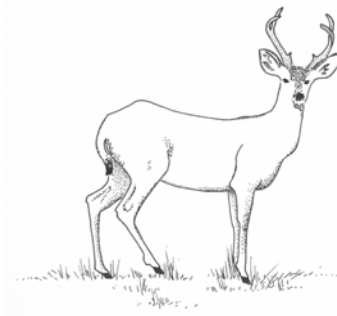


# Discovering Nature at Filoli

## A Teacher's Guide Grades 3-4



**FIOLI [www.filoli.org/education](http://www.filoli.org/education)**

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## **Exploring Nature at Filoli**

The Filoli Nature Preserve is home to hundreds of different plants and animals, which depends, in one way or another, on each other. We look forward to helping your class explore the web of life created by the interactions of these plants and animals in their different habitats.

This teacher's guide is designed to help you and your students make the most of your visit to Filoli. It includes some general background information for you to share with your class before your visit, activities to help prepare for the walk, other activities to extend the experience back in the classroom, and an annotated bibliography of useful materials. We encourage you to prepare your class by making use of these materials, especially if you are just beginning your exploration of these concepts. We offer this walk for grades 3 and 4 and suggest that you adapt the materials as necessary for your class.

The following activities are based on California Curriculum Standards on Life Sciences for Grades 3 and 4.

### **Grade 3**

**Standard 3: Adaptations in physical structure or behavior may improve an organism's chance for survival.**

*Standard 3a:* Students know plants and animals have structures that serve different functions in growth, survival, and reproduction

*Standard 3b:* Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands and wetlands

### **Grade 4**

**Standard 2:** All organisms need energy and matter to live and grow.

*Standard 2a:* Students know plants are the primary source of matter and energy entering most food chains.

*Standard 2b:* Students know producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem.

*Standard 2c:* Students know decomposers, including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.

**Standard 3: Living organisms depend on one another and on their environment for survival.**

*Standard 3a:* Students know ecosystems can be characterized by their living and nonliving components.

*Standard 3b:* Students know that in any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.

*Standard 3c:* Students know many plants depend on animals for pollination and seed dispersal, and animals depend on plants for food and shelter.

*Standard 3d:* Students know that most microorganisms do not cause disease and that many are beneficial.



## **A Day in the Filoli Nature Preserve**

**(to be read aloud)**

A new day is starting in the preserve. The sun rises and shines on all the plants and animals in the preserve. Green leaves turn to the sun, using the light to make food for the plants they are part of. As they make their food, the leaves also help make the air that living things need to breathe. The air is cool and fresh.

Out in the meadow, the ground is wiggling. A gopher is under the ground, eating the roots of the grass, clover and other plants. The gopher digs up and pops its head above the ground. SWOOSH! Wings flap overhead, and the gopher dives back into its hole. It was lucky this time!

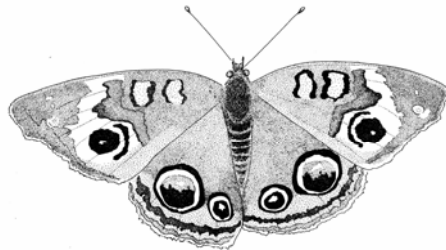


The hawk flies away. Such bad luck not to catch that gopher! Now it has nothing to feed its babies. Maybe it will have better luck in the forest catching a squirrel. There are so many of them, and they are plump and lazy from eating all the acorns that drop from the oak trees. It should be easy to catch one.

The forest is shady and cool. A spider builds her web in the tree branches, hoping to catch an insect as it flies by. The ground is soft, covered with leaves that are slowly turning back into soil. Small animals like slugs, earthworms and roly-poly's eat the dead leaves, breaking them down so other plants can grow in the soil they make. These little decomposers have an important job. Without them, the forest would be piled high with leaves!



A banana slug crawls slowly along a fallen log. A small paw reaches out and—GULP—the slug is lunch for a young raccoon. Raccoons usually sleep during the day, but a noisy group of people passed by its hiding place and woke this one up. One slug isn't enough for a hungry raccoon. It wanders on out of the forest, looking for another snack.



What's that? A butterfly! The butterfly flies from one flower to another, sipping out the sweet nectar inside and warming itself in the sun. As it goes, it carries pollen from one flower to another. With the right pollen, a flower can make a seed. Without the butterfly's help, the pollen might not get to the flower.

It's afternoon now, and the sun is getting warm. Hummingbirds are singing their squeaky songs as they fly from one flower to another, drinking the sweet nectar. Bees are buzzing around in the sunshine, collecting nectar to make honey. The raccoon decides to go to the pond for a drink. It hides when it hears some children coming down the path. It watches the people from the bushes and then walks on.

The pond is quiet. The afternoon sun shines on the green algae in the water. What's that swimming near the bottom of the pond? Is it a fish, a frog, a pollywog, a turtle? No, it's an animal that calls this pond it home. It's a newt, swimming back and forth looking for food, and here it comes to the surface for air.



The sun is going down now, and deer are feeding in the grassland. The school children and other human visitors have all gone home, and the garden turns dark and quiet. Sweet-smelling white flowers glow in the moonlight, and moths flutter over to sip at the nectar inside. Bats fly silently through the night sky, catching flying insects, and a fox wanders through the grassland, looking for mice and other small animals to eat. The young raccoon, sleepy from being awake during the day, takes a short nap and then goes out exploring in the dark. Maybe tomorrow people won't be so noisy, and it will be easier to get a good day's sleep.



**Some questions to ask before your visit:**

Why do you think some animals choose to live in the grassland and not in the forest? (This isn't a zoo; animals live wild here.) They live where they can find food and where they feel safe.

When we visit, we might not see all of the animals we heard about in the story. Why do you think that might be? (They might be afraid of us; the weather might not be good for them; some of them might be asleep when we are there.)

What do you think we should do to make sure we don't bother the animals in the preserve? (Keep quiet; don't get too close; be careful not to hurt their homes...)

## **Vocabulary**

We may use these words during your visit to the preserve, as seems appropriate for your students' grade level. They are based on the curriculum standards for grades three and four. You may share these definitions with your students, or have them use their dictionaries to find other definitions.

**animal** – a living thing that gets food by eating plants or other animals

**bacteria** – microorganisms that act as decomposers

**carnivore** – an animal that eats other animals

**chlorophyll** – the green coloring in plants that makes it possible for them to make their own food, or “photosynthesize.”

**consumer** – an organism that cannot make its own food and eats other organisms

**decomposer** – an organism that breaks down plant and animal material into simple chemicals. The chemicals can be re-used in the ecosystem.

**ecosystem** – a community of organisms interacting with each other and with the nonliving environment

**environment** – everything that surrounds and influences an organism

**food chain** – a description of the feeding sequence of one set of organisms in an ecosystem, such as grass seeds eaten by chipmunks, which are eaten by hawks. The sun energy in the grass seeds is converted by each of the organisms that are part of the chain.

**food web** – a description of the feeding relationship between all of the organisms in an ecosystem.

**forest** – an area of land with lots of trees

**fungus** – a living thing that gets food from dead plants or animals. A mushroom is one kind of a fungus.

**grassland** – an area of land that is flat and hilly with a lot of grass and few trees

**habitat** – the home and environment of a plant or animal

**herbivore** – an animal that eats plants

**life cycle** – the sequence of changes an organism goes through. The organism develops from its earliest stage to the same stage in the next generation

**nature preserve** – a place where plants and animals are protected so that they can be studied and enjoyed

**organism** – any living thing, including all plants and animals

**plant** – a living thing, usually green, which makes its own food using the sun's energy

**predator** – an animal that eats other animals

**prey** – an animal that is eaten by another animal

**producer** – an organism such as a plant or algae that makes its own food

**recycler** – a living thing that breaks down dead plants or animals (also known as decomposers)

**riparian** – along a river or stream

**wetland** – a low land that is covered by water at least part of the year

## **Pre-Visit Activities**

### **Becoming a Nature Detective**

A visit to Filoli is a chance for students to become nature detectives, exploring and discovering the wonders of the natural world around them. Help your students get ready to make the most of their trip with the following activity.

Introduce the concept of a “nature detective” to your students—a nature detective is someone who explores the natural world by observing closely, thinking about what they observe, and coming up with ideas about what they discover. Everyone of us can be a nature detective—everyone has special tools that can help them be a nature detective.

Divide children into small groups. Ask them to think about what tools all of us have on our bodies that we can use to explore the world around us. Each group can make a list of the tools they think of, or can draw pictures illustrating their ideas. Have each group share their results with the class, and compile their ideas in a large list or drawing.

Here are some suggestions—you and your class may think of others.

Eyes = counters, cameras  
Noses – scent detectors  
Fingers – tweezers, feelers  
Hands – rulers, cups  
Hair – wind detector  
Memories – notebooks and pencils  
Ears – tape recorders  
Feet – transportation  
Skin - thermometer

## Web of Life Word Seek

Use this scramble to help familiarize your students with some of the terms we will use on our walk. Student version is on the next page.

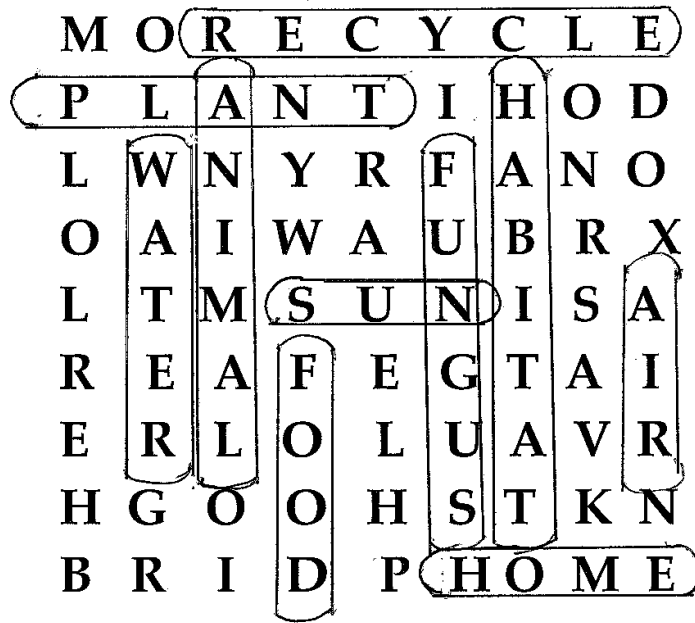
M O R E C Y C L E  
P L A N T I H O D  
L W N Y R F A N O  
O A I W A U B R X  
L T M S U N I S A  
R E A F E G T A I  
E R L O L U A V R  
H G O O H S T K N  
B R I D P H O M E

## Hidden Word List

Plant	Home
Animal	Water
Fungus	Air
Sun	Food
Recycle	Habitat

## Web of Life Word Seek (Answer Sheet)

Can you find all of the hidden words?



### Hidden Word List

Plant	Home
Animal	Water
Fungus	Air
Sun	Food
Recycle	Habitat

## **Web of Life Game**

The following pages are designed to be cut into small slips that you may distribute to your students. Each slip contains the name of an organism and some information about the organism. It is not necessary to use every slip, and slips can be duplicated for a larger class without affecting the activity.

Distribute the information slips to your students. Have them make a simple nametag, perhaps with a drawing representing the living thing on their slip. When students have finished making their nametags, have them stand in a large circle, wearing their nametags and holding their information slips.

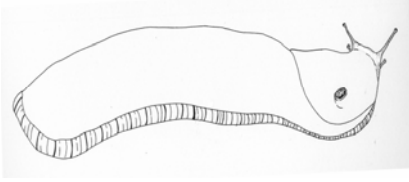
Hold up a large ball of string, and explain that this will represent the connections between living things. Living things can be connected in different ways—one may be food for another, or may provide a home for another, or may help another travel. Give the ball of string to one student, and ask the student to think about how that living thing is connected to another. The first student should hold onto the end of the string and pass the ball to the student she or he has chosen, explaining how they are connected. That student then chooses another student, explains how they are connected, and still holding onto the string, passes the ball to that student. Continue until all children are part of the web. If necessary, they may pass to the same child more than once.

Ask the children what they think would happen if one part of the web disappeared. Imagine that all of the plants in the web were lost. Have any children representing the plants let go of the string? Then ask any children who were connected to the plants to drop the string, and then those who were connected to them. What happens to the web?

<p><b><u>Grass</u></b>  <i>Gets energy from:</i> sun  <i>Eats:</i> makes its own food  <i>Is eaten by:</i> deer, rabbits, mice                caterpillars, grasshoppers  <i>Gives shelter to:</i> rabbits, mice,                        worms, snakes</p>	<p><b><u>California poppy</u></b>  <i>Gets energy from:</i> sun  <i>Eats:</i> makes its own food  <i>Is eaten by:</i> deer, rabbits, mice,                caterpillars, grasshoppers  <i>Gives shelter to:</i> insects</p>
<p><b><u>Turkey vulture</u></b>  <i>Gets energy from:</i> what it eats  <i>Eats:</i> dead animals (carrion)  <i>Is eaten by:</i> Decomposers  <i>Gets shelter from:</i> tall trees</p>	<p><b><u>Raccoon</u></b>  <i>Gets energy from:</i> what it eats  <i>Eats:</i> apples, blackberries, worms,                birds, grasshoppers, bird eggs                Caterpillars, grasshoppers  <i>Is eaten by:</i> coyotes, foxes  <i>Gets shelter from:</i> hollow trees, low                        shrubs</p>
<p><b><u>Mouse</u></b>  <i>Gets energy from:</i> what it eats  <i>Eats:</i> plants and seeds  <i>Is eaten by:</i> hawks, snakes,                coyotes, raccoons, owls  <i>Gets shelter from:</i> grass, blackberry                        plants</p>	<p><b><u>Blackberry plant</u></b>  <i>Gets energy from:</i> sun  <i>Eats:</i> makes its own food  <i>Is eaten by:</i> deer, mice, raccoons,                birds  <i>Gets shelter from:</i> grass, brush</p>
<p><b><u>Grasshopper</u></b>  <i>Gets energy from:</i> what it eats  <i>Eats:</i> grass, flowers  <i>Is eaten by:</i> mice, raccoons, hawks  <i>Gets shelter from:</i> grass, brush</p>	<p><b><u>Hawk</u></b>  <i>Gets energy from:</i> what it eats  <i>Eats:</i> grasshoppers, rabbits, mice                snakes  <i>Is eaten by:</i> decomposers  <i>Gets shelter from:</i> trees</p>
<p><b><u>Coyote</u></b>  <i>Gets energy from:</i> what it eats  <i>Eats:</i> mice, rabbits, deer, snakes  <i>Is eaten by:</i> decomposers  <i>Gets shelter from:</i> trees, blackberry</p>	<p><b><u>Worm</u></b>  <i>Gets energy from:</i> what it eats  <i>Eats:</i> dead plants  <i>Is eaten by:</i> birds, raccoons  <i>Gets shelter from:</i> grass, dandelions</p>

<p><b><u>Deer</u></b>  <i>Gets energy from:</i> what it eats  <i>Eats:</i> grass, shrubs, poison oak  <i>Is eaten by:</i> coyotes, people, insect decomposers  <i>Gets shelter from:</i> brush, trees</p>	<p><b><u>Great Horned Owl</u></b>  <i>Gets energy from:</i> what it eats  <i>Eats:</i> mice, gophers, snakes, rabbits  <i>Is eaten by:</i> decomposers  <i>Gets shelter from:</i> trees</p>
<p><b><u>Newt</u></b>  <i>Gets energy from:</i> what it eats  <i>Eats:</i> spiders, worms  <i>Is eaten by:</i> garter snakes  <i>Gets shelter from:</i> decaying logs</p>	<p><b><u>Rabbit</u></b>  <i>Gets energy from:</i> What it eats  <i>Eats:</i> grass, flowers, dandelions  <i>Is eaten by:</i> hawks, snakes, coyotes  <i>Gets shelter from:</i> grass, blackberry plants</p>
<p><b><u>Fungus</u></b>  <i>Gets energy from:</i> What it eats  <i>Eats:</i> Dead things in the forest  <i>Is eaten by:</i> mice, raccoons  <i>Gets shelter from:</i> leaves, plants, trees</p>	<p><b><u>Gopher</u></b>  <i>Gets energy from:</i> What it eats  <i>Eats:</i> seeds, roots, bulbs  <i>Is eaten by:</i> hawks, owls, coyotes, foxes, snakes  <i>Gets shelter from:</i> grass, ground tunnels</p>
<p><b><u>Banana slug</u></b>  <i>Gets energy from:</i> what it eats  <i>Eats:</i> plants, leaves, shrubs, algae, animal droppings  <i>Is eaten by:</i> raccoons, garter snakes, crows  <i>Gets shelter from:</i> Decaying logs and leaves</p>	<p><b><u>Fox</u></b>  <i>Gets energy from:</i> what it eats  <i>Eats:</i> squirrels, mice, woodrats, birds, rabbits, dead animals, insects  <i>Is eaten by:</i> Bobcats and insect decomposers  <i>Gets shelter from:</i> Dens in hollow trees, logs and under rock ledges</p>

**Plants and Animals You Might See on Your Visit**  
Artwork by Megan Gnekow



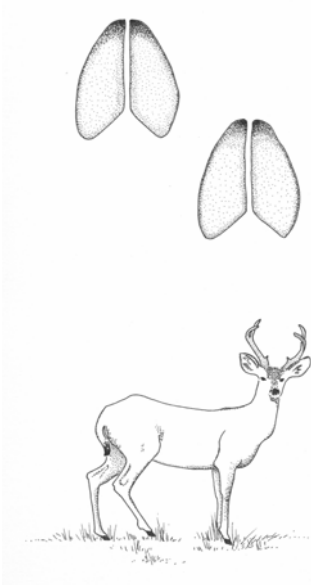
Banana Slug



Poison Oak



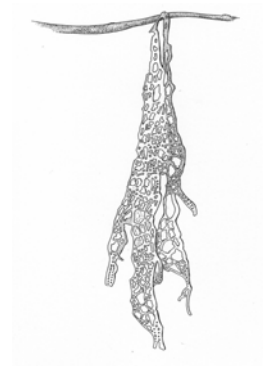
Coast Live Oak



Black-tailed Deer & Tracks



Coast Redwood



Lace Lichen



Common Buckeye Butterfly



California Newt



Scrub Jay

## Post-Visit Activities

### **Habitat Mural**

A community is made up of many interconnecting parts that create a web of life in a habitat. In this activity, students will recreate that web, based on their experiences at the preserve.

Ask the students to name and briefly describe the different habitats they visited at Filoli. Help them remember as much as they can about the different areas they visited.

Imagine you had to build a pond, a forest, or other community in a huge, empty space. What things would you need to fill in the space? Divide the students into small groups, and assign each group a habitat that they visited. Each group should make a list of everything they remember that can be found in their habitat. Encourage students to think broadly, considering both living and non-living parts of the community.

Next, give each group a large piece of paper on which they can draw all of the parts of their community. Allow ample time for students to draw the different parts of the community they are creating.

When the drawings are completed, hang them so all students can see. Ask each group to describe to the class how different things in their drawing can depend on each other. Encourage them to think about food, shelter, nutrients, pollination, seed dispersal—the whole range of ways that plants, animals and the non-living parts of the environment interact. Encourage the rest of the class to add their ideas.

**Extension** –Give each group two colors of yarn and some tape. They will use the yarn to show the relationships between the different parts of the community. Students should choose one color of yarn to represent food chain connections—connect plants and animals with pieces of yarn to show who eats what. They should use the other color of yarn to show how different parts of the community are connected in different kinds of relationships (homes, pollination, hiding places, pest control, etc.)

### **Classroom Conservation**

Sometimes we forget to think about how our everyday activities can affect the world around us. Here is an activity to help students see one way that their daily lives can affect one part of the natural world---TREES!

Talk about trees and what they do for other living things and what they do for us. Trees provide homes for all kinds of animals, from spiders and termites to squirrels and birds. Larger animals like deer find shelter underneath them. Do we use trees to make our homes? Trees provide food to animals that eat their fruit, leaves, seeds, even sticks and wood! What do we eat that comes from trees? Trees also make oxygen and can help clean the air of pollutants, provide shade on a sunny day, and help protect other plants and animals from the wind.

What are some things people make out of trees? There is one tree product we use every day in our classroom—paper! How much do we use? Let's find out by saving all our paper for a week. Collect it in two boxes—paper that has been used up, and paper that could be used again (blank on one side, colored paper that could be cut up for an art project, etc.)

At the end of the week, how much paper is in each box? Which has more? How much does it weigh? How many pounds would your class use in a year? If all the classrooms in your school use the same amount of paper, how much paper would your whole school use in a week? In a year? It takes one tree 100 feet tall and 1 ½ feet in diameter to make 750 pounds of paper. That's how much paper one American person uses in a year (not just for school, of course)! How many trees do all the people in your classroom/school use in a year?

How could you reuse some of the paper you saved? How could you cut down on the amount of paper you use? Save all your paper for another week, see if you can reduce the amount of paper you use, or increase the amount that can be reused.

If your class can use less paper, how do you think that may affect the rest of the natural world?

I saw many living things when I visited the Filoli Nature Preserve.  
Here is a picture of one living thing I saw.

The living thing is called a \_\_\_\_\_

It gets the food it needs to live and grow by

It protects itself by

Some other living things that depend on it are

Living things like this live in

My name is: \_\_\_\_\_

## **Bibliography**

*Amazing Insects*. Monica Russo, Sterling Publishing, 2004.

*Atlas of the Biodiversity of California*. Department of Fish and Game.  
<http://www.dfg.ca.gov/biogeodata/atlas>

*DK Eyewitness Books*—this series includes several on topics relevant to your visit:

-Ecology	-Bird	-Insect
-Plant	-Amphibian	-Life
-Tree	-Reptile	

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*Watching Nature*. Monica Russo. Sterling Publishing, 1998.

