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## **HELP YOUR STUDENTS BE NATURE DETECTIVES AT THE SAN FRANCISCO BOTANICAL GARDEN**

The San Francisco Botanical Garden (SFBG) is an extraordinary 55-acre public garden featuring over 7000 kinds of plants from around the world. There is a lot to explore in this remarkable garden, but if you are a teacher planning to bring a class for a visit, it can be hard to know where to start!

The materials provided here are meant to help you to put together a "Nature Detectives" field notebook which will guide your students' explorations in the garden. You can tailor the notebook to your class and its interests, needs, and abilities. Students can then work on the activities individually, in cooperative learning groups, or in parent or teacher led groups.

The activity sheets have been designed to help you make the most of your visit to the garden. Each sheet has two parts, one for you, the teacher, and the other for your students. On one side, a simple observation activity asks students to pay close attention to some part of the natural world and to record their observations. The other side contains information for the teacher, including suggestions for where to conduct the activity, a brief explanation of what students will learn, and a bit of background information.

Look through the activity sheets and decide which ones are most relevant to your class, considering grade level, curriculum area, and expected length of visit. Make copies which can then be bound together to make a booklet (many possibilities here - punch holes and bind with string, staple pages together, use recycled manila folders as covers, etc.) Each child or group of children can then have their own workbook. Activity sheets can be bound together in the same order for everyone, or mix them up so that different children or groups will be working on different activities at the same time.

Please remember that these activities are primarily designed to foster observation - there is seldom a right or wrong answer. Some children may begin to closely observe something other than what is described in the workbook. This is wonderful! The garden is full of unpredictable surprises, opportunities for observation which can never be anticipated but only appreciated. Be sure to include a blank sheet in your students' notebook where they can record their observations of the unexpected.

## Planning your route

If you are unfamiliar with the garden, we strongly recommend that you visit on your own prior to bringing your class. That way you will know better what to expect when you bring your students. Do remember that the garden will be much less busy on a weekday than on a weekend, so crowds should not be a problem for a school group.

We will provide maps for your visit. You may wish to plan your visit in detail in advance, or you may wish to plan when you arrive. Older students can help decide where to go. If smaller groups are going out on their own with an adult, be sure to pick a clear meeting place and set a meeting time. You may eat lunch in the Demonstration Garden area, behind the bookstore. Please be sure to clean up afterward. If your class would like to play active games, we ask that you go across the street to the Big Rec ballfield.

## Garden rules

Please be sure that your students and accompanying adults know basic garden rules, for their safety as well as the garden's:

1. Walk only on paths or on lawn areas.
2. Do not pick anything from a living plant. You may carefully touch plants, and you may pick up plant parts that have fallen off. (With an adult's supervision, students can pick samples of grass, daisies, and other such plants only in the lawn areas.)
3. Treat all animals you see, from insects and spiders to squirrels and birds, with respect - you are visiting their home.
4. Do not feed any animals in the garden. They are wild animals and are healthiest when they find natural food.

## Nature Detectives

To help your students prepare for their walk, go through the "Becoming a Nature Detective" activity on the following page. It will get them thinking about how they can be actively engaged during their visit to the gardens.

## Becoming a nature detective

A visit to the SFBG 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. Every one of us can be a nature detective - we all have special tools that can help us investigate the natural world.

Divide children into small groups. Ask them to think about what tools we have *in or on our bodies* that we can use to explore the world around us. Each group can make of 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, rulers  
skin - thermometer

## TEACHER INFORMATION

### Leaves in the Lawn

**WHERE?** This activity can be done in any of the lawn areas of the garden.

**WHAT?** Students closely observe the variety of plants found in the lawn, then record their observations. If you wish, you can provide students with small bags and allow them to pick one of each leaf that they find growing in the lawn.

**WHY?** This activity helps students focus, make careful observations, and recognize that the plant world is full of variety - even in a plain green lawn!

**MORE** You can often find a variety of small flowers growing in the lawn. Students can list the colors, count the petals, and collect samples of these as well.

If you are very lucky, you may spot a gopher in the lawn. Be sure to take the time to watch this little creature at work.

## TEACHER INFORMATION

### Leaf Rubbings

**WHERE?** Students can collect leaves from the ground as they walk almost anywhere in the garden.

**WHAT?** Students make a leaf rubbing picture using a crayon and a leaf that they like. **BRING CRAYONS!** Help students find a flat, tough leaf on the ground - leaves that are too soft don't work so well. Students should carefully look at the leaves and notice the veins, which carry water and nutrients through the leaf. Students put their work book on the ground or on a bench, then place the leaf under the activity sheet with the veiny side up. They should be able to feel the leaf through the paper. Finally, they should take a crayon and rub it sideways over that area of the paper. Watch the leaf picture appear! Try using different color crayons too.

**WHY?** Making a leaf rubbing will focus children's attention on the wide variety of shapes and textures of leaves. They will also notice the veins of a leaf, the system of "pipes" which carry water and nutrients through the plant.

**MORE** The leaves that make the best images are tough with prominent veins. Younger children may need help to find suitable leaves. Older children can be given the challenge of finding the leaves that work the best.

If you look on the ground under some of our magnolia or eucalyptus trees, you may find some "ghost leaves" or "leaf skeletons." These magical leaves have almost completely decomposed, leaving behind only their tough veins. Magnolia trees can be found in the New World Cloud Forest, around and behind the Moon-Viewing Garden, as well as in a few other locations. Eucalyptus are here and there throughout the garden as well as in the Australian section.

## TEACHER INFORMATION

### Leaf Smells

**WHERE?** The Fragrance Garden is ideal. There are also concentrations of aromatic plants in the New World Cloud Forest (look for the plant name "Salvia") and an herb garden in the Children's Garden.

**WHAT?** Students rub the leaves of different plants, then smell their fingers to discover the scents of the different leaves. They describe their favorite scent and draw a picture of the plant.

**WHY?** While most people are aware of flowers having scents, we often don't notice that leaves can be scented as well. Students will be encouraged to use more of their senses when exploring plants.

**MORE** Flowers usually have scents designed to attract a pollinator, especially insects. Leaves often have scents designed to repel insects and other animals. Even the scents that we humans find appealing can be unpleasant for animals which want to eat a plant.

Herbs are plants whose strongly scented and flavored leaves are used in small amounts to flavor our food. Various teas are also made from leaves with strong scents and flavors.

## TEACHER INFORMATION

### Measuring Plants

**WHERE?** All around the main lawn is ideal, since one question asks students to walk around the big tree in the main lawn. This is also a good introductory activity so students discover one way to make observations about the plants they will see.

**WHAT?** Students use their bodies to measure different plants and plant parts.

**WHY?** Students will discover the wide variety of sizes of plants and will relate them to their own bodies.

**MORE** For younger students, the main focus is primarily on relating plants to their own bodies. Older students can work on thinking about measurement in a more general way and can extend the activity in the classroom by making the conversion between their body part and inches or centimeters.

## TEACHER INFORMATION

### Collecting Plant Parts

**WHERE?** Anywhere in the garden. Children can collect as they go, then fill out the sheet, or else stop in one area to complete the activity.

**WHAT?** Students collect plant parts that have fallen off of plants and do their best to decide what part of the plant they have found. **BRING TAPE** so students can tape their discoveries into the work book.

**WHY?** Children are collectors! They will be able to take samples of plants without damaging living plants and can hypothesize about what they have found.

**MORE** Anything that has fallen from a plant is fair game - leaves, blossoms, seeds, twigs, bark, etc. Some items may be too big or bulky to tape in place. You will need to decide whether students can take items that don't fit on the sheet. Children may wish to collect a LOT of what they find, but this is not the point of the activity. They should decide on exactly three things which they wish to keep. If you wish you can designate a class or group collecting bag into which a few chosen treasures can be placed.

## TEACHER INFORMATION

### My Special Plant

WHERE? Anywhere in the garden.

WHAT? Students pick one special plant to observe and describe.

WHY? This allows students to focus in on the characteristics of a single plant which they like.

MORE Be sure students realize that not every plant will have a fruit, or a flower, or a name tag. They should fill in as much of the work sheet as is relevant. If the name is a mystery, why not make up a name?

## TEACHER INFORMATION

### Flower Visitors

**WHERE?** This activity can be done anywhere in the garden. The native garden is a wonderful place for this in spring, while the Mexican cloud forest is good December through March.

**WHAT?** Students observe a plant in flower to see if any pollinators visit the plant. If you wish, you can specify a period of time to observe - 3 to 5 minutes is usually enough.

**WHY?** Students learn to observe patiently, and they recognize that insects and other small animals interact with plants.

**MORE** This activity can be a starting point for a discussion of pollination, or it can serve as confirmation of what has been discussed in the classroom. If you are studying communities, you can talk about how the animals are doing a job for the plant (moving pollen) in exchange for a reward (nectar or pollen) without having to go into the details of pollination.

## **TEACHER INFORMATION**

### Animals in the Garden

**WHERE?** This activity can be done as you move through the garden. Alternatively, stop at one or more of the ponds.

**WHAT?** Students try to find an example of four basic types of animals in the gardens and draw what they see.

**WHY?** Students recognize that a variety of different kinds of animals make use of the garden.

**MORE** Squirrels are the most common mammal (except perhaps for humans!) that your students are likely to see. Various insects make the garden their home - be sure your students know to look for a six-legged creature. The best place to find a reptile or amphibian is at one of the ponds, where turtles and tadpoles find a home.

## **TEACHER INFORMATION**

### Animals Homes and Food in the Garden

**WHERE?** This activity can be done as students move through the garden. Alternatively, stop at one of the ponds, or in the redwoods or the cloud forest to complete this activity.

**WHAT?** Students look for evidence of places where animals live as well as things that they might eat and record their observations, either by drawing or writing.

**WHY?** This sharpens students' observational skills and helps them recognize why there are animals in the garden.

**MORE** Students may need to be reminded that there are many different kinds of animals of all shapes and sizes - don't forget small animals like insects, slugs, and spiders!

## TEACHER INFORMATION

### Animal Observation

**WHERE?** Animals of various types can be found throughout the garden, but some areas are particularly rich. Turtles and ducks can be found at the Wildfowl Pond, while the other ponds may have herons, tadpoles, insects and other wildlife. The Redwood Grove is home to many squirrels, birds, and small invertebrates. The John Muir Nature Trail is home to many birds and insects.

**WHAT?** Children observe an animal for several minutes and record what they see the animal do.

**WHY?** Students get a sense of how animals interact with their garden environment.

**MORE** Don't forget that small animals such as insects, spiders, roly-polies and worms are fun to observe, not just the bigger and more dramatic mammals and birds.

The animals in the garden use the plants in many different ways - shelter, food, nesting. After their observation, children can think about ways that the garden provides for the animals' needs.



