Good Bugs
Spring lesson

Activity: Identify beneficial and pest insects from pictures and an outdoor bug hunt (season and weather permitting); release live ladybugs

Goal: To learn that not all bugs are bad for your garden and that some are beneficial insects you would want to have in the garden; learn about the ladybug life cycle.

Supplies: Landscape Pest ID cards, handouts on ladybugs, live ladybugs

How to proceed
Familiarize yourself with the background information and the photos of the various beneficial insects. Discuss the information with your class. You can ask them which beneficial insects they are familiar with--most all know the ladybugs, but few probably know the minute pirate bug. The first part of the card deck has a section for beneficial insects and the rest focuses on insect pests.

For older classes, you may want to play up the gruesome aspects of the beneficials, especially the parasitoids (kids seem to like the yucky stuff!). Parasitoids literally eat the pest from the inside out. For example, the parasitized caterpillar may still be walking about, looking like a normal caterpillar, as the parasitoids know not to eat the parts that would immediately kill the caterpillar. But at some point, a fly or wasp will hatch out of the caterpillar, which then is completely killed. You couldn't think of a better horror movie than what nature provides!

If weather permits, take the kids on a beneficial insect and plant hunt. Look carefully for pests (aphids, whiteflies, scale) and for predators. Also have them do a survey of our garden plants. How are we doing in providing the appropriate flowers (small, or composite-sunflower/daisy type) for beneficial insects?

If you want to go into more depth in ladybugs, there is a ton of information, pictures, activities, lessons plans, etc. at the Cornell University's "Lost Ladybug Project"

http://www.lostladybug.org/index.php

Background
Although there are many insects that are beneficial to us, notably bees, when gardeners talk about beneficial insects they usually mean those insects that control pests in our gardens. Beneficials can control the pests in two ways. They may be predators that actively hunt and eat pest insects, or they can be parasitoids that lay eggs in the bodies or eggs of the pests, eventually destroying them from within. Many of these insects are

quite small, so it is hard to know if you have them working for you unless you look very closely. But some of them are large, familiar creatures, like the ladybird beetle.

The advantages of using beneficial insects for pest control include the following:

(1) you don't have to apply poisonous sprays;
(2) you leave pest management up to the insects and not up to you;
(3) you should experience longer lasting pest control.

But beneficial insects will also do their job more slowly than a sprayed-on pesticide, as they must be given time to find the pest population. This requires some tolerance for plant damage, since you must have certain level of pests in your garden to attract beneficial insects in the first place! (Although you can buy some beneficial insects to hasten the process.)

When beneficial insects are not preying upon the pests, they need nectar and pollen in their diet. Since they have small mouthparts, they like to feed from small flowers like those of parsley or sweet alyssum, or from composite flowers (sunflowers, asters) that are made up of tiny flowerets. Therefore, to attract and keep beneficial insects in your garden, you should plant these types of flowers for year-round bloom. Familiarize yourself with the following list of some beneficial insects. Consult the ID cards for pictures.

Ladybugs are perhaps our most familiar beneficial insect predator. Both the larva and the adult eat aphids and other soft-bodied insect pests. Their bright color may function to warn bird predators that they are distasteful. They can secrete a distasteful fluid from their leg joints and they also drop to the ground and "play dead" as a defense mechanism. Ladybugs have interesting migration patterns and will gather together in dense clusters in the winter in various areas around California.

Common beneficial insects

Larger insects

Ladybird beetles: Predators. Familiar red and black, or all red beetles. Larvae are less familiar but no less useful. Both adults and larvae eat large numbers of aphids.

Ground beetles: Predator. About 3/4 inch long, black, shiny, fast runners. They live and forage in leaves, mulch.

Soldier beetles: Predator. Tan and black beetles which eat aphids

Lacewings: Predator. Delicate looking adult brown or green with transparent wings. Adults eat nectar; larva is a fierce predator and looks like tiny (1/2 inch) alligator. Eggs on stalks, look like old-fashioned pins.

Hover flies: Predator. Looks like a bee, but flies like a fly. Larvae eat aphids and other pests.

Tachinid flies: Parasitoid. Large, 1/2 inch, often bristly flies that lay eggs on caterpillars or various bugs.

Ichneumon wasp: Parasitoid. Large wasps (1 inch) that lay eggs in beetle or sawfly larvae.

Small insects
Minute pirate bug: Predator. Tiny (1/12 inch) but versatile predator in adult and larval stages.

Big eyed bug: Predator. Small bug with big eyes, eats a variety of pests.

Trichogramma wasp: Parasitoid. A tiny wasp that lays its eggs in the eggs of many caterpillars.

Lysiphlebus wasp: Parasitoid. One of many small wasps that lay their eggs in aphids. If you find crusty brown or black bodies (mummies) among the aphids, such wasps are at work. (Maybe we can call these aphid mummy wasps.)

Braconid wasp: Parasitoid. Another small wasp that lays eggs in caterpillar larvae. Eventually, adult wasps will emerge from the dead caterpillar (see photo).

Some plants that will attract beneficials: members of carrot family=parsley, fennel, dill, cilantro, etc. Alfalfa, alyssum, asters, buckwheat, clover, cosmos, lavender, marigolds, mint, statice, sunflowers, tansy, yarrow, zinnia. Remember to let the plants flower!

WORKSHEET **Is Your Garden Beneficial Insect-Friendly?**

BENEFICIAL INSECTS OBSERVED

Beetles
__ladybird beetles (ladybugs)
__ground beetles
__soldier beetles

Flying insects
__Lacewings
__Hover flies
__tachinid flies
__big-eyed bug
__minute pirate bug

Wasps
__small wasps
__Ichneumon wasp

OTHER BENEFICIAL CLUES

__aphid mummies present?
__parasitized caterpillars?
__egg masses near pests?

DO YOU HAVE PLANTS THAT ATTRACT BENEFICIALS?

__buckwheat
__alyssum
__asters
__cilantro
__clover
__cosmos
__dill
__fennel
__lavender
__marigolds
__mint
__parsley
__statice
__sunflowers
__yarrow
__zinnia

__other carrot family plants

__other small-flowered herbs

__other small flowers