



**Science Unit:** *Plants and Animals Through the Stages of Ecological Life*  
**Lesson 3:** *Organisms – Their Needs*

School year: 2007/2008  
Developed for: Mount Pleasant Elementary School, Vancouver School District  
Developed by: Luana Avila (scientist), Connie McGregor and Maureen McDonnell (teachers)  
Grade level: Presented to grades 6 - 7; appropriate for grades 4 – 7 with age appropriate modifications  
Duration of lesson: 1 hour and 20 minutes  
Notes: Students should have a prior lesson on scientific process and experiment design.  
If you like to use beans as the plants, make sure to grow beans before starting this lesson. Alternatively, you could buy potted plants.

**Objectives**

1. Learn to design and setup a large (multi-day) experiment
2. Determine the difference between animal and plant need for heat
3. Determine the difference between animal and plant need for light

**Background Information**

As with all organisms, animals and plants grow, reproduce and die. However, animals and plants fulfill these basic needs through different mechanisms. To grow most animals only require food, whereas plants require 'food', in the form of soil nutrients, and also light. In order to survive most animals and plants require warmth. This lesson is designed to teach experiment design and experiment setup through testing the difference between animal and plants regarding their need for warmth and light for growth.

**Vocabulary**

<u>Word:</u>	<u>Brief definition.</u>
Hypothesis	A guess or a prediction based on previous knowledge about the experiment
Variable	The factor that is being changed in an experiment.
Replicate	A repetition of an experiment to make sure your observation is correct, to strengthen your conclusion
Observation	The result of an experiment, the outcome of an experiment.
Conclusion	The final decision after considering your results

**Materials (enough for 28 students divided into 4 groups)**

- 12 male crickets (all same developmental stage and species)
- 12 plants (all same species)
- 12 yogurt containers to house crickets
- Cricket bedding/ hay/ lettuce/ fish food
- Cheese cloth (enough to cover all containers)
- 1 desk lamp (fluorescent bulb)
- 12 elastics
- 2 Heating pads (or anything that generates heat)



**In the Classroom**

**Introductory Discussion**

1. Place on the table: cricket, worm and plant
2. Ask them are these? Animals, plants, organisms, living beings
3. Ask them to describe similarities between all three organisms
  - Alive
  - Grow
  - Reproduce
  - Die

After you have a list focus on growth

4. What do they need to grow? (Make a table and have the students fill the growth needs – (?) represent the variables we will test in this experiment – light and heat)

	Plants	Animals
Growth	Light (?), soil, water, CO <sub>2</sub> , O <sub>2</sub> , heat(?)	Food, shelter (heat?) O <sub>2</sub> , water, Light (?)

5. How can we test this?
  - Doing an experiment
6. Ask the students to come up with an experiment designed to test the difference between animal and plant heat needs.
  - Research question: Do plants require heat to survive?
  - Prediction: Crickets will require heat to survive, plants will not.
  - Positive control: crickets require heat to survive
  - Negative control: crickets in the cold will not survive
  - Variable: amount of heat
  - Measurement: cricket activity (chirps) or survival / plant growth or survival
  - Replicates: repeat the experiment to make sure your observation is correct!
7. Ask the students to come up with an experiment designed to test the difference between animal and plant light needs.
  - Research question: Do crickets need light to survive?
  - Prediction: Plants need light to survive, crickets don't.
  - Negative control: plants in the dark (will not survive)
  - Positive control: plants in the 24hrs light (will survive)



## SCIENTIST IN RESIDENCE PROGRAM

- Measurement: plant: height and number of leaves / animal: number of chirps/ minute
- Replicates: repeat the experiment to make sure your observation is correct!

Provide instructions for the rest of the lesson and the safety guidelines

1. Students should form 4 groups and be responsible for setting up half of one experiment
2. Make sure to follow the instructions in setting up each environment for your animal and plant
3. Treat the animals and plants with respect
4. Record the experiments design, hypotheses and controls in your worksheet.
5. Make sure to get a experiment follow-up worksheet to record the observation you will be making over the next 3 weeks

### **Science Activity: Setting up Heat Needs Experiment**

Setup

1. Make 6 environments for the crickets
  - a. Use a yogurt container covered with a cheese cloth secured with an elastic. Place bedding, hay, fish food and lettuce.
  - b. Place 1 cricket in each container
2. Take 6 plants

Place 3 cricket containers and 3 plants ON a heating pad

Place 3 cricket containers and 3 plants OFF the heating pad(s)

### **Science Activity: Setting up Light Needs Experiment**

Setup

1. Get 1 lamp
2. Make 6 environments for the crickets
  - a. Use a yogurt container covered with a cheese cloth secured with an elastic. Place bedding, hay, fish food and lettuce.
  - b. Place 1 cricket in each container
3. Take 6 plants

Place 3 plants and 3 cricket containers under a cold light lamp that will be on 24 hrs

Place 3 plants and 3 cricket containers in darkness (24 hrs darkness)

After the setup is finished each student should visit the other experiment and write the setup in their worksheet.

### **What to expect:**

Crickets need their surrounding temperature to be between 21 and 23°C in order to survive, therefore make sure the heating pad is giving adequate heat, especially over weekends.



## SCIENTIST IN RESIDENCE PROGRAM

Beans will not survive in darkness, but if you buy a potted plant make sure to check whether it is plant that likes shadow, those are likely to survive in low light environments.

If you are using chirps as a measurement, make sure all your crickets are male

### **Closure Discussion**

1. Ask students what was the most difficult thing about setting up the experiments
2. Draw on the board the final setup for each experiment
  - Write beside each experiment setup: variable, measurement, control and prediction
3. Ask students to brainstorm possible problems with each experiment – make a list

After 2 weeks debrief the progress/ results of the experiment

### **References**

1. Advice from Graham regarding cricket care - Noah's Pet Ark store owner (Broadway at MacDonald, Vancouver, BC).

### **Extension of Lesson Plan**

1. Investigate other variables that are different between animals and plants.
2. Have the class make graphs based on number of chirps.

Investigator name: \_\_\_\_\_

### Experiment Design – Investigating Heat needs

**Research Question:**

\_\_\_\_\_

**Hypothesis:**

\_\_\_\_\_

\_\_\_\_\_

**Variable:** \_\_\_\_\_

Experiment setup

Testing condition		
Plant		
Animal		

- Experiment
- Control

- Experiment
- Control

What will you be measuring or watching out for?

PLANTS	ANIMALS

Possible problems with this experiment:

\_\_\_\_\_

\_\_\_\_\_

## Experiment Design – Investigating Light needs

**Research Question:**

---

**Hypothesis:**

---

---

**Variable:**

---

Experiment setup

Testing condition		
Plant		
Animal		

- Experiment
- Control

- Experiment
- Control

What will you be measuring or watching out for?

PLANTS	ANIMALS

Possible problems with this experiment:

---

---



