they could know exactly what percentage of sunlight was reaching each group of containers.

- **Why did the scientists count the number of leaves and measure the roots and stems of each plant?** The scientists needed a way to compare the growth rate of the plants. By counting and measuring, the scientists could compare the plants' growth. Counting and measuring provided a way to compare the plants without introducing personal opinion or evaluation into the process.

Findings

- **Basing your answer on what you know about plant germination, does it surprise you that Oriental bittersweet germinated and grew at about the same rate, regardless of the amount of sunlight? Why or why not?** Students should know that most plants will germinate better either in more sunlight or in less sunlight, depending on the unique needs of the plant. It is unusual for a plant to germinate and grow almost equally regardless of the amount of sunlight it receives. Students should be able to back up their answers with their own evidence or knowledge.
- **Reread the second paragraph in the "Introduction." What do you think would happen to the plants in the five groups if the scientists had let the plants grow for another 100 days before measuring them?** The Oriental bittersweet plants growing in 100 percent and 70 percent sunlight should grow much faster and have more leaves than the plants in the more shaded conditions.

Discussion

- **Do you think Oriental bittersweet could become a bigger threat to native forests in the future? Why or why not?** Oriental bittersweet will likely become a bigger threat in the future. The reasons are that it can germinate and grow in shaded conditions, and it can sit and wait until an area is open to sunlight before it grows quickly and further reproduces. Regardless of the answers your students give, they should be able to back up their answers with observations, knowledge, or logic.

Goll-ly! Don't Take a Knapweed!

Introduction

- **In your own words, state how spotted knapweed and gall flies have changed some things for deer mice living in the arid grassland in this study.** The spotted knapweed has reproduced so much that native grasses and other native plants are overtaken and choked out. The addition of gall flies has caused the feeding cycle of deer mice to change. They now can eat as much as they want from September to May. Then in the summer, their food source is reduced. This situation is the opposite of their natural cycle. This change may also be causing the population of deer mice to increase because of the wide availability of food for much of the year.
- **What question did the scientists want to answer?** Is the population of deer mice higher in areas where spotted knapweed has overtaken native plants and gall flies have been released to control it?

Method

- **Why did the scientists select two large areas to study—one ecosystem with nonnative knapweed and the other a native ecosystem without knapweed?** The question the scientists wanted to answer required them to compare a native ecosystem with a grassland area that had been overtaken by nonnative knapweed.
- **Why was each deer mouse given a different number?** Each deer mouse was

given a different number so the scientists could tell if they had trapped the same mouse twice. Also, when recording the weight and sex of each mouse, the number helped to identify it as an individual.

- **Why did the scientists collect information over 3 years?** The only way the scientists could compare fall and spring populations was to collect information over more than 1 year. In addition, the more times and the more different conditions under which the scientists were able to compare the numbers of mice, the more confidence they could have in their findings.

Findings

- **Reread the last paragraph in the "Introduction" section. Was the scientists' prediction correct? What is the evidence?** Yes, the scientists' prediction of a larger population of deer mice in spotted knapweed sites was correct. The evidence is shown in figures 8 and 9, which indicates that, overall, larger numbers of deer mice were in spotted knapweed sites.
- **During the summer when gall fly larvae are not available, the population of deer mice living in areas with spotted knapweed eats more native seeds and insects than it normally would eat simply because the total number of individuals is higher. How might an overall increase in the number of deer mice affect the native seeds and insects?** As predators of insects and seed eaters, an increase in the number of deer mice, along with a decrease in other food, would cause the number of insects and seeds to be reduced.
- **Do you think the introduction of invasive species can upset the ecology of any area? Using this study as an example, explain your answer.** Yes. In this study two nonnative species have been introduced. The introduction of these two species has caused a change in the number of deer mice, which ultimately will have an impact on other plants and animals in the ecosystem.

Discussion

- **Basing your response on the findings and implications of this study, what would you conclude about using nonnative species to control invasive ones?** You might conclude that before using nonnative species to control invasive species, you should give careful thought to the problem and do research to predict and protect against any harmful results that might happen to other plants and animals in the ecosystem.
- **Purple loostrife is an invasive plant. Scientists recently found that Galerucella beetles, native to Europe and Asia, help control purple loostrife by eating its leaves. How does this information change your answer to the question above?** If you concluded that nonnative species should not be used to control invasive species, this information will help you see that, in some cases, using nonnative species may be the best approach to controlling invasive species.