

CLASSROOM STUDIES

The following activities have been designed for use in the classroom. They cover various concepts in the biology and ecology of peregrine falcons, raptors in general, as well as exercise in math, science, geography and writing. They were designed to be adaptable to a broad range of age levels, and many of the activities or follow-up questions can easily be modified to meet specific objectives. Students can use this website, or links provided on this site, to obtain detailed information on peregrine falcons as an aid in completing the activities. Format includes an introduction followed by the activities and a series of follow-up questions.

BIOACCUMULATION: PESTICIDES IN THE FOOD CHAIN

Introduction

Although the energy available to a predator like a falcon decreases as you move up the food pyramid, unfortunately many toxic substances increase in concentration as you move up the pyramid. This process is often referred to as "bioaccumulation" and is the reason peregrine falcons were nearly wiped out due to the affects of pesticides in the 1950's and 1960's. Accumulated pesticides in the falcons affected their ability to produce calcium. This resulted in the shells of their eggs being too thin.

Pesticides in the food chain

The following numbers will have to be adjusted for class size. The example is based on a class of 24 students. Divide the class into 6 groups of 4 students each. Within each group designate each student as part of the food chain of the peregrine falcon (one student represents the plants, one the insects, one the songbirds, and one a falcon.) You can either provide the following materials to each group or have them create them as part of the activity. In each group, the plants should punch out 100 "dots" of paper* using a hole punch and green construction paper. The insects should each be given a role of masking tape* and asked to tear off 20 pieces approximately 2-3 inches in length. The birds should each be given 5 white socks and a magic maker and asked to draw eyes and a beak on the end of the sock like a hand puppet. The falcons should each be given a pillow case and a magic marker. Ask them to draw a beak, eyes and the falcons characteristic "black mask" on the end of the pillow case like an arm puppet.

Once the groups have completed the above tasks, explain to the students that the activity they will be doing demonstrates how pesticides can move up the food chain, concentrating in predators like falcons at the top of the food pyramid. Relate the story of DDT spraying in the 1950's and 60's and its impact on peregrine falcon populations. You can add some fun to this activity by asking your students to dress up in 1950's or 60's style the day before, but not telling them why you want them to do this. Begin the activity by explaining to the students that you will spray the crops with DDT to start the activity. Go around to each of the "plants" in the groups and lightly spray their crops (the paper dots) with a plant mister. Now ask the "insects" to have their 20 bugs consume the 100 plants by picking them up with their tape. Each of the 5 bugs should pick up 5 plants (to speed this along have the "plants" help out.) Now ask the "birds" to have their 5 songbirds eat the 20 bugs. They should do this by putting on each sock like a hand puppet, grabbing 4 bugs per sock then pulling their hand out of the sock while still gripping the bugs so that the bugs are contained inside the inverted socks (to speed this along have the "plants" and

“insects” help out.) Finally, have the “falcon” eat the 5 songbirds. They should do this by placing the pillowcase on their arm like an arm puppet and grabbing each of the songbirds, pulling their hand out of the pillowcase while still gripping the birds so that the birds are contained within the inverted pillowcase. At the end of the activity each group should have one pillowcase, containing 5 socks, each containing 20 strips of tape, each having 5 paper dots stuck to it.

** you can substitute velcro strips for the tape and small felt pieces for the paper dots in this activity.*

Have your students answer the following:

- How many songbirds did the falcon have to eat to accumulate the amount of DDT sprayed on 100 plants?
- What would happen to a larger predator that ate a single peregrine falcon?