



Ecology Explorers Lesson Plan

Name:

Rob Trenck

School:

Red Mountain High School

Grade Levels:

7-12

Title:

Bruchid Investigations: Bruchid Development Investigation

Brief Description:

This activity involves the utilization of the bruchid pods to conduct further investigations of the Blue Palo Verde (*Parkinsonia florida*) seed pods. Possible investigation is:

- A. Bruchid development investigation
 - 1. Temperature (Development time)
 - 2. Desert vs. Urban pods (Success rate)

Objectives:

The students will be able to:

- A. Collect and record data
- B. Generate a problem
- C. Generate and test hypothesis
- D. Make a prediction statement
- E. Design/setup experimental design chart
- F. List procedures
- G. Analyze data
- H. Make conclusions based on collected data





State Standards:

Science:

Essentials:

1SC-E1 Identify a question, formulate a hypothesis, control and manipulate variables, devise experiments, predict outcomes, compare and analyze results, and defend conclusions

1SC-E3 Organize and present data gathered from their own experiences, using appropriate mathematical concepts, analyses and graphical representations

1SC-E4 Identify and refine questions from previous investigations

Proficiency:

1SC-P1 Propose solutions to practical and theoretical problems by synthesizing and evaluating information gained from scientific investigations

1SC-P4 Create and defend a written plan of action for scientific investigation

1SC-P6 Identify and refine a researchable question, conduct the experiment, collect and analyze data, share and discuss findings

Distinction:

1SC-D1 Design and complete an advanced scientific investigation, either individually or as part of a group, and formally report results to peers, teachers and others



Materials:

The following items may be necessary to complete the Bruchid investigations:

Bruchid pods (Labeled various types)	Rulers
Dissecting microscopes	Thermometers
Dissection kits	Lab report forms
Petri Dishes	Identification keys
Markers for labeling	Insect reference books
Computers with internet access	

Procedures:

Bruchid Development Investigation:

Students at this point should have already been introduced to the Ecology Explorers protocol for the collection of Bruchid data. This lab will allow the students to develop a better understanding of the development of the Bruchid beetles that develop within Palo Verde seeds. The students should identify the Bruchid beetles to species using a simple key. The same species of beetle should be used for this experiment in order to not add another variable to the experiment, this is vital to the validity of this experiment. There are two different aspects to this experiment that will be outlined here:

1. Temperature (Development time)
2. Desert vs. Urban pods (Success rate)

Temperature:

Does the temperature* that Bruchid eggs are kept affect the length of time needed to develop and emerge as adult beetles?

This investigation is designed to investigate the affect of temperature upon the development of Bruchids'. Does temperature change the amount of time needed for their development from egg to emerged adult? Each student will have to complete their own lab report, completing the problem, hypothesis, prediction statement, experimental design chart and procedures. Following the collection of data the students will work in groups to complete the



graph, analysis and conclusion portions of the lab report. Each group of students will have 6 seeds that they will have Bruchid beetles lay eggs upon. They will make note of the day of egg deposition and place 2 seeds into each of the containers of the 3 different class determined testing temperatures. They will check the different temperature egg containers on a daily basis making note of any emerged adults and the day of emergence. Upon completion of the data collection the students will assemble a class data set and use that collected data to complete their lab reports.

* Note - due to the difficulty of having different constant temperatures, it is best to determine as a class the temperatures that they wish to investigate. Usually one temp below room temperature and one above room temperature are best. Room temperature can then be the control to which they compare their results. The class data set can then be analyzed for trends or to determine if there is a relationship present.



Desert vs. Urban Pods:

Does the type of seed that a Bruchid beetle deposits its egg affect the success rate of emerging adults?

This investigation is designed to investigate the affect of seed type (desert vs. urban) upon the development of Bruchids'. Does seed type affect the number of emerged adults? Each student will have to complete their own lab report, completing the problem, hypothesis, prediction statement, experimental design chart and procedures. Following the collection of data the students will work in groups to complete the graph, analysis and conclusion portions of the lab report. Each group of students will have 6 seeds that they will have Bruchid beetles lay eggs upon. They will make note of the day of egg deposition and place 3 seeds into each of the containers of the 2 different types of seeds (desert or urban). They will check the containers on a daily basis making note of any emerged adults and the day of emergence. Upon completion of the data collection the students will assemble a class data set and use that collected data to complete their lab reports



**BRUCHID INVESTIGATIONS
LAB REPORT**

Name _____

Date _____ Period _____

Problem:

Prediction Statement:

If:

And:

Then:

Experimental Design:

Procedures:



Data Table:

Graph: (see attached)

Analysis:

Conclusion:
