

## Sonoma Ecology Center K-12 Watershed Education Program

### GROWING DISCOVERY

#### LESSON 3

##### GOALS

- Students will become familiar with harmful insects which are garden pests.
- Students will give examples of ways in which pesticides enter food chains
- Students will be able to describe possible consequences of pesticides entering food chains
- Student will be able to name two predatory or parasitic insects.
- Students will be able to name ways to fight off invasive garden pests
- Students will be able to articulate what a food chain is and provide one example.

##### NGSS:

BEFORE CLASS PREP: On board write SEC, instructor name, presentation overview, organize food chain cards, set up boom box (optional)

MATERIALS: beans, handkerchiefs 2 blue & 6 red, 20 ziploc bags, 4<sup>th</sup> grade Musically Aligned CD, boombox, harmful insects and beneficial insect boxes, food chain cards

##### **PART 1: REVIEW (5 minutes)**

- Review of Lesson Two

##### **PART 2: FOOD CHAINS INTRODUCTION AND SONG (10 minutes)**

- Ask students what they know about insects and garden plants
- Introduce students to the pest insects. Have students characterize these insects as herbivore, carnivores, or omnivores. Explain that insects can harm people by eating our plants, not just by biting people,
- Explain to the students that there are natural ways to control harmful garden animals. Show the students the beneficial insects.
- Play the song twice. Sing Food Chain Gang song the second time.

##### **PART 3: Hazardous Links, Possible Solutions (Project WILD) (25 minutes)**

- Distribute the handkerchiefs and ziploc bags, the 2 blues represent the “Bluebirds”, 6 red for “ladybugs”, and the rest are given the bags and are the “aphids.” The container is to represent the “stomach” of the animal.
- With the students’ eyes closed, or otherwise not watching where the food is placed, spread the white and colored along the field perimeter bordered by the cones.
- Give the students the following instructions: the aphids are the first to go looking for food; the bluebirds and ladybugs are to sit quietly on the sidelines watching

the grasshoppers. At the end of 30 seconds, the grasshoppers are to stop collecting food tokens

- Next, allow the ladybugs to hunt the aphids, they have 1 minute to hunt. Any aphid tagged or caught by the ladybug must give its bag or container of food to the ladybug and then sit on the sidelines
- Next, allow 60 seconds (or whatever set time) for the bluebirds to hunt the ladybugs. The same rules follow. Any ladybug still alive may hunt for aphids. If a Bluebird catches a ladybug, the BB gets the food bag and the LB goes to the sidelines. At the end of the designated time period, ask all students to come together in a circle, bringing whatever food bags they have with them
- Ask students who have been “consumed” to identify what animal they are and what animal ate them. Next, ask any animals still alive to empty their food bags out onto the floor or on a piece of paper where they can count the number of food pieces they have, separating the colored from the white pieces.
- Inform the students that there is something called a “pesticide” in the environment. This pesticide was sprayed onto the crop the grasshoppers were eating in order to prevent a lot of damage by the grasshoppers. If there were substantial crop damage by the grasshoppers, the farmers would have less of their crop to sell
- This pesticide accumulates in food chains and can stay in the environment a long time. In this activity, all multicolored food pieces represent the pesticide. All aphids that were not eaten may now be considered dead if they have any multicolored food pieces in their food supply. Any ladybugs for which half or more of their food supply was multicolored pieces would also be considered dead from chemical side effects. The one hawk with the highest number of multicolored food pieces will not die. However, it has accumulated so much of the pesticide in its body that the egg shells produced by it and its mate during the next nesting season will be so thin that the eggs will not hatch successfully.
- Talk with the students about what they just experienced in the activity. Ask for their observations about how the food chain seems to work and how toxic substances can enter the food chain. Discuss “biomagnification,” and discuss how it can result in the accumulation of chemicals in species higher in the food chain.

### **Part 3: Food chain card came from EEI Curriculum (15 minutes) – If time allows**

#### **ASSESSMENT (5 minutes)**

Name two insects which can harm garden plants. Name two natural ways to combat harmful insects.