

**Grasshoppers on Nihoa:  
thinking about and doing science with two virtual experiments**  
*Barbara Mayer, Maggie Prevenas and Sandy Webb*

TEACHER PAGE

**Appropriate grade level:** 4-12

**Subjects:** Science

**Time required:** part of a class period on two days (e.g., before the scientists go to Nihoa, and then again when they return.)

**Hawai'i Performance Standard:**

**Science:** Standard 1: The Scientific Process: Scientific Investigation; Code 8.1.1. The students will be able to determine the link(s) between evidence and the conclusion of an investigation.

**Materials:** just paper and pencil...unless you choose to mimic the Nihoa in your school's playground, in which case you will need: coat hanger quadrats, coffee filters, plant oil (like corn oil, soy oil, canola oil and orange peel oil)

**Objectives:** Students shall participate virtually in scientific research being conducted on Nihoa in the Northwestern Hawaiian Islands. The students will devise a hypothesis and a data table, in preparation for finding out the results of the scientific research.

[Assessment for both experiments may be found in the Rubrics file.](#)

**Background:** Grasshoppers, *Schistocerca nitens*, were first seen on Nihoa in the 1980's. Even though the endemic Nihoa Millerbird eats this alien grasshopper, the bird can't eat it fast enough to keep the grasshopper's numbers under control.

In the last few years there has been a population explosion of these grasshoppers, and they have denuded all the broad-leafed plants; populations of the native palm (Nihoa loulou) and grasses have not been as heavily impacted. Therefore, the biologists' goal is to bring the grasshopper numbers under control. To begin to accomplish this goal, a group of scientists is on Nihoa right now doing 2 experiments; one on grasshopper food preference; the other, on what bait would work to capture the hoppers.

You, as the teacher, should know that the scientists, with their knowledge background, are predicting that the grasshoppers (a) will prefer broad-leafed plants and (b) will be attracted to the oil from oranges. However, the students will not be told this at the beginning of the activity!

The two student activities concerned with grasshoppers on Nihoa can stand alone, or they could be done sequentially, or perhaps half the class could do one activity while the other half could do the second activity. Finally, each group could share the results of their activity with the whole class, by way of a Powerpoint presentation, a skit, etc.

Each activity could be taught in different ways. For example, if you would like your students to follow the scientific questioning that the party of scientists is actually using on Nihoa, you may follow the suggestions on...

- (1) STUDENT PAGE 1: Experiment #1: [Grasshopper Plant Food Preference](#)
- (2) STUDENT PAGE 2: Experiment #2: [Grasshopper Bait](#)

Another way to teach the material would be for you to ask the students do devise their own experiment that they would like to do, if they were the scientists on Nihoa. In which case, you would give the students only the background situation on Nihoa, and let them come up with their own question, hypothesis based on the question, materials, methods, and data table. Teachers may have to assist students in determining the averages and ranges of the data.

**Materials:**

See at the top of this webpage and also the STUDENT PAGES for each experiment.

**Methods/Procedures:**

See the STUDENT PAGES for each experiment.

However, you as the teacher could mimic what's happening on Nihoa by using wire hangers made into quadrats (by bending into a square) to survey in the schoolyard for experiment #1. You could model experiment #2 by placing oiled filters in the schoolyard to find out which oil any of the insects prefer.

**Results:**

Students should design a data table to collect the data. There should be one data table per experiment. At this stage, it will just be a blank table. The data will be reported on this website when the Nihoa scientists return to the ship on Saturday, August 20.

**Conclusion:**

On August 20 the students can put the data the scientists give them into their own (possibly revised) data table. Then the students can reach a conclusion in answer to their question.