

Activity #2

Ant Alert: How Does Invasion Threaten Natives?

● ● ● In Advance *Student Reading*

- Assign the Student Page “That Ant is a Tramp” as homework reading (pp. 20-23).

● ● ● Class Period One *Ants Video*

Materials & Setup _____

- *Nova* video, “Ants! Little Creatures Who Run the World” (included with this curriculum)
- VCR

For each student

- Student Page “Ant Video Note Sheet” (pp. 24-25)

Instructions _____

- 1) Watch the *Nova* video entitled, “Ants! Little Creatures that Run the World.” The entire video lasts approximately 1 hour, so if you have a shorter period than that, play video from beginning through the leafcutter ant segment. This is 47 minutes of run time. Or play as much of the video as you can during the class.
- 2) During the video, ask students to fill in the Student Page “Ant Video Note Sheet.” Let students know they do not necessarily need to remember the species names of different kinds of ants on this note sheet. However, they should be able to describe the ant species well enough that someone who’s watched the video would know which ant they are describing.
- 3) As homework, have students review their class notes and the “Argentine Ants” student page from the previous homework assignment to prepare for a brief in-class quiz the following class period.

● ● ● Class Period Two *Argentine Ants Teaching Teams Preparation*

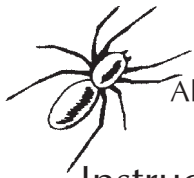
Materials & Setup _____

For each student

- Student Page “Argentine Ants Quiz” (pp. 37-38)

For each student teaching team

- One copy of the appropriate topic set (see class period two instructions) from the Student Page “Argentine Ants Teaching Teams Background” for each team member (pp. 26-36)



Instructions

- 1) Have students complete the Student Page “Argentine Ants Quiz.”
- 2) Divide the class into four or more teams. Each team should consist of at least three students. Assign each team a topic from the list below, making sure that each topic is covered by at least one team. Explain to students that they will be working in teams to teach the rest of the class about a specific topic related to Argentine ants and the threat they pose to native ecosystems on Maui.
Topic #1: The location and spread of Argentine ants in Haleakalā National Park
Topic #2: The threat Argentine ants pose to native arthropods in the alpine/aeolian ecosystem
Topic #3: Biological and behavioral characteristics that make Argentine ants a strong invader
Topic #4: Characteristics of Argentine ants that affect how they spread and can be controlled
- 3) Hand out the appropriate section of the Student Page “Argentine Ants Teaching Teams Background” to the teams, making sure each team member receives a copy of the information on the group’s topic.
- 4) Have team members use the information from the initial homework reading and the student page you just handed out to develop a creative presentation that will teach other students about the team’s topic. Ideas include writing and performing a song or chant, making a visual representation, developing a multi-media presentation, or performing a skit or comedy routine.
- 5) Each team must also come up with two questions they want other students to be able to answer after their team presentation and have these questions written on a piece of paper that can be handed in.

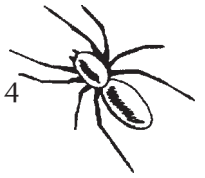
Teaching Option

- If you want to pare down this activity from three class periods to two, or prefer to present the information yourself, substitute a lecture and discussion format. Use the Student Page “Argentine Ants Teaching Teams Background” for your background notes.

● ● ● Class Period Three *Team Presentations*

Instructions

- 1) Invite members of each team to stand up in front of the class and make their presentation. Go in the order in which the topics are listed above. Complete all the team presentations on a given topic before moving on to the next one. Prior to each presentation, have the team hand in its list of two questions that other students should learn to answer based on the presentation.
- 2) If there is time at the end of the class, have a class discussion focusing on the implications of what students have learned about Argentine ants for resource management in the park.
- 3) Select one or more questions from presentations on each topic, and either orally assign them as homework, or use them to prepare a quiz for the following class period or a later homework assignment.



Journal Ideas

- Do you think resource managers in Halekalā National Park should make eradicating or controlling nonnative species such as Argentine ants a top priority? Why or why not?
- Think about the social structure and operation of ant colonies. Identify one aspect of ant behavior from which humans could learn valuable lessons and explain how that would benefit people. Then identify one aspect of ant behavior that would be destructive if people adopted it, and explain your thinking.

Assessment Tools

- Student Page “Ant Video Note Sheet” (teacher version, pp. 16-17)
- Student Page “Argentine Ants Quiz” (teacher version, pp. 18-19)
- Participation in preparing and delivering team presentation
- Team presentations: Assess on the basis of creativity, conformance with information provided, and thoroughness in answering the questions the team identified for other students.
- Journal entries



Ants Video Note Sheet

This list of possible responses is not complete, but provides guidelines for assessment and discussion.

Write something you learned from the video about ants, termites, or other social insects that illustrates each of these traditional Hawaiian values.

Laulima — Cooperation, many hands or people working together on a task to accomplish a goal

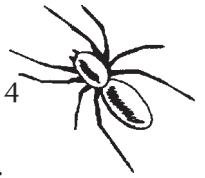
- Large numbers of wood ants feeding on caterpillars and moths ensures success.
- Termites can repair tremendous damage to their home because so many work together.
- Kenyan raid ants bunch together before invading a termite nest, combining the force of numbers with organized aggression.
- Herdsman ants form living bridges over gaps. The moving colony crosses these bridges.
- Millions of driver ants act like a super-organism, killing almost everything in its path. Ants release those trapped in slug slime, and several ants work together to carry heavy loads back to the nest.

‘Ohana — Extended family system, the primary component of society. Individual interests are not as important as the interests of the group.

- Living in family groups has been the key to cockroach success. They digest food only with the assistance of small organisms in their guts. These are passed from parent to offspring during feeding.
- All ants belong to extended families and carry prey home to share.
- Raising many close sisters together ensures success for the whole colony. Individual ants can afford to risk their lives since they will soon be replaced.
- Desert ant workers may die after only a few days in the scorching heat, but when they do find food they carry it immediately back to the nest.
- Leaf cutter ants are “robots,” programmed to serve the colony.

Kuleana — Responsibilities and roles. If each member of society fulfills their *kuleana*, all needs for survival will be met.

- When their nest is damaged, soldier termites come out first to defend, then workers come out to repair.
- Worker ants are dedicated to caring for the eggs, grubs, and cocoons of their younger sisters.
- Male ants die soon after mating, and the newly mated queens establish new colonies.
- During times of plenty, honeypot ants are filled by their sister workers with sweet food to eat during lean times.
- When driver ants go foraging, soldiers guard the column, cut up prey, form living bridges for other ants to cross, and hold back obstacles along the trail. Workers clear the trail and carry prey back to the nest. Other workers throw out “garbage” from the nest.
- Thousands of herdsmen ants link legs to form a living cradle that serves as the colony’s nest.



Write at least two similarities and two differences between Argentine ants and other ant species on the video. Here are six areas of comparison to use for ideas. There are others, as well.

Argentine Ant Characteristics and Behaviors

- Argentine ant colonies reproduce by “budding.” The new queens walk to their new nest site after having mated in the nest. Argentine ant males die after mating.
- Argentine ants are voracious predators.
- Argentine ants do not have permanent nests. They may move the entire nest from time to time.
- Argentine ant nests have more than one queen.
- Argentine ants do not defend their nests from other Argentine ants in the same area.
- Other

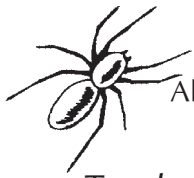
Note Two Similarities and Two Differences Between Argentine Ants and Other Ant Species

Similarities

- Wood ants are voracious predators during the summer.
- Kenyan raid ants are also predatory, pursuing termites and raiding their nests.
- Driver ants are particularly voracious predators, forming rivers of ants from which very little escapes alive.
- Driver ants move their nests frequently (in search of food).
- Herdsman ants regularly move their nests.

Differences

- Harvester ants in Arizona reproduce through mating flights. Tens of thousands of winged males and future queens from many colonies gather in an “ant orgy.” The mated females fly off to form new colonies.
- Malaysian herdsman ants get all their food from honeydew produced by bugs that they tend.
- Certain ants in South America make their homes in the hollow stems of a plant that also produces white nodules that serve as food for the ants. In return, the ants defend the plant against predators.
- In the Amazon, some ants grow hanging gardens in nests of chewed plant fibers.
- The ancestral piles of wood ants are passed through generations. Some may date back to the 1900s.
- Leaf cutter ant colonies, numbering two to three million workers, have a single queen.
- Honey pot ants defend their nests and prey against ants from other nests. Entire colonies may be overrun and the honeypots dragged off to the victorious colony.



Teacher Version

Argentine Ants Quiz

- 1) Explain Argentine ants' response to a disturbance in their environment, such as a vibration, change in weather, or a manipulation of their nest.

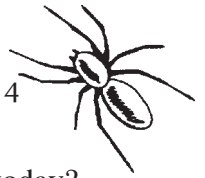
Answer should be based on this excerpt from the text:

Even a slight disturbance such as a vibration or a small manipulation of the nest will send Argentine worker ants scurrying away from the nest trying to carry larvae and pupae (their “brood”) to a safer place. Entire colonies may move in response to physical disturbance, changes in weather conditions, or changes in their food source.

Argentine ants are so sensitive that even a hiker or picnicker walking by or sitting down could create enough of a vibration or disturbance to cause a nearby nest to relocate.

- 2) How could this type of response help Argentine ants “hitch a ride” with humans?

It would take no more than a few ants and their cargo of brood to relocate into a hiker's pack, a picnicker's cooler or garbage bag, shipments of nursery stock, or other items. Once they have reached their new destination, they might be able to establish a new colony.



- 3) How many different populations of Argentine ants are known in Haleakalā National Park today?

Two

- 4) Is the size of those populations getting bigger, getting smaller, or staying about the same?

Both are getting larger.

- 5) Give two reasons why Argentine ants are considered a threat to native insects and plants in Haleakalā National Park.

Responses should be based on the following points from the text:

There are no native ants on the Hawaiian Islands, so most of the insects that evolved here are not adapted to defend themselves against the aggressive predatory abilities of large colonies of Argentine ants. Native Hawaiian insects are often soft-bodied and flightless—easy prey for the Argentine ant.

Argentine ants also may prevent native insects from using rocks, logs, and other objects for cover. These ants often nest under objects of this type. In the extreme environment of the alpine/aeolian zone, that cover may be important refuge to the native insects to shelter them against the midday sun, the nighttime cold, and the wind.

Argentine ants reduce the populations of native arthropod species. The effects are especially severe at higher elevations, where the prey species are fewer in number. Species that are known to be severely affected by Argentine ant predation in the park include native bees and moths, which are the main pollinators for native plants such as the silversword.

Argentine ants have no predators, competitors, or parasites in the alpine/aeolian ecosystem.

Argentine ants are well known for displacing native insect and ant species elsewhere in the world. Researchers and resource managers at the park are concerned that the same thing could happen at Haleakalā.