



Insect Discovery

THE SCIENTIFIC METHOD: *WHAT DO CRICKETS EAT?*

Lesson Plan – Insect Science Educational Supplements

Grade level: K-3

Academic Standards:

Next Gen Science Standards: Developing possible solutions (ETS1.B)

Common Core: Participate in shared research and writing projects (W.2.7). Reason abstractly and quantitatively (MP.2). Draw a bar graph representing up to four categories (2.MD.D.10)

Life Skills: Learning to learn.

Time: 45-60 minutes

Logistics: Small group project

Materials:

- 60 crickets (from pet store)
- 4 terrariums or other container you can see through
- Multiple food choices (ex. apples, carrots, lettuce, nuts...)
- Paint sharpies
- Graph paper
- Scrap paper for tallying

Background: Introduce students to the process of science by performing and designing their own experiment. Planning and carrying out investigations to answer questions or test solutions to problems builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

Preparation: Set up four cages/containers with approximately 15 crickets in each cage. Crickets are readily obtained from most local pet store in the reptile food section. Be sure the terrariums have lids so the crickets cannot escape and provide water (e.g. wet paper towel in dish). **IMPORTANT** – starve the crickets the night before the experiment so they will be hungry! Have graph paper available for student use as well as scrap paper for note making.

Activity:

1.) *Set the tone.* Lead a discussion on what is science. Ask the children if they know what scientists do and how do they discover things. Have the students performed experiments of their own in the past? Tell them today is their chance to practice being scientists.

2.) *Introduce the experiment.* Break the classroom into four groups and place a cage of crickets in front of each of the groups. Give them some time to just observe the crickets. After the kids have gotten to know the crickets a bit, you can present the activity in one of several ways. One way is to explain that you have a bunch of pet crickets that you want to feed, but you don't know what they like to eat. Ask the students to help you figure it out. Another approach is to ask the students what their favorite foods are. Then ask what foods they might expect the crickets to prefer. Show the students the four food choices you have available. Have the students make a prediction as to which of the foods crickets will like best. Have each group write their

prediction on the worksheet (attached).

3.) *Designing the experiment and testing predications* Ask the students how they would test what crickets prefer to eat. Guide them towards a choice test – they place different food choices in the cage and see how many crickets visit each food over a short space of time. For simplicity, we have used the rule that each time a cricket approaches and starts eating counts as one visit, even

if the same cricket visits repeatedly. Give each group one of each of the four food choices to place in the four corners of their terrarium. Designate several scientists within each group to be responsible for observing and keeping track of comings and goings to one food item. Give each scientist a sheet of scrap paper for making tally marks (and explain how to observe and make tally marks!)

4.) *The experiment* After placing the foods in the container, students can observe the crickets for about 5 minutes and make tally marks every time a cricket approaches the particular food and starts eating. At the end of the 5 minutes they can count up their tally marks. Remind the students that this is not a game with winners and losers – this is real science and the important thing is to count accurately, not to get the most crickets.

5.) *Interpreting the results* The students will graph their group's results using a bar graph. Plot how many crickets visited each food type over the 5 minutes.

6.) *Class discussion and assessment*

A. Are there any conclusions we can draw about what kinds of foods crickets prefer? Compare each group's graph to the graphs of other groups. Are the results always the same? Is one experiment sufficient to prove something? When drawing conclusions, students must learn to compare results with their original predictions and see if initial questions can now be answered. Students should also learn that the results of some experiments aren't conclusive, so additional tests might be required. Communicating and sharing results is an important part of the scientific inquiry process.

B. Ask the students to discuss the scientific process. What did we do first? How did we proceed? Make a list of the steps of the scientific method on the board (question, hypothesis, experiment, analyze). Explain this is the best way to learn new things about the world in any context.

7.) *Additional experiments* Based on the class discussion see if there is interest in devising additional experiments using the cricket terrariums to answer further questions.

For example, if you mark a single cricket with a sharpie and repeat the experiment do you notice that it stays consistently at the same food choice or samples many? Have the students observe this singular cricket in their terrarium for five more minutes to see what choices it makes. Is there an ecological benefit to this sampling many choices? One possible discussion is generalists versus specialists — some animals eat many foods and some eat just one or two kinds (because of habitat, specialization in characters, etc.)

Or, set up a fifth terrarium with four examples of the same food choice. Have students count how many times crickets moves to each corner and samples the choice. Discuss the importance of

having a control in experiments. Create a graph as a class and discuss whether the results from the first experiment are substantial given the new evidence.

Background Biology:

Crickets belong to the order Orthoptera along with grasshoppers and katydids and belong to their own family, Gryllidae. While most orthopterans are plant eaters, these crickets are omnivores (as you will not doubt figure out observationally!). Crickets are known for their song, produced exclusively by the male using a file and scraper structure on his forewings. You can recognize the adult male by this structure that appears as crinkles in his wings. Males sing to attract females and to defend territory. Interestingly, crickets have ears in their legs. Adult females have a distinct dark ovipositor that they stick into damp sand when they are ready to lay eggs. Juveniles are smaller and have short wing buds.

Names _____

Cricket Feeding Experiment

Prediction:

Test: How will your group figure out which food the crickets like best?

Food choices:

Results: (number of cricket visits)

1. _____

2. _____

3. _____

4. _____

Conclusion: