look before they put the fruit in their mouths, then they will observe taste and texture while eating it, and after they've eaten all three fruits they will rank them, #1 being the best.

Step Seven: Take out the fresh fruit and cut it into enough pieces to yield at least two pieces per person. As you do so, explain where the fruit came from. Place the fruit onto the plate labeled A.

Step Eight: Have each youth pick up a piece of fruit with a toothpick. Remind them to fill out the *Taste Test* tally sheet as they taste the fruit.

Step Nine: Open the canned fruit, drain the liquid off, and pour the fruit onto the plate labeled B. As you do so, explain that people preserve fruit and other foods by canning them. Point out that in many places, people can only grow foods at specific times of the year. Canning makes it possible to eat foods when they aren't in season. In canning, the food is heated up, creating a vacuum within the can that keeps it sealed; this keeps out bacteria that could cause the food to spoil. Canned fruit often contains lots of extra sugar, preservatives, and other additives, and the heating process used to can the food destroys some of the vitamins.

Step Ten: Again, have youth pick up a piece of fruit with their toothpick. Guide them through the questions and have them write their observations on the tally sheet.

Step Eleven: Pour some of the dried fruit onto the plate labeled C. As you do so, explain that drying is another way to preserve food. The fruit or vegetable is placed in a huge dryer that removes the moisture from it. Dried foods are not susceptible to the bacteria that spoil food and so can keep for much longer than fresh foods. As with canning, dried fruit can have added sugar, sulfur, or other ingredients. More nutrients are retained in the dehydration process than in the canning process, but dried fruit is still less nutritious than fresh fruit.

Step Twelve: As before, guide the youth through the questions and have them write their observations on the tally sheet.

Step Thirteen: Have the students give each fruit an overall rank. Ask:

- ? Which fruit tasted best?
- ? Which smelled best?
- ? Which had the best texture?

If they prefer the canned version, ask:

- ? If this didn't have added sugar, do you still think it would be your favorite?
- **?** Which form of the fruit do you think is healthiest for you?

Wrap-up Questions

- ? Why is it good for people in cities to be near farms? (It allows access to fresh produce, which is healthier, tastier, and more environmentally sustainable.)
- **?** Why is it good for farms to be near a city?

(It provides a nearby market for the produce.)

- ? If we didn't have farms, what would you eat?
- ? What could you do to help farms?

Distribute the *Things you can do for farms* handout.

Bay Area Farm Products

Alfalfa Almonds Apples Apricots Artichokes Arugula Asian pears Asparagus Avocados Barley Basil Beans Bean sprouts Beef Bees Beeswax Beets Bell peppers Blackberries Blueberries Boysenberries Broccoli Brussels sprouts Cabbage Cantaloupe Carrots Cauliflower Casaba melon Celery Chard Cheese

Cherries Chickens Chives Cilantro Clams Collard greens Corn Cucumbers Ducks Eggplant Eggs Fennel Figs **Filberts** Garbanzo beans (chick peas) Garlic Goat milk Gourds Grapes Green beans Hav Herbs Honey Honeydew melon Horseradish Jalapeño peppers Iicama Kale Kiwi Kohlrabi

Lamb Leeks Lemons Lettuce Lima beans Melons Milk Mushrooms Mussels Nectarines Oats Okra Ollalieberries Onions Oranges Oysters Parsley Parsnips Peaches Pears Peas Pecans Peppers Persimmons Pistachios Plums Pomegranates Popcorn Pork Potatoes Prunes

Pumpkins Quince Rabbits Radishes Raisins Raspberries Rhubarb Rutabagas Safflower oil Shallots Snap peas Snow peas Sorghum Spinach Squash Strawberries Sugar beets Sunflower seeds Sweet potatoes Swiss chard Tomatoes Turkeys **Turnips** Walnuts Watermelons Wheat Wool Zucchini

Taste Test

	Fruit A:	Fruit B:	Fruit C:
Looks Describe how this fruit looks. What is its color? Does it look good to eat?			
Smell Before you put it in your mouth, describe this fruit's smell. Does it smell sweet? Fruity?			
Taste Put the fruit in your mouth. How does it taste? Is it sweet? Tart? Does the taste remind you of something?			
Texture Describe how this fruit feels in your mouth. Is it crisp? Juicy? Soft?			
Ranking Give your favorite a "1," your second favorite a "2," and third favorite a "3."			

Things you can do for farms

- Take your family to a local farmers' market. You can get fresh fruits and vegetables, and also help keep farms in business. For a list of farmers' markets, check your local newspaper or see the California Federation of Certified Farmers' Markets website at www.cafarmersmarkets.com, or go to www.localharvest.org.
- Ask your family to subscribe to a farm! By joining a CSA (community supported agriculture) program, you can get a weekly box of fresh, seasonal produce for a fair price. Find a CSA near you at www.localharvest.org.
- Visit a grocery store to find out where your milk, eggs, fruits, and vegetables come from. Check the labels to see if they are from local farms or from farms in other places. Whenever possible, choose things from local farms.
- Plant seeds such as lettuce, pepper, or mint in a pot of soil. Place it in a sunny window and water when the soil feels dry. Taste the results! For tips on gardening with pots, go to www.container-gardens.com.
- Visit a community garden in your neighborhood or city. A community garden usually has small plots that people in the neighborhood can plant and take care of. To find one, check with the Ecology Center at (510)548-2220, or go to www.gardenfortheenvironment.org/pages/ communitygardens.html for a list of San Francisco community gardens. For more general information, check out the links page on the American Community Gardening Association's website (www.communitygarden.org).

Find out more...

- Check your library for a book on how to grow plants.
- Visit a farm without even leaving town! See the 4-H Virtual Farm website, www.ext.vt.edu/resources/4h/virtualfarm/ main.html and learn more about how people depend on farms.
- Go on one of Greenbelt Alliance's summer farm tours with your family. For the schedule, go to www.greenbelt.org.





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Wild, Wild Weeds



Summary

Using a weed field guide, youth search for wild plants growing around the site. They look for ways that the plants get what they need to survive, and then make fabric art prints out of weed leaves they have collected.

Learning Objectives

Youth will:

- Identify wild plants that live around their school or program site.
- Learn to distinguish ways that one plant differs from another.
- Describe how wild plants get what they need to survive.
- Use leaves to make a plant-pigment art print.

Materials

For the group

- 2 or more small blocks of scrap wood (1" x 3" x 3" or larger), with a smooth surface
- 2 or more clean rags
- 2 or more small hammers
- Roll of tape
- · Hand lenses (optional)

For each participant

- Copy of Wild, Wild Weeds Field Guide
- Small strip of white or light-colored fabric (about 3" x 3")
- Safety pin
- Several varieties of weed leaves collected in advance (optional; see Preparation)
- Copy of *Things you can do for plants* handout

Correlation to California Content Standards

Science

- Life Science: Adaptations in physical structure or behavior may improve an organism's chance for survival. (Grade 3)
- Life Science: All organisms need energy and matter to live and grow. (Grade 4)
- Life Science: Living organisms depend on one another and on their environment for survival. (Grade 4)
- Ecology (Life Science): Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. (Grade 6)

Visual Arts

- Artistic Perception: Students perceive and respond to works of art, objects in nature, events, and the environment. They also use the vocabulary of the visual arts to express their observations. (Grades K-12)
- Creative Expression: Students apply artistic processes and skills, using a variety of media to communicate meaning and intent in original works of art. (Grades K-12)

Background Information

Streets and buildings cover much of the Bay Area, and city-dwellers rarely think about what lies underneath, or about what lived there before modern development arrived. In some parts of the greenbelt you can get a sense of what the whole landscape may have once been like—blanketed in plants. Even in the most urban areas you can see wild plants if you look carefully—in the cracks of the street asphalt, around the edges of the school playground, or lining the bases of the buildings.

Many of the wild plants that live in the city are what some would call weeds. But keep in mind that whether a wild plant is a weed or not can be in the eye of the beholder. The poet Ralph Waldo Emerson described a weed as "a plant whose virtues have not yet been discovered."

For gardeners, farmers, groundskeepers, and park rangers, a weed is an unwanted plant. Uninvited, this plant finds an opening, sets its roots, and makes itself at home. It may compete with crops or other plants, affect the health of livestock, break up cement or asphalt, or disrupt the natural ecosystem. Weeds can also have benefits. Like all plants, they can improve the fertility of the soil and enhance its texture, reduce soil erosion by covering bare spots, attract butterflies and birds, and provide beauty where there might not otherwise be any. For wildlife, the leaves, nectar, flowers, seeds, and fruits of weeds can be rich food sources. Weeds also offer wildlife shelter, safety, and nesting materials. Some weeds are edible to people.

Many successful weeds grow best in "disturbed" areas, where people have changed the natural order of things. You can find them in vacant lots, in playgrounds, along roads, in pastures, and in garden beds and lawns. Rugged and adaptable, these bold survivors can teach us a lot about how nature works. Successful weeds often have one or more of the following characteristics:

- They thrive in a wide range of conditions and with little water. They can often survive in places that other plants can't.
- They grow quickly and are hardy.
- They have strong root systems. Some have long, tough taproots, and if the plant is cut off, the root can grow a new plant.



Native California poppies sprout up in a vacant lot in Oakland.

- They are good at protecting themselves. Some have prickly leaves to keep from being eaten. Some grow so low to the ground that stepping on them doesn't hurt them. Some release a chemical into the soil that prevents other plants from growing.
- They produce large amounts of seeds. A single dandelion plant, for example, can make more than 15,000 seeds in one summer. Or they reproduce well vegetatively parts of a plant grow into a whole new plant.
- They have tough seeds that live a long time.
- They are not native to this place and so lack the natural enemies that might keep them in check.

Weeds are a good reminder that the greenbelt is not really separate from the city. Nature does not know county boundaries or city limits. These wild plants will grow anywhere their needs are met, whether that is in the greenbelt or on a city block.

Preparation

Step One: Identify a site that has a number of weeds. If there are only a few plants, you will need to bring along a variety of other freshly picked leaves for this activity to supplement any collected by the youth. Try to include different shapes and colors of leaves.

Step Two: Assemble copies of the *Wild, Wild Weeds Field Guide*. First make double-sided copies of the pages. Then fold all the pages, placing the title page on the outside. Staple the pages together into a book.

Procedure

Step One: Introduce the activity by asking the youth if they have been to the Bay Area's greenbelt:

- **?** What was your favorite thing about your visit to the greenbelt?
- **?** What did you notice about the plants in the greenbelt?

- ? What's the difference between wild plants and garden plants? (Wild plants grow without the help of people.)
- ? What do wild plants need to grow? (Water, nutrients, and sunshine.) Do you think wild plants could grow in the city?
- ? What is underneath sidewalks, houses, and streets? (Soil.)

That soil still has nutrients and living things in it. When asphalt or cement gets older it begins to crack, letting in water, sunlight, and seeds. Plants can grow in these cracks even if the cracks are tiny.

? What's another name for wild plants that grow in the city? (Weeds.)

Step Two: Give each student a copy of the *Wild*, *Wild Weeds Field Guide*, and take the group outside.

Step Three: Point out the boundaries of the activity and tell the group that they will search within those boundaries for as many different wild plants as they can find. Explain that they are looking for weeds—and that these weeds are usually smallish plants growing in a sidewalk crack, along the base of a building, in an empty field, or any place that is not watered or tended by people.

They may use the field guide to help them find out the names of weeds they see. They will need to look at the picture *and* read the description, and look carefully at the plant to determine whether it is a match. The pictures are not to scale and may be much smaller or larger than the actual plant. Point out that they may discover a weed that is not listed in the field guide and, if so, they can make up a name that describes it.

Step Four: Pair students up with a partner. Give pairs a few minutes to look for plants. Help them compare plants they find with those in the field guide. If they have trouble finding any plants, gather the group and talk about where they might focus their

search. Give them a few more minutes to look. Bring hand lenses for them to get a closer look at the plants, if they are interested.

Step Five: Gather the group together and have volunteers point out one of the wild plants they discovered. They should tell the group whether it was in the field guide and its name. For a few of the plants, ask:

- **?** What clues did you use to identify this weed?
- ? How does this wild plant get the water and nutrients it needs to live?
- ? Do you see anything about this plant that helps it survive? (Help the youth look for features that protect it from being eaten, pulled, or stepped on, or that help its seeds get distributed.)

Step Six: Help the students collect one to three weed leaves each. Explain that when collecting wild plants, people should remove only one leaf for every four leaves left on the plant.

Step Seven: Show how to make the wild plants into fabric art:

- Smooth a strip of fabric onto a block of wood. Tape it down.
- Arrange leaves onto the fabric with the vein side down (if possible).
- Cover all the leaves with a piece of rag.
- Using a hammer, begin on one end of the leaves and pound firmly and evenly over the entire leaf area.
 When you hit them, the leaves will transfer color onto both pieces of fabric.
- Remind participants to work safely, being careful not to pound their fingers.
- Lift up the top rag and remove any pieces of leaf stuck to the fabric.

Step Eight: Give the youth the materials for making their own wild plant fabric art. They will need to take turns with the wood blocks, hammers, and rags. Help the group

figure out a fair way for taking turns.

Step Nine: As the youth work, walk among them to offer help and to make sure they are working safely. You may also engage the group in a discussion about why leaves are important (leaves make food for the plant, leaves are eaten by people and animals, and leaves help people identify plants).

Step Ten: When they are done, give the youth a safety pin for pinning their fabric art onto their backpacks.

Wrap-up Questions

- ? How would YOU define a weed?
- ? Weeds have a bad reputation, but what are some good things about them?

(They keep the soil from washing away, they give wild animals food and shelter, and they can be pretty.)

- **?** Do you think weeds are friends or foes?
- **?** Where do you think these wild plants come from?

(Weed seeds can be dormant in the soil for a long time. The seeds come from nearby plants, or can get tracked in from further away on shoes or clothing. Originally, some weeds came from the local greenbelt, but many were imported, accidentally or intentionally, from Europe.)

? Do these plants "know" where the city begins or the greenbelt ends?

? What could you do to help plants?

Distribute the *Things you can do for plants* handout.

Variations

For a younger group, lead a guided wild plant walk. Rather than have them look for wild plants on their own, take the group to a few plants you have spotted in advance. Use the field guide as a visual aid to point out key features of the plant. For the fabric art, have the youth arrange the leaves on the fabric and you do the pounding.





PROTECTING OPEN SPACE AND PROMOTING LIVABLE COMMUNITIES

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California Burclover (Medicago polymorpha)

This plant has leaves that look like a shamrock or clover. The middle vein of each leaf is usually reddish. When the flower gets older, it forms a prickly seedpod called a burr that can catch onto your clothes.

 Image: constrained of the second of

Storksbill (Erodium spp.)

This plant grows a tiny pink flower with five petals. The flower turns into a fruit (not edible) that is long and thin and shaped like a sword or a stork's bill. As the fruit dries it separates into five parts, each with a spiral tail. The spiral tail acts like a screw, winding into the soil and planting the seed more securely.



Sowthistle (Sonchus oleraceus)

The painfully prickly leaves of this plant are often twisted and curly. If the stem is broken it oozes a milky liquid. The Maori people in New Zealand used the liquid to make chewing gum. (Do not taste this or any weed unless an adult says it's OK!)



Chickweed (Stellaria media)

This plant has small leaves and tiny star-shaped flowers with white petals. Its slender stems trail along the ground and have a line of fine white hairs along them. At different times people have used this plant in salads, in medicines to soothe the stomach, and to help them lose weight.



USDA-NRCS PLANTS Database / Hitchcock, A.S. (rev. A. Chase). 1950. Manual of the grasses of the United States. USDA Misc. Publ. No. 200. Washington, DC.

This grass has bright green leaves, and if you look closely you can usually see that they are softly hairy. Flowerheads

at the tips of the stems look like fingers. Sparrows and

other birds eat the seeds.

his pretty little plant grows along the ground a



This pretty little plant grows along the ground and has tiny reddish-orange flowers. It is also called "poor man's weatherglass" because its flowers close up tightly when the weather is bad.



Oxalis (Sour Grass) (Oxalis pes-caprae)

The leaves of this plant have oxalic acid, which makes them taste sour. (Do not taste this or any other weed unless an adult says it's OK!) Bright green and shaped like shamrocks or clovers, the leaves are often partly closed. The seedpods shoot out many brown seeds.



Dandelion (Taraxacum officinale)

This plant hugs the ground with its leaves. Gardeners find this weed hard to pull out of the ground because its taproot can be as long as your leg. The tiny white parachute on each seed helps spread dandelions.



Groundsel (Senecio vulgaris)

This plant's leaves have bumps all over them. Its yellowish flower always looks closed up. When it turns to seed, it has a puffy seedhead sort of like a dandelion's. This plant can be poisonous to cows, horses, and people.

Mallow (Malva spp.)

This plant sometimes lies close to the ground and sometimes is a few feet tall. Its leaves are round and wavy. One species of mallow is called cheeseweed because its seedpods look like wheels of cheese. This plant's seeds can live up to 100 years in the ground before sprouting!

Things you can do for plants

- "Adopt" a weed. Find a weed growing at home or at your program site. Look at it every day and watch it grow and change.
- Teach three friends about a weed and what it's good for.
- Plant seeds in a pot at home or at your program site. Nasturtium flowers are easy to grow. Water the pot when the soil feels dry. Make sure to put a saucer under the pot to catch the excess water.
- Volunteer to plant trees in your neighborhood. The California ReLEAF Network (www.nationaltreetrust.org/releaf/) has information on groups that are planting trees near you. Friends of the Urban Forest plants trees in San Francisco neighborhoods. You can learn more about trees by volunteering to help them on a Saturday morning. They are at www.fuf.net or (415)543-5000.
- Volunteer at the Golden Gate National Recreation Area to find out more about California native plants and weeds while doing fun, hands-on work. Go to www. parksconservancy.org/volunteer/dropin2. html#steward or call (415)4R-PARKS.

Find out more...

- Check your local library for a weed field guide. A field guide is a book with pictures and descriptions to help you identify something in nature. Ask the reference librarian for help finding one about weeds.
- Search the Internet for information about specific plants. A good place to start is UC Davis's website on common weeds: www. ipm.ucdavis.edu/PMG/weeds_common.html.
- Find out more about California native plants (plants that grew here before the Europeans arrived and brought species from other lands) at www.cnps.org.
- Learn more about plants on a free Greenbelt Outing with a parent or guardian. You can find the schedule at www.greenbelt.org.





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Urban Wildlife Safari



Summary

First, youth play a memory game using a special deck of cards to match a wild animal with its description. Then they go on a wild animal safari around their program site and discover features of the animals that help them meet their needs.

Learning Objectives

Youth will:

- Learn that wild animals also live in the city.
- Describe ways that animals in the greenbelt and at the program site meet their survival needs.

Materials

For the group

- Hand lenses
- Prizes, such as nature stickers or small treats (optional)

For each group of two to four participants

- 1 set of Urban Wildlife Memory Game cards
- · Resealable sandwich bag

For each participant

Copy of *Things you can do for* wildlife handout

Correlation to California Content Standards

Science

- Life Science: All organisms need energy and matter to live and grow. (Grade 4)
- Life Science: Living organisms depend on one another and on their environment for survival. (Grade 4)
- Life Science: Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. (Grade 5)
- Ecology (Life Science): Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. (Grade 6)

Background Information

Living in the city among buildings, roads, and other human constructs, it is easy to forget that we are surrounded by nature. The greenbelt is not just "out there" beyond the city boundaries. There are elements of the greenbelt right here where we live, work, and play. If you pause to take a look, you might see gulls circling overhead, a squirrel scampering across a power line, or ants scurrying along a crack in the sidewalk.

A city neighborhood can be a great place to learn about nature. By observing the habits and life cycles of the creatures that share our habitat, we can also begin to understand the nature that lives beyond our neighborhoods.

This activity focuses on the wildlife that the youth might find at their school or program site. The term wildlife includes any non-domesticated animal living in a natural state. Wildlife may be insects, spiders, birds, mammals, reptiles, fish, or amphibians.

Preparation

Step One: Copy and cut apart the cards on pages 22-23. Place each set, containing picture cards and clue cards, in a sandwich bag and seal.

Step Two: Scout out the program site for good places to find wildlife. The most likely places will be in and around plants and soil. A tree or shrub may have insects and spiders among the leaves or around the base; sidewalk cracks may be busy with ants; and a loose brick may have pill bugs crawling underneath.

Procedure

Step One: Introduce the activity by asking the youth whether they have been to the greenbelt, and asking them to think about the wildlife they saw there:

- ? Did you see any wildlife in the greenbelt? What did you see?
- **?** What is wildlife? (Wildlife is any undomesticated animal living in a natural state, not in captivity. Wildlife generally can fend for itself, getting its own food, water, and shelter; escaped domesticated animals are not considered wildlife.)



A mourning dove perches on a backyard fence. Photo ©2004 Tom Greer.

- **?** What are some examples of wildlife? (Wildlife can include insects, spiders, amphibians, mammals, birds, reptiles, and others. Keep asking until the youth give a range of examples.)
- **?** What wildlife have you seen living in the city?

Step Two: Show the students how to play the *Wildlife in the City Memory Game* (see page 23). Give each small group a set of cards for playing the game.

Step Three: If a group finishes before the others, have them try to sort the clue cards, putting together those that are alike in some way. For example, some of the cards show ways that the animals protect themselves, while others describe how they get food.

Step Four: When most of the groups are done, have the remaining groups finish up by turning any unmatched cards face up and matching them.

Step Five: Tell the youth that they will be going on a wildlife safari around the site. They will work in pairs to find as many different animals as they can. Point out that:

- They should be quiet and walk slowly so as not to startle the wildlife.
- The wildlife is not to be touched, disturbed, or harmed in any way.
- They will try to find as much wildlife as they can.
- They will be looking for ways the animals get their needs met in the city.
- Everyone who finds at least one animal will get a prize (optional).

Step Six: When they find an animal, they may use the hand lenses to get a closer look. Help them examine the animal more carefully by asking:

- **?** What can you see about this animal that helps it protect itself?
- **?** What can you see that helps it get the food and water it needs?
- ? How does this animal move around? How does moving help it survive in the city?

? What else about this animal helps it survive in the city?

Step Seven: If it seems they are having trouble finding animals, gather the youth together and ask them for ideas of good places to look, such as under rocks, among the leaves of a tree or bush, or in sidewalk cracks. Point out that these places give protection from sun and predators, and that they provide the food and water that these animals need. Give them time to keep looking.

Step Eight: Have the youth share with the group what they found. With the whole group, go around and look at the more interesting animals, asking the above questions. Hand out the prizes.

Wrap-up Questions

- **?** What is something good about wildlife in the city? (For example, it can be beautiful to watch, make soothing sounds, and help us learn about nature.)
- **?** How is city wildlife different from greenbelt wildlife? How is it the same?

(Think about how animals meet their needs for food, water, and shelter.)

- ? If you were a wild animal, do you think you would prefer to live in the city or in the greenbelt? Why?
- ? What can you do to help wildlife?

Distribute the *Things you can do for wildlife* handout.



Squirrels are lively residents of Bay Area urban parks. Photo by Sherry Ballard © California Academy of Sciences.



Insects are common Bay Area garden visitors. This damselfly can be distinguished from a dragonfly by its ability to fold its wings when at rest. Photo ©2000 Nick Kurzenko.

Urban Wildlife Memory Game

(copy and cut cards apart)



Urban Wildlife Memory Game

(copy and cut cards apart)

This animal looks like a large rat. It carries its young in a pouch and can "play dead" to protect itself from enemies.	This "cooing" bird eats seeds and grains. It uses bridges and balconies for its nests.	Game Rules Players: Two to four people may play at a time. Object: The object of the game is to get as many pairs as possible. Making a Pair: A pair is the clue card and the picture card of the same animal. Each clue tells about a way the animal meets its survival needs.
This animal gets its name because it often flies in the house. It sponges up food with its mouthparts.	This animal has seven pairs of legs and a hard armor. It can roll up into a ball to protect its soft underside.	How to Play: Shuffle the cards and deal them all face down in four rows. The player to the left of the dealer goes first. The player turns over two cards, leaving them in place. If a clue is turned up, the player reads the clue out loud. If the cards match, the player removes the two cards and takes another turn. If the cards do not match, the player turns the cards back over as they were originally, ending the turn. Play continues in the same manner. The next player
This animal makes webs to catch prey for food.	This animal eats insects that munch on plants. We call it a "lady," but it can be male or female.	 turns over two cards and, depending on whether they match, takes the cards or turns them back over. The game continues until all the cards have been matched up. Illustration credits: trin Moutinho * Lisa Hall Δ Ellen Blonder
This animal has a hard shell and glides on its long, slimy "foot."	This small animal lives in a hive and eats nectar and pollen.	* and Δ Courtesy of California Wildlife Habitat Relationships System, California Department of Fish and Game. Used by permission.

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Things you can do for wildlife

- When you see a spider or insect indoors, capture it in a container and let it outside instead of squishing it. Watch it for a few minutes to see where it goes and what it does.
- Tell a friend about why it's good to have wildlife in the city.
- Make a bird feeder. An easy way is to take an empty toilet paper roll and punch two holes at one end of it. Spread peanut butter on it, roll it in birdseed, and then hang it outside by a string tied through the holes. Place it somewhere that gives the birds places nearby to hide.
- Suggest to your teacher that you grow a butterfly garden. This is a garden that is designed to attract butterflies. It has special plants that butterflies prefer, and water and shelter for them. For more information, go to www.milkweedcafe.com/bflygarden.html. For specific information for California, visit www.laspilitas.com/butterflylist.htm.
- Volunteer to care for injured wildlife at WildCare in San Rafael: (415)453-1000 x21 or www.wildcaremarin.org, or the Lindsay Wildlife Museum in Walnut Creek: (925)935-1978 or www. wildlife-museum.org.
- Volunteer to restore wildlife habitat in the Golden Gate National Recreation Area. Go to www.parksconservancy.org/ volunteer/dropin2.html#steward or call (415)4R-PARKS.

Find out more...

- Pick one wild animal that you've seen in your city and go to the library to find out more about it.
- Check out the National Wildlife Federation website, www.nwf.org. Click on "For Kids and Teens" and learn about some amazing animals and things you can do to help wildlife.
- Ask your parent or guardian to take you on a free Greenbelt Outing to look for wildlife. Go to www.greenbelt.org.





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Water Pollution Solution



Summary

Using a simple model of a watershed, youth see where many kinds of pollution end up. They then try to clean up polluted "Bay water" and in the process learn why it's better to keep it clean in the first place.

Learning Objectives

Youth will:

- Describe ways that people and other living things rely on water for survival.
- Describe how oil, soap, and other materials can pollute water by washing from the ground and running off into a lake, stream, or bay.
- Understand that it is better to keep water clean in the first place than to have to clean it up.

Materials

For the group

- Newspaper
- 8.5" x 11" sheet of paper
- Marker with water-soluble ink
- Small spray bottle of water
- Chocolate syrup
- Liquid soap
- A few strips of shredded paper
- A handful of dirt in a sandwich bag
- Food coloring
- A sponge for cleanup

One for the whole group, or for each group of 2-5 participants (see variations)

- A clear plastic container (quart to half-gallon size)
- A sponge
- 2 small cups
- Strawberry basket or funnel
- Coffee filters or paper towels
- Toothpicks
- Small pieces of cardboard
- Turkey baster (can be shared between groups)

For each participant

• Copy of *Things you can do for the Bay* handout

Correlation to California Content Standards

Science

 Investigation and Experimentation: Scientific progress is made by asking meaningful questions and conducting careful investigations. (Grades 3-8)

History-Social Science

- Students demonstrate an understanding of the physical and human geographic features that define places and regions in California. (Grade 4)
- Chronological and Spatial Thinking: Students use map and globe skills to...interpret information. (Grades 3-5)

Background Information

During a rainstorm in the city, what comes down from the sky as clear, clean rainwater quickly becomes a murky mess as it flows along city streets, collecting oil, mud, and more. This mixture ends up in the storm drain system and eventually flows into the San Francisco Bay.

The Bay's biggest source of water pollution is urban runoff, the rain and other water that flows over streets, parking lots, and rooftops before reaching the Bay. Runoff dumps more toxic substances like lead, copper, and zinc into the Bay than sewage treatment and industrial discharges combined. It also includes many other pollutants, such as litter, food waste, automotive fluids, paint and other construction materials, and yard waste, all of which can harm fish, birds, and other wildlife.

Our cities have two different drainage systems—sewers and storm drains. Sewers carry wastewater, which is the water from sinks, showers, washers, toilets, and drains. This water is treated (cleaned) before it is directed into creeks, rivers, or the Bay. The storm drain system channels rainwater away from city streets to prevent flooding. This system contains no filters, so the water flows into the Bay without getting treated.

Preparation

Put down newspapers to protect the table from getting wet. Fill containers with water and set aside.

Procedure

Step One: Introduce the activity by asking the youth whether they've visited the greenbelt.

- **?** What body of water did you see on the trip to the greenbelt?
- **?** How clean do you think that water is?
- **?** Why might it be important for water to be clean?

Step Two: Help students understand that water is absolutely crucial for life. Point out that without water, people, animals, and plants simply could not live. Even though the students may not drink much plain water (they might drink soda, juice, or milk), they are getting water from these drinks and from the food they eat. Talk about the different ways people use water and why it is important that water be clean.



Urban runoff is the largest source of pollution in the San Francisco Bay.

? What are some ways that you use water?

(For example, drinking to keep our bodies healthy, cooking, growing food, bathing, washing dishes, doing laundry, and so on.)

- ? What would you do without water?
- ? Do you know anyone who fishes in the Bay? Why is it a problem for fish and people if the Bay water is polluted?

Step Three: Make a simple model of the San Francisco Bay (or other body of water) and show it to the youth:

- Crumple up a piece of paper and lay it out so that its largest indentation is in the middle, representing the Bay.
- Tell the group that this represents the Bay Area, but with the Bay dry. Point to a higher area of the model and ask:
- ? What would happen if someone living here changed the oil of their car and dumped it onto the street? Where would the oil go? (It might sit in the street or run into a storm drain.) What do you think would happen if it rained?
- Using a water-soluble marker, make a small circle on the model to represent the oil.
- Ask for a volunteer to spray water lightly over the entire model. Water will collect in the indentation that represents the Bay. The water will also dissolve some of the ink, and you should be able to see some ink in the Bay.
- Clean up the model by pouring the water into the sink and recycling the paper.

Step Four: Introduce the next activity by telling the youth they are going to look for the solution to pollution. Have them imagine that the Bay is like a soup, with all the ingredients that get washed from the area around it. Give each group of 2-5 participants a container of water that will represent the Bay.



This section of Strawberry Creek in Berkeley was daylighted—or returned from underground pipes to the surface—and now enhances a public park.

First, ask them to imagine that someone's car leaks oil.

? Where does the oil end up?

(On the streets and then in the Bay.) Pass the chocolate syrup around and have the youth pour a small amount of it into the Bay water.

Then, have them imagine that someone washes their car on the street.

? Where does the soapy water end up? (In the Bay.)Pass the soap around and have the youth pour some liquid soap into

Have them imagine that someone drops trash on the sidewalk.

the Bay.

? Where does it end up? (In the Bay.) Place some small strips of paper into the water.

Have them imagine that a bare hillside loses dirt when it rains.

? Where does the soil end up? (In the Bay.) Add a bit of dirt to the water.

Finally, have them imagine that a factory leaks some chemicals into a nearby stream.

- ? Where do the chemicals end up? (In the Bay.) Add one or two drops of food coloring to the water.
- ? Do you think this water would be good for fish, birds, or people? What do you think we could do to make it cleaner?

Step Five: Give each group the collection of materials. Give them some time to use the tools provided to see how clean they can get the water. Then ask:

- ? What methods worked?
- **?** Is the water completely clean? Does it look clean? Smell clean?
- ? What else could we try?

Step Six: Try other suggestions if the materials are available. When the water is as clean as the group can get it ask:

- ? Do you think fish or other animals would want to swim in this water?
- ? Is this water you would want to drink?

(This is the ultimate test; if you can't drink it, then it isn't clean.)

? Which do you think is easier: cleaning up water or keeping it clean in the first place?

Step Seven: Ask them if they have figured out what the solution to pollution is (lead them to understand that the best solution is to avoid pollution in the first place).

Wrap-up Questions

- **?** Why should we be careful about what we put on the ground?
- **?** Why should we care about clean water?
- **?** What could you do to help keep water clean?

Distribute the *Things you can do for the Bay* handout.

Variation

The second activity (steps 4-7) is most effective with the youth in groups of 2-5, each group with its own container of simulated Bay water. As an alternative, the whole class can work together with one container. Attempt to clean the Bay water in front of the class by asking for volunteers to suggest how the pollution can be removed. Students can come to the front of the room and demonstrate their methods.

Things you can do for the Bay

- Don't litter! Trash from the streets ends up in the Bay.
- Pick up litter you see and throw it away or recycle it.
- Put dirty cleaning water down a sink or toilet, not in the gutter or storm drain.
- Pick up after your pet.
- Organize your group to stencil storm drains with the message "No Dumping–Drains to Bay." In Alameda County, call (510)670-5543. Elsewhere around the Bay, call your city's stormwater program manager. Some of the Bay Area agencies are:
 - Alameda Countywide Clean Water Program
 - Contra Costa Clean Water Program
 - Fairfield-Suisun Urban Runoff Management Program
 - Marin County Stormwater Pollution Prevention
 Program
 - San Mateo Countywide Stormwater Pollution Prevention Program
 - Santa Clara Valley Urban Runoff Pollution Prevention Program
 - Sonoma County Water Agency
 - Vallejo Sanitation and Flood Control District
- Make sure the adults in your family know they can recycle used car oil at local gas stations. Pouring it in the storm drain sends it straight to the Bay.

Find out more...

- Call your water district to find out where your water comes from and look for that place on a map. In San Francisco, call the San Francisco Public Utilities Commission at (415)551-3000 and in the East Bay, call the East Bay Municipal Utilities District at (866)40-EBMUD, or ask your family for the phone number from the water bill.
- Find out about San Francisco and East Bay creeks and watersheds at www.museumca.org/creeks.
- Visit the Save the Bay website (www.savesfbay.org) to learn more about the San Francisco Bay.
- With your family, visit a nearby body of water on a free Greenbelt Outing. Find the schedule at www.greenbelt.org.





Nature in the City Bingo



Summary

Youth play a bingo game in which they look for elements of nature at the program site. They compare what they find to what they saw at the outing site.

Learning Objectives

Youth will:

- Observe nature where they live and play.
- See ways that people are a part of the greenbelt, not apart from it.

Materials

For the group

- Large sheet of chart paper divided in four with headings: Favorite Thing, Surprise, Same as Home, Different from Home
- Marking pen
- Prizes, such as small flower bulbs or seeds, nature stickers, or small treats

For each participant or pair

- Copy of Nature in the City Bingo card
- Pencil
- Copy of *Things you can do for nature in the city* handout

Correlation to California Content Standards

Science

- Life Science: All organisms need energy and matter to live and grow. (Grade 4)
- Life Science: Living organisms depend on one another and on their environment for survival. (Grade 4)
- Ecology (Life Science): Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. (Grade 6)

Background Information

The Bay Area's greenbelt is defined as the open space and farmland that surround this nine-county area. It is often thought of as a broad band encircling the area (hence the name green*belt*). The greenbelt is interconnected with the cities and towns that lie within.

Urban dwellers rely on the greenbelt for farm products, for recreation, and for scenic beauty. The greenbelt also provides environmental services to the entire region that help to make our cities more livable. The plants, animals, and other elements of greenbelt areas:

- Create fertile soils
- Maintain the balance of the air's oxygen and carbon dioxide
- Help collect and purify water to drink and use
- Prevent erosion
- Prevent flooding
- Maintain climate balance
- · Create and pollinate our food

In addition, cities and the greenbelt are linked together by the species they share in common. Many of the same insects, birds, and plants you see in the greenbelt may also be found right at home on your block.

Procedure

Step One: Introduce the activity by showing the chart and having the youth think about a time they have visited the Bay Area's greenbelt. Ask them to share their ideas for each of the four categories:

- Their favorite thing they saw in the greenbelt
- Something about nature that surprised them on thir visit to the greenbelt
- How the greenbelt site they visited is like home
- How it is not like home

Record their answers on the chart as they share.

Step Two: Ask the youth to describe the greenbelt and ask them whether they think they could find pieces of the greenbelt at the program site.

Step Three: Give each student (or pair) a bingo card and a pencil. Explain the activity:

- They will be looking outside for pieces of the greenbelt.
- They will be searching for elements of nature (not made by people or

right machines) for each of the squares.

- They should be careful not to disturb anything.
- They will find more items if they are quiet and walk slowly rather than dart around.
- They should draw each item they find.
- They should try to get five in a row vertically, diagonally, or horizontally.
- Every person who gets five in a row (subject to checking by the leader) will get a prize.

Step Four: Take the group outside and show them the boundaries for the activity before you have them begin.

Step Five: If some youth finish before the others, challenge them to see how many items they can find. Maybe they can find all of them!

Step Six: Go back inside and ask a few of the youth to share something from their bingo card.

Step Seven: Have youth take a look at the chart you started in step 1 and say whether there is anything they would add or change based on what they found at the program site.

Wrap-up Questions

- ? What did you find here that you also saw in the greenbelt? Were any of the plants and animals exactly the same?
- ? People sometimes think that nature is "out there" away from the city. Do you think that is true? Why or why not?
- **?** Why is it good to have nature in the city?
- **?** What could you do to help nature in the city?

Distribute the *Things you can do for nature in the city* handout.

Variations

For a shorter activity, youth can write the name or description of what they see instead of drawing it. For a longer activity, you can require that they fill in the whole chart.



Flowers brighten an urban street.

Nature in the City Bingo

Look for these things NOT made by people or machines. When you find one, draw it in the square. Find something that is...

B	0	R In the square.	G	Ο
An animal	Living on a plant	A sign of the season	Moving	Round
Flat	Water for wild animals	Red	Rough	An insect sound
The size of a dime	A bird sound		Straight	Living in soil
Moving in the air	Shiny	Nice-smelling	An animal home	A seed
Yellow	Living in a crack	Sharp	Surprising to you	Eaten by animals

Things you can do for nature in the city

- Get a map of your city and find the park closest to your home. Go there and pick up a few pieces of trash to make it nicer.
- Go for a walk around your neighborhood with someone in your family. Look for plants and animals living in out-of-the-way places.
- Volunteer to clean up a park or plant trees in your neighborhood. Check the Bay Area Volunteer Information Center, www.volunteerinfo.org, to learn what groups are looking for help. Volunteer opportunities specifically for youth can be found at www.thevolunteercenter.net/ volunteers_youth.php.
- Create more nature in the city: grow some plants at your home, or ask your teachers about starting a garden at school. For help, see the San Francisco Green Schoolyard Alliance website at www.sfgreenschools.org.

Find out more...

- Go to your local library and ask the librarian to help you find a book on urban nature (or nature in the city).
- Visit the Randall Museum in San Francisco, the Oakland Museum in Oakland, or the Lindsay Museum in Walnut Creek to learn more about nature in our area.
- Contact a local hiking club, environmental organization, or urban garden to find out what they are doing to help the greenbelt.
- Sign up for a "nature in the city" tour of San Francisco (San Francisco Neighborhood Parks Council, www.sfneighborhoodparks. org/nitc/ or (415)621-3260) or a nature walk at one of the East Bay Regional Parks (www.ebparks.org or (510)562-PARK). Ask your family to take you on a free Greenbelt Outing. Look for the schedule at www.greenbelt.org.





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