



BE A SCIENTIST

Developed by the San Francisco
Bay Wildlife Society

Activity packet designed by Megan Tobias



NATIONAL
WILDLIFE
REFUGE SYSTEM



Santa Clara Valley
Urban Runoff
Pollution Prevention Program

Calling all scientists!

Welcome to the "Be A Scientist" Activity Packet!

Throughout this packet, you will complete activities that challenge you to be a scientist in various ways. You will use your observational skills to be a field scientist, examine the relationships between plants and animals as a biologist, design a pollinator garden as an engineer, and think like an environmental scientist as you come up with ways to protect local habitats.

A scientist is someone who studies things in order to understand how the world works. To do so, they make observations, ask questions, and research various topics. There are many different types of scientists and a wide variety of ways in which a person can engage in science. The most successful scientists are curious, patient, courageous, detailed, creative, and open-minded. With these qualities, you can be a scientist at home, on your next adventure in the outdoors, and in the classroom!



Before you begin your journey as a scientist, there are some important terms for you to review. Please read through them below!

Important Vocabulary Words

Environment - Where we live, work, eat, and play. All of the physical surroundings on Earth, including all living and nonliving things that rely on the environment to survive.

Ecosystem - All of the living and nonliving things in an area and their environment. These plants, animals, water, rocks, and soil all make up a community and interact with each other.

Organism - A living thing that can grow and reproduce, such as a plant or animal.

Biology - The study of organisms, or living things.

Biodiversity - The variety of life, such as the different types of plants and animals, found in a habitat or across the entire Earth. Scientists can measure the health of a habitat by its biodiversity.

Engineering - The process of creating and building items and structures using one's knowledge of science and math. Engineers use their inventions to solve problems.

Important Vocabulary Words, continued

Endangered species - Any plant or animal species that is in danger of disappearing forever.



Habitat - A place where an animal lives that provides it with food, water, and shelter—everything it needs to survive!

Litter - Trash that is not disposed of properly and can pollute the environment.



Recycle - The act of taking materials that are no longer useful and changing them into new, usable items.

Native plants - Plants that grow naturally in a particular area or ecosystem. Over time, these plants evolve and adapt to the local soils and climate as well as with other native plants and animals.



Wetland - A place where land and water meet; land flooded by water either permanently or seasonally.

Watershed - The entire land area where water drains and collects from rainfall. Watersheds are divided by ridges of high land, and the water from many sources travels to a common point or an eventual outflow point such as a bay.



Runoff - The draining away of water on the ground surface, specifically rainwater that flows over the land because the ground and plants cannot absorb it. The water will also flow into the nearby watershed.



Pollutant - A substance that, when introduced to an environment, has harmful effects. Pollutants can be chemicals or waste products that threaten the health of plants, animals, or the natural environment.

Pollution - The presence or introduction of harmful substances into an environment; the destruction or contamination of a natural resource.



Bioaccumulation - The spread of a substance or pollutant in a living organism that travels up the food chain. Animals farther up the food chain will eventually have higher pollutant concentrations as they build up from the previous level.

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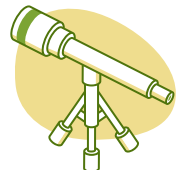
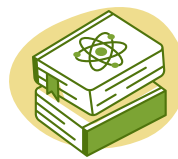
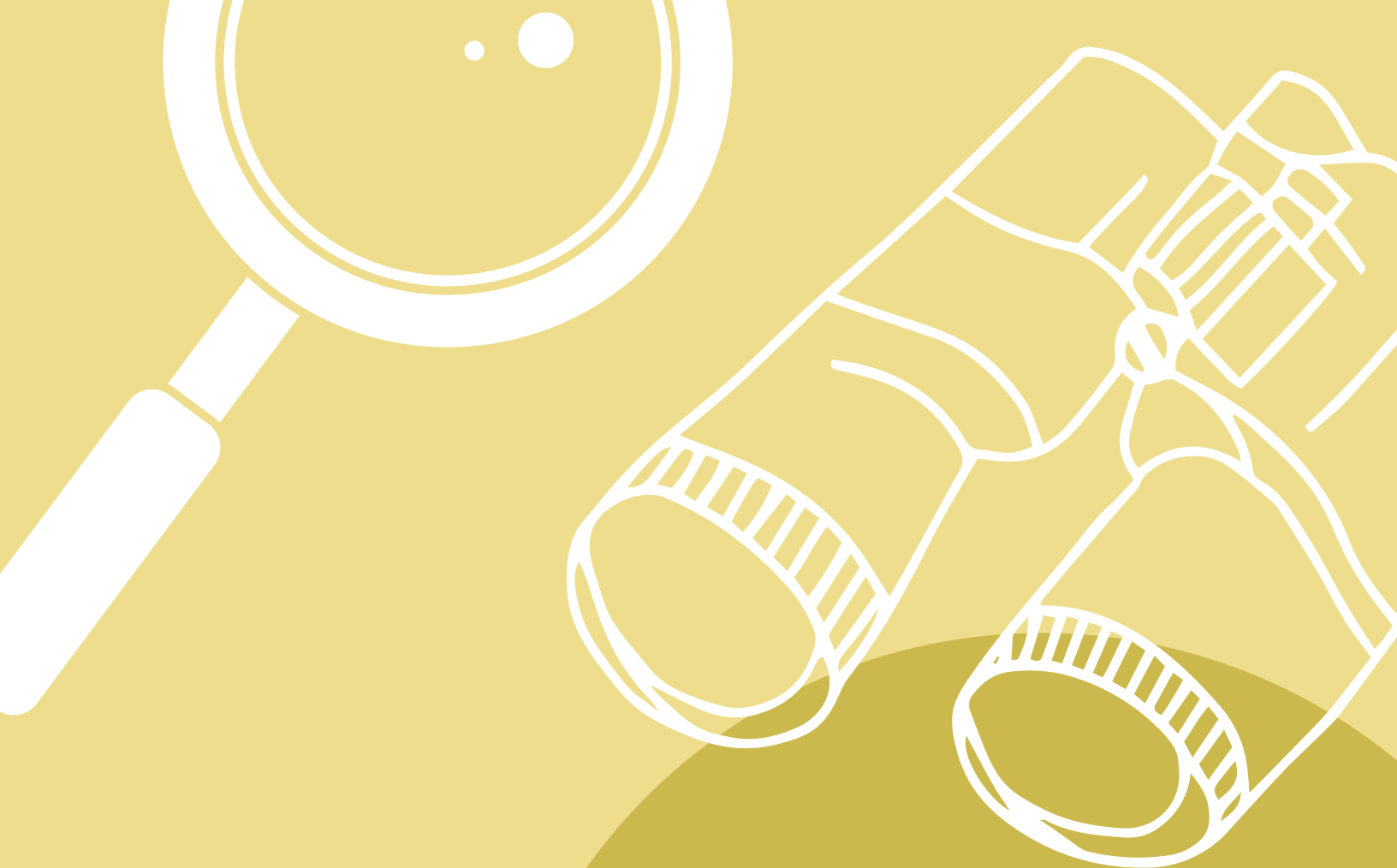


Image: Don Edwards San Francisco Bay National Wildlife Refuge during sunset.



PART 1

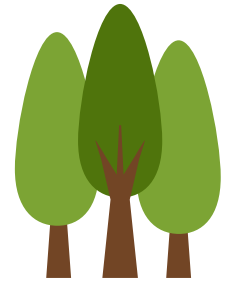
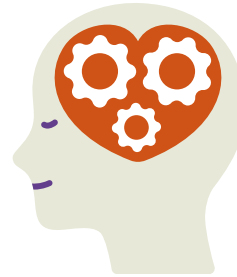
MAKING OBSERVATIONS



Intro to Mindfulness



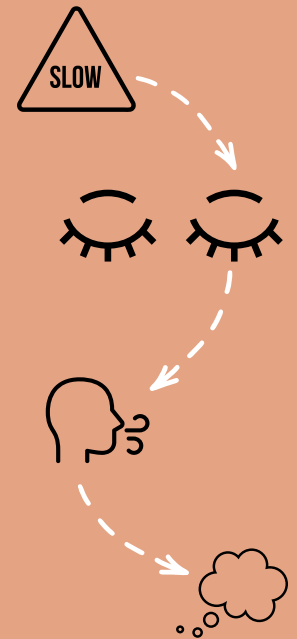
Mindfulness is the ability to be fully present and to be aware of where you are and what you are doing. For many of us, nature can be a peaceful place where we go to take a break from our normal routines. By practicing mindfulness in nature, we can feel calm and appreciate the outdoors through all of our senses.



Instructions

This activity is designed to help you be calm, present, and more open to your surroundings in the outdoors. Find a comfortable spot outside (on your balcony, under a tree, in your backyard, etc.) and get ready to relax!

- 1 Slow down, and find a place to sit or stand.
- 2 Once you are comfortable in your spot, close your eyes.
- 3 Calmly take 12 deep breaths. Take your time; do not rush these breaths. You should feel as if you are completely filling up your lungs with air, then slowly exhaling all of it.
- 4 While you complete this mindfulness exercise, you can think about any of the following:
 - Focus on what you can hear.
 - Focus on what the ground feels like beneath you.
 - Focus on your body; if any part of it feels tense, try to actively relax it.
 - Focus on how the wind or sun feels on your body.



Reflection

How did this exercise make you feel? What are some other things that you enjoy doing in an outdoor setting when you are stressed? Write your answer in a few sentences below.

All scientists are mindful in nature; they pay attention to the wellness of the environment around them.



You can do this by being aware of surrounding habitats and not making loud noises, disturbing plants and animals, or leaving trash on the trail.



Sharp Eyes



One of the most important components of being a scientist is making observations. While observing something, scientists form questions based on what they see, hear, and feel. Later, they use these observations and questions to form a hypothesis (proposed explanation for why something happens) that they will test in an experiment. Observing is a crucial step at the beginning of this process—and as a scientist, you can make observations with your own eyes from any location that you wish.

By playing this game, you will realize that you must be very observant if you are to notice the world around you. In order to really get to know the world of nature, you must use all of your senses and focus, for much of nature is silent, shy, or hidden.

Instructions

- Find an even number of players. Divide your group into two equal teams, and have the teams face each other about six feet apart. Choose one person to be the "signaler" that will notify everyone to start various stages of the activity.
- At a signal, look at the person directly across from you and try to take in as much as possible about their appearance.
- At another signal, turn around so your two teams no longer face each other. While you all are facing the other way, change something about your appearance (untie a shoelace, fasten a button, take off a shoe, cuff your pant leg, etc.).
- At a third signal, turn back to face each other again. Try to spot the changes in the player opposite you.

Did you notice the changes that your opponents made? List them below!

It's fun and challenging to find subtle changes in appearance, just like it is when trying to observe all the details of nature! For the second part of this activity, use the same sharp observation skills to try to spot the items outlined below. Check off the boxes as you find them!

- A bird flying through the sky
- A multi-colored leaf
- Ants crawling on the ground
- Hills in the distance
- An animal in a tree



Add three of your own observations below.

- 1 _____
- 2 _____
- 3 _____



Bird Scavenger Hunt



Test your observational skills with this Bird Scavenger Hunt! Use your “sharp eyes” (and binoculars, if you have them) to find as many of the items, actions, or birds as you can. Then, when you identify one of the objects in the grid below, mark it off. You can complete this scavenger hunt anywhere—on a walk through your neighborhood, during a stroll at your local park, or while visiting Don Edwards San Francisco Bay National Wildlife Refuge!

<p>Bird nest</p> 	<p>Insect</p> 	<p>Bird in a tree</p> 	<p>Shelter on the ground</p> 	<p>Bird in water</p> 
<p>Bird scat</p> 	<p>Bird with white feathers</p> 	<p>See a bird eating</p> 	<p>Water source</p> 	<p>Bird on the ground</p> 
<p>Two kinds of leaves</p> 	<p>Bird feeder</p> 	<p>FREE SPOT</p> <p>Write in your own sighting!</p>	<p>Plant on the ground</p> 	<p>Bird flying</p> 
<p>Shelter above the ground</p> 	<p>Hazard to a bird</p> 	<p>Bird with long legs</p> 	<p>Hear a bird singing</p> 	<p>Bird smaller than your fist</p> 
<p>Birds in a group</p> 	<p>Feathers on the ground</p> 	<p>See two different kinds of birds at once</p> 	<p>Predator</p> 	<p>See a bird preening</p> 

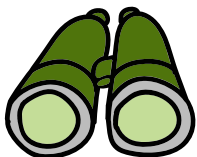
Nature Journaling

Now that you have begun to develop your observational skills, you will put them to the test as a Field Scientist conducting research in the outdoors. To keep track of your observations, you will make entries in a Nature Journal! Each entry can be completed anywhere outside. Nature and wildlife are everywhere, not just in what we think of as the “wilderness.”

Remember to be respectful of your environment and to be quiet while you study your surroundings. As we learned during our "Sharp Eyes" activity, much of nature is silent, shy, or hidden.

Materials

- Nature Journal or Blank Paper
- Pencil
- Markers, Crayons, or Colored Pencils
- Binoculars or Magnifying Glass (optional)



Instructions

- 1 Find a spot outdoors where you can comfortably write and draw. You can make a Nature Journal entry anywhere, including in your backyard, from your porch, or on your balcony. Be creative; you can observe nature in the most unexpected places!
- 2 Once you have found your observation spot, make note of the following at the top of each entry in your Nature Journal: the date, time, weather, and location.
- 3 Using one of the Nature Journal Ideas on the next page as a general guide, observe your spot for at least 15 minutes, making notes and sketches in your journal (you can take more time after to write down your thoughts and complete your drawings).
- 4 You can continue to make Nature Journal entries wherever you go! Bring your Nature Journal on a hike, to the beach, or on a walk through your neighborhood—you never know what you might observe!

Tips

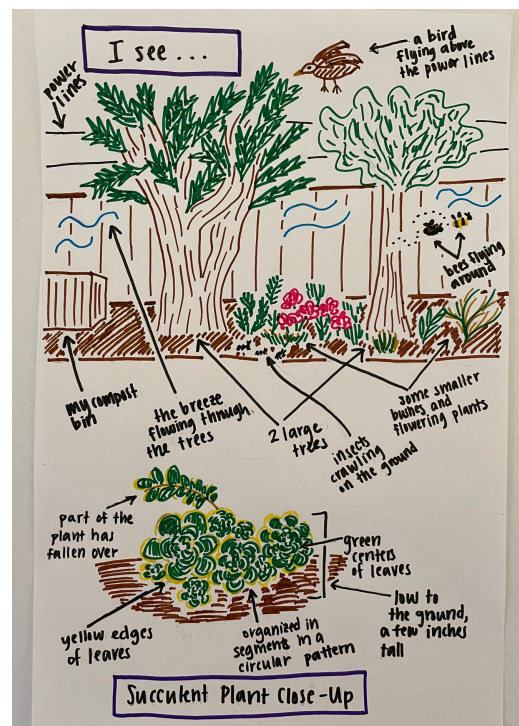
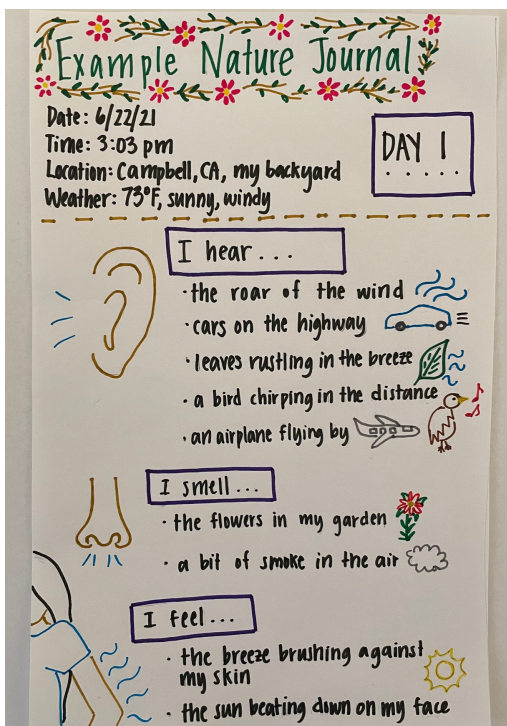
- Use binoculars or a magnifying glass to help you see things that are farther away or things that are close to you in more detail.
- If you're unsure of what to write, try starting your sentences with: "I see...," "I think...," "I wonder...," "This reminds me of..."
- When you draw, you can sketch a full view of your surroundings or focus on making detailed sketches of individual plants or animals that you observe. Try to do both throughout the week!

Nature Journal Ideas

Try to make a Nature Journal entry every day for a week. You can choose one of these Nature Journal Ideas each time you journal. You do not have to answer all of the questions; these "ideas" are here to guide your own observations!

- **Observing with different senses**
 - Close your eyes for 2 minutes and use your other senses to get to know your environment. What do you hear? What do you smell?
 - Open your eyes, and take the rest of the time to observe your space with all of your senses. What do you see?
- **Observing from different angles**
 - Look above you. What plants or animals do you notice?
 - Get close to the ground. What do you observe from this perspective?
- **Observing plants and animals**
 - What animal might live in this environment? (If you see an animal during your observation, write about it!) Describe a day in the life of that animal.
 - Pick a plant near you. What personality does it seem to have? What stories would it tell?
- **Observing urban green spaces**
 - Find an observation spot that is in an urban area, such as a city park, your balcony, or your yard. What sorts of urban areas are beneficial for wildlife? What urban spaces are not as beneficial for wildlife? Why?
- **Make your own story**
 - Write a story about what goes on when you are not at this spot. What other animals visit this spot during the day, and what do they do?

Unsure where to start? Having trouble organizing your thoughts? Check out these sample Nature Journal entries below for examples on how to structure your observations.





PART 2

BEING A BIOLOGIST



Food Chain Links



Calling all biologists! The Don Edwards San Francisco Bay National Wildlife Refuge is trying to understand the relationship between some of our wetland species, and we need your help.

A biologist is a scientist who studies living organisms. There are many different types of biologists—some focus on microscopic objects like cells, while others study how populations of different species interact with one another. For this activity, you will be a wildlife biologist that is examining the relationship between various plants and animals in a wetland habitat. To understand this relationship, you will create a food chain!

Intro to Food Chains

What is a food chain?

A food chain shows the order in which plants and animals feed on each other.

What are producers?

All food chains begin with producers, usually plants. Plants make their own food (energy) by using sunlight. Through photosynthesis, plants absorb energy from sunlight and convert carbon dioxide and water into food.

What are consumers?

Animals are consumers, they cannot produce food on their own.

What are first level consumers?

Animals that eat plants are known as herbivores and they are first level consumers on a food chain.

What are second, third, and fourth level consumers?

Animals that are second, third, and fourth level consumers in a food chain are insectivores (insect-eating), carnivorous (flesh-eating), or omnivorous (flesh-and-plant-eating).



Wetland Food Chain Example

Pickleweed is eaten by salt marsh harvest mice, which are eaten by Ridgway's rails, which are eaten by birds of prey.



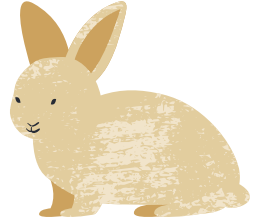
Food Chain Links, continued

Instructions

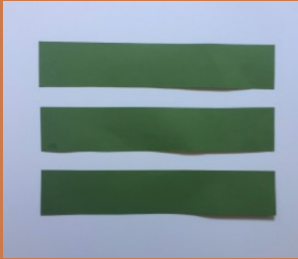
You are going to make your own wetland food chains! First, choose which food chain you would like to make. Check out the Wetland Plants and Animals fact sheets in the Appendix if you need some ideas. Remember—your food chain must start with a producer. Follow the remaining instructions below to complete the chain.

Materials

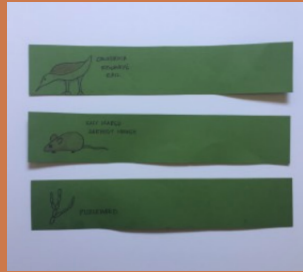
- Construction paper
- Scissors
- Glue
- Pencil
- Colored markers



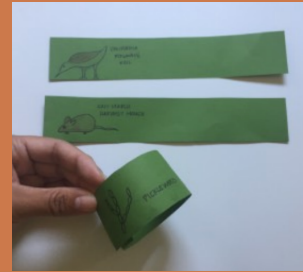
Cut the construction paper into strips that are about 1.5 inches wide and 8 inches long.



Draw or write down one member (plant or animal) on each strip of paper



Loop and glue the strips into a chain that shows the order of the food chain you chose.



Once all of your strips have been linked together, your food chain is done!



Reflection

A pollutant is a harmful substance, such as a chemical or trash, that threatens the health of plants, animals, or the natural environment. What would happen if a new pollutant was introduced into an ecosystem where this food chain exists? In particular, how would it change if this impacted one of the species in your food chain? Write your answer below.

Bioaccumulation refers to the spread of a substance or pollutant in a living organism that travels up the food chain. Animals farther up the food chain will eventually have higher pollutant concentrations as they build up from the previous level. Which of the following would have a higher level of pollutants in its body? Circle your answers.

1.



Peregrine Falcon

or



Crab

2.



Salt Marsh Harvest Mouse

or



California Ridgway's Rail

Design Your Own Pollinator Garden

What is a pollinator?

A pollinator is any animal that moves pollen between plants, helping them to reproduce. Pollinators visit flowers to drink nectar or eat pollen and transport pollen grains as they move from plant to plant. Bats, bees, beetles, birds, butterflies, moths, and wasps are all common pollinators that are found at the Don Edwards San Francisco Bay National Wildlife Refuge and around your neighborhood.



Why do we need to protect pollinators?

Most of the flowering plants on Earth need the help of pollinators. The world's pollinators are currently known to support 180,000 different plant species and more than 1,200 crops. About 1 out of every 3 bites of food you eat is brought to you by the help of pollinators! By helping plants make more plants, pollinators also play an important role in maintaining healthy natural ecosystems. The simple truth is the humans can not survive without pollinators.

Pollinator populations are declining due to a loss of feeding and nesting habitats. Pollution, human development, the misuse of chemicals, and climate change are all having negative impacts on pollinators.



Pollinator Necessities

These items are important components of a pollinator's habitat that help them to survive. To protect pollinators around our neighborhoods, we can make sure that our yards include most, if not all, of these items!

Dried Leaves



Mud



Twigs



Plants of Different Heights



Bee Blocks



Water



Different Colored Flowers



Exposed Soil



Bushes and Shrubs



What is a bee block?

Bee blocks attract native bees to yards and fields by providing holes in which the bees can nest. Once the tunnel is full of eggs, the female bee will plug the hole. The different sizes of holes attract different bee species.

Pollinator Garden, continued

For this activity, you will use your biology and engineering knowledge to design your own pollinator garden. Using the nine "Pollinator Necessities" items mentioned on the previous page, draw an ideal pollinator garden in the rectangle below. Your drawing can be from an overhead view, or you can structure it as if you were looking at the garden from your own perspective. Feel free to add as many pollinators into your design as you wish!



Reflection

After engineers design something, they move on to building it. What steps would you take to build your pollinator garden?

Once your pollinator garden is finished, how would you monitor its success?

Challenge: Make your design a reality! Tell your family about the importance of pollinators, and work with them to add some of these items to your own garden at home.



PART 3

BEING AN ENVIRONMENTAL SCIENTIST



Eco-Art Challenge



Using your engineering skills, create an art or fashion piece from recyclable objects!

Activity Introduction

One of the most important skills that scientists possess is the ability to solve problems by coming up with creative solutions. In this section, you will learn about plastic pollution and the importance of protecting our watersheds, and then you will use your skills as an engineer and environmental scientist to creatively combat the issue of plastic pollution.

What is plastic pollution?

A major problem today is plastic waste or plastic pollution. Plastic pollution is the buildup of plastic in the Earth's environment, which can negatively impact humans and animals. If not thrown away properly, our trash can move from our neighborhoods into streams and rivers, which eventually empty into the ocean. This process poses a threat to the health of local watersheds and coastal habitats alike. Plastic items like discarded fishing nets and six pack rings can entangle animals, and some animals can mistake grocery bags and water bottle caps for food.



Why is it important to limit our waste?

With so many items thrown away each day and dumped into landfills, we are running out of space to put our trash. The Don Edwards San Francisco Bay National Wildlife Refuge location in Alviso is surrounded by 5 landfills. Some trash blows into the Refuge, threatening animal and plant life. Our local watersheds are also put at risk by pollution from urban runoff. By limiting our waste, disposing of trash properly, and coming up with creative solutions to these issues, we can slow down the growth of landfills and reduce plastic pollution. When we work together, we can keep our ecosystems clean and healthy.

The Watershed Connection

Our watersheds can be significantly affected by plastic pollution. A watershed is an area of land where water drains and collects from rainfall. They are divided by ridges of high land. Within each watershed, water from many sources travels to a common point or an eventual outflow point such as a bay.

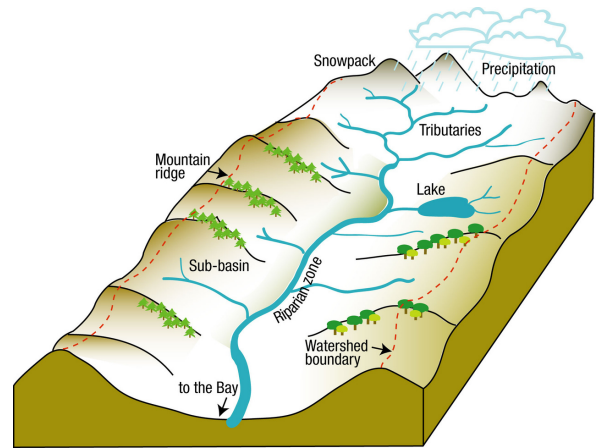
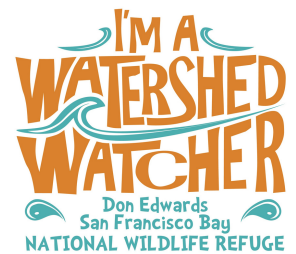


Image from Friends of the Fox River

Find your watershed! In which watershed is your school or home located?

- **Alameda County** - Use this interactive map to find your local watershed: <https://acfloodcontrol.org/the-work-we-do/resources/#explore-watersheds>
- **San Mateo County** - Enter your address into the interactive map to locate your watershed: <https://publicworks.smcgov.org/watersheds-san-mateo-county>
- **Santa Clara County** - Visit the Valley Water website: <https://valleywater.org/learning-center/watersheds-of-santa-clara-valley>
 - Tip: Click on each watershed listed and select the "Fast Facts" tab to find your city.
- Once you have located your watershed, fill in the following:
 - Zip Code or City Name: _____
 - Watershed Name: _____
 - Is your school located in the same watershed? _____ If not, in which watershed is it located? _____
- **Bonus: Use Google Maps to find your local creek!**
 - Type "creek" into the search bar to find creeks close to your current location or search manually for the light blue water sources. Which creek is nearby? _____



Why do we need to protect our local watersheds?

Watersheds provide clean drinking water, a home for local plants and animals, and recreational opportunities for our enjoyment. When unnatural substances such as chemicals and plastic enter our watersheds, they threaten the health of the local ecosystem and all of its inhabitants. It is important that we all do our part to protect our watersheds. You will learn more about different actions you can take in the next three activities. **Once you complete them, you will become a Watershed Watcher!**

Eco-Art Challenge, continued

Instructions

For this activity, you will collect recyclable and single-use items from your home and make eco-art. Designing eco-art is a creative way to bring attention to an environmental issue like waste and plastic pollution. Choose one of the following eco-art options, and get to work!



Option 1: Trashion Show

Imagine that a famous clothing brand is asking you to make clothing or accessories (hats, bracelets, jewelry) from recycled materials or single-use items—things you use once and then throw away like straws, plastic bags, and drinking cups. Using recyclable and single-use items at home, make a piece of clothing or an accessory that will be part of a Trashion Show! Just like a scientific article or research presentation on this topic, the Trashion Show will bring awareness to plastic pollution.

Option 2: Recyclable Art Piece

Imagine that a local museum is asking you to make an art piece using recyclable materials or single-use items. Your art piece will be featured in the museum for a long time and will make people think about reducing waste and stopping plastic pollution. Your art piece can be big or small, and you can also use other materials like markers and paint to make your art piece stand out. Feel free to be as creative as you wish!

Need some inspiration? Check out these Eco-Art examples from our 2021 Virtual Marsh-In Summer Camp!





Environmentalism from Home



In our daily lives, there are many ways that we can combat plastic pollution and protect our environment. Even from home, we can change our behaviors to shift away from single-use items and other non-reusable objects.

Environmental scientists use their knowledge of the natural world to protect the health of the environment, wildlife, and humans. In this activity, you will be an environmental scientist that is coming up with ways to prevent pollution and protect our land by matching the human-made objects on the left to the "environmentally-friendly" action on the right. If we follow these actions, we can protect our local watersheds from being polluted and safeguard the health of local habitats.



Paper Bag

Going Paperless/
Unsubscribe List

Car



Donating/Thrifting



Astroturf

Exploring/Sharing
Your Knowledge

Clothing



Recycling/Upcycling



Plastic Bottle

Renewable Energy

Battery



Carpooling/Public
Transportation



Hand Lens

Using Reusable Items

Junk Mail



Planting Native
Species

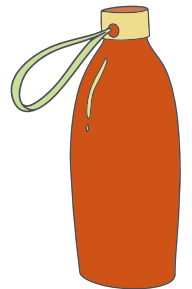
What You Can Do to Protect Your Watersheds from Home

As you learned in the Eco-Art Challenge activity, it is crucial that we take action to protect our local watersheds. The checklist below features many things that you can do from home or at school to positively impact watersheds and share your knowledge with others.

We challenge you to complete at least 5 of these items throughout the week. If you're able to check off all of them, that is great! By following through on these actions, you are continuing to be a Watershed Watcher and using your knowledge to lead by example. Who knows—maybe your actions will inspire others to act similarly in the future!

Watershed Watcher Action Checklist

- Tell your friends and family about the importance of watersheds.
- Complete the Eco-Art challenge to upcycle your trash and give them a second life!
- If you have an outdoor pet, pick up your pet's waste and dispose of it properly.
- Use a reusable water bottle instead of a single-use plastic water bottle.
- Check that your recyclables are clean before they go out to your curbside bin. This will keep them from going to the landfill.
- Encourage your household to use environmentally-friendly household cleaners.
- Safely pick up litter around your neighborhood, at your local park, or on your favorite trail.
- Take a walk around your neighborhood and look for storm drains. Remove any litter, leaves, or other items that may be washed into the storm drain.
- Explore your yard, balcony, or outdoor space. Is there room to plant native plants? If so, draw out a plan to add some to create habitat for native animal species.
- Encourage your household to take any cars to the carwash instead of washing them at home. You can keep soap and dirt from entering the storm drains!





Scientist Pledge



Through their observations, research, and innovations, scientists help us to understand the world and guide us to act in ways that benefit the health of humans, wildlife, and the natural environment. In this activity, you will create a “Scientist Pledge” where you will describe one way you pledge to help the earth using what you learned throughout this packet.

Instructions

On the magnifying glass template below, write down one or two actions you plan to take as an environmentally-conscious scientist. You can use these questions to guide your pledge:

- What would a scientist advise us to do in order to limit pollution?
- How would a scientist treat a habitat that they are observing?
- How can you think like a scientist to solve an environmental problem?

If you need some more ideas, think back to what you learned about in the other activities. Feel free to decorate your Scientist Pledge, as well! You can also share your pledge with others so they will see exactly how much you care! By sharing the pledges, we can inspire others to make positive changes, too!

**As a
scientist, I
pledge
to...**



For Teachers or Parents: You and your students/children can continue to help the environment by being community scientists! A community scientist is someone who participates in scientific research as a member of the public. We encourage you to share your nature observations using www.iNaturalist.com. Please visit their website for more information.



APPENDIX

Wetland Plants and Animals: Fun Facts



Great Egret

Diet: Small vertebrates and aquatic invertebrates.

Size: 39" in length and 51" wingspan.

Description: Large white heron; heavy yellow bill; blackish legs and feet; breeding adults have long plumes which trail from the back and extend beyond the tail.

Did you know? This bird stalks its prey slowly and methodically, and you can often see the great egret hunting in the uplands, salt marsh, mudflats, and sloughs.



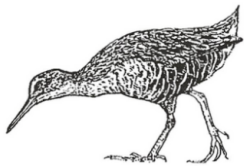
Salt Marsh Harvest Mouse
(endangered)

Diet: Pickleweed.

Size: 2 1/2" - 3 1/2" long.

Description: Upper parts of mouse are a rich brown, which contrasts with the lighter-colored fur of its belly. Salt marsh harvest mouse closely resembles the more common western harvest mouse (*R. meglotis*).

Did you know? It is an endangered species found only in the salt marshes of the San Francisco Bay.



California Ridgway's Rail
(endangered)

Diet: Crustaceans, insects, frogs, worms, small mammals, and cordgrass.

Size: 14" - 16 1/2" in length.

Description: Grayish edges on brown back feathers; olive wing tints; gray cheeks; cinnamon undersides.

Did you know? It has a very distinctive call that is a series of ten or more dry "kek kek kek kek" notes, which accelerate and then slow. They predominantly call at dusk and dawn.



Snail

Diet: Diatoms, algae, plant materials, and clams.

Size: Extremely variable in size, 0.1" - 1" in length.

Description: Has a single coiled shell and a distinct head and tentacles.

Did you know? Snails crawl slowly in the mud in shallow water, feeding on diatoms that they scrape off of the mud with their tongues.



Fish (Topsmelt)

Diet: Zooplankton and phytoplankton.

Size: 14 1/2" in length.

Description: Green from above, silver from below, with a bright silver side stripe.

Did you know? These fish swim in large schools.



Peregrine Falcon
(delisted 8/26/1999)

Diet: Small to medium sized birds.

Size: 16" - 20" long.

Description: A powerful raptor with a black "helmet" head; long, pointed wings, mostly brown in color.

Did you know? It is the fastest bird in the world, and it can reach speeds of up to 2000 miles per hour, diving from above to kill its prey.

Wetland Plants and Animals: Fun Facts



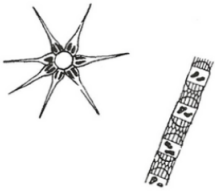
Northern Harrier

Diet: Males prey more on birds, while females eat more mammals. It has been reported to drown waterfowl.

Size: 16 1/2" in length, 42" wingspan.

Description: Obvious white rump patch. Male has gray back, throat, and breast, white belly marked with brown, tail with black bars. Female is brown-streaked on breast; brown above.

Did you know? The Northern harrier flies close to the ground when searching for its prey in the upland, salt marsh, and salt pond habitats.



Phytoplankton
(tiny, drifting plants)

Diet: Sunlight (used for photosynthesis).

Size: 63 - 153 micrometers in length (very tiny!).

Description: Drifting plants, primarily single celled algae and diatoms.

Did you know? Phytoplankton is at the base of the food chain for the ocean, bay, slough, and mudflat food webs.



Pickleweed

Plant size: Low growing plant that spreads out across the salt marsh, branches grow 8" - 25" tall.

Leaf description: The compressed leaves look like a series of pickles attached end to end.

Flower description: Tiny white flowers that bloom from April to September.

Did you know? This plant takes up salty water through its roots and stores excess salt in the top "pickles." In the fall, this part turns red and falls off, ridding the plant of the extra salt. This is the salt marsh harvest mouse's main food source.



Salt Grass

Plant size: 8" - 12" tall, low growing grass.

Leaf description: Stiff and wiry grass-like leaves.

Flower description: Clusters of flowers in bloom from April to July.

Did you know? The plant often has noticeable salt crystals that have been sweated out onto the leaves.



Crab

Diet: Detritus, phytoplankton, zooplankton, and dead fish.

Size: 1.2" - 1.4" in length.

Description: Light gray, green, or yellow carapace (dorsal section of shell) with small blue/black spots and lighter colored legs with similar spots. Its legs are covered in many hairs known as setae.

Did you know? They burrow in the mudflats of the slough and are preyed on by egrets, California Ridgway's rail, and killdeer.

Neighborhood Plants and Animals: Fun Facts



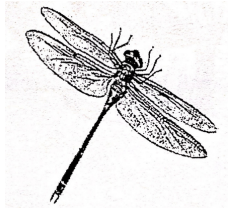
Anna's Hummingbird

Diet: Feeds on nectar, water, spiders, and tree sap.

Size: 3 1/2 inches - 4 inches in length.

Description: Male has a deep rose red head and throat; female's throat has reddish flecks; both have grayish underparts washed with green.

Did you know? This is the only hummingbird in this area that does not migrate.



Dragonfly

Diet: Other insects.

Size: 1 inch - 3 1/2 inches in length.

Description: Two pairs of multi-veined wings which are usually outstretched, even in rest; males have three terminal abdominal appendages, and females only have two terminal dorsal appendages.

Did you know? Dragonflies often fly in tandem, and the male usually carries the female on its appendages. They are seen near ponds and marshes.



Monarch Butterfly

Migratory: Flies to areas in South America and Mexico in the fall and returns north in the spring.

Larval Diet: Milkweed.

Adult Diet: Nectar from a wide range of native plants, including milkweed.

Size: 4 1/8 inches - 4 5/8 inches in length.

Description: Large orange wings with black borders; included in the borders of the upper wings are small white circular markings; wings are attached to its solid black body.

Did you know? The larvae of this species are poisonous to birds. They advertise their presence with yellow, black, and white vertical bands along their bodies in order to remind predators that the last time they ate a monarch larvae, they vomited.



California Ground Squirrel

Diet: Nuts, seeds, fruit, grasses, some insects, and carrion.

Size: 9 inches - 11 inches in length (head to tail tip).

Description: Brown fur; long bushy tail; short ears.

Did you know? The California ground squirrel lives in burrows that it digs itself. It is found on hillsides and on salt pond levees. It is eaten by owls, hawks, and foxes.



Black-Tail Jackrabbit

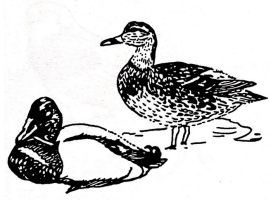
Diet: Grasses, nuts, and seeds.

Size: 17 inches - 21 inches in length.

Description: Brown fur with a black colored tail.

Did you know? The black-tail jackrabbit has long ears that help to keep it cool during hot weather.

Neighborhood Plants and Animals: Fun Facts



Mallard

Migratory: Mallards are migratory birds that migrate south from regions as far north as Alaska; however, they are found in locations throughout the United States all year long.

Diet: Aquatic plants and aquatic invertebrates.

Size: 23 inches in length.

Description: Dull brown body; white tail; white underwings; bright blue speculum with both sides bordered in white; male can be identified by his metallic green head and neck.

Did you know? Mallards are seasonally monogamous, switching mates each year. They nest and raise their young in the salt marsh. They are a "puddle duck" that feeds with its tail in the air and head underwater in the slough.



Western Fence Lizard

Diet: Insects and spiders.

Size: 2 1/4 inches - 3 1/2 inches in length.

Description: Black, gray, or brown lizards with blotched patterns; undersides have blue patches on the throat and belly of the male; female lacks throat patches and her belly patches are not as bright as the males.

Did you know? This lizard got its name because it was commonly seen sitting on fence posts.



California Buckwheat

Origin: Native.

Plant Size: 1 foot - 2 feet tall shrub with long stalks.

Leaf Description: Small, coarse leaves attached to long, branching stems.

Flower Description: Large compound head with white flowers. Blooms from March to October

Did you know? Buckwheat is one of the few acceptable larval food plants for the Acmon blue butterfly.



California Poppy

Origin: Native.

Plant Size: 4 inches - 6 inches tall, small plant.

Leaf Description: Small and thin, branch-like leaves.

Flower Description: Four petals, which may be orange, yellow, or yellow with orange at the base. Blooms from March to October.

Did you know? The California poppy is California's state flower.



Common Yarrow

Origin: Worldwide distribution. Believed to be native of Eurasia and Africa.

Plant Size: May be 6 inches tall or more; plant stays fairly low to the ground, expanding outward more than upward.

Leaf Description: Soft, feathery, fern-like leaves.

Flower Description: Flat-topped flower clusters are white to pink on a narrow stalk.

Did you know? Yarrow is an important larval food source for the Painted Lady butterfly.