

## Animal Behavior

**Time: 50 minutes**

**Grade Level: 9-12**

**Objectives:**

Students will be able to design and carry out an experiment to study insect response (behavior) to stimuli.

Students will be able to design a data table that is appropriate for their experimental design. (Analysis)

Students will be able to interpret and report (orally) the results of their experiment to the class. (Synthesis and Evaluation)

Students will be able to evaluate the outcome of their experiment based on their hypothesis and prediction. (Evaluation)

Students will be able to comprehend that insect behavior is influenced by external stimuli and predict how insects in natural environments react to stimuli. (Comprehension and Synthesis)

**Idaho Achievement Standards**

648.02a Know that observations and data are evidence on which to base scientific explanations.

649.01a Identify questions and concepts that guide scientific investigations.

Employ scientific inquiry and develop critical thinking skills.

653.02 Know that multi-cellular animals have nervous systems that generate behavior.

Know that organisms have behavioral responses to ...internal and external stimuli...

Know that behaviors often have an adaptive logic when viewed in terms of natural selection.

**Background Subject Matter Content**

Behavior is an organism's response to stimuli

Stimuli can be internal or external

External - light, gravity, temperature, odor, moisture, etc.

Internal - thirst, hormones, etc.

Behaviors can be innate or learned

Innate behavior - response to stimuli that is performed spontaneously the first time the stimulus is encountered (startle response, sucking, crying, etc.)

Influenced by genes

Reflex - startle reaction, moving away from hot object

Taxes - movement towards or away from a stimulus

Learned behavior - behavior that develops as a result of experience

Innate behaviors can be modified by learned behavior

Some behavior can be measured by simple observations

**Key Point**

An organism's behavior is closely related to the environment in which it lives.

## The Lesson

### Introduction (10 minutes)

Engage - burst balloon & toilet paper trail

Students were unknowing participants in animal behavior experiment

Ethology - study of an organism's behaviors in an ecosystem

Can learn much about an organism by observing behavior in a natural or lab setting

Lab will involve looking at insect behavior

### Background/Content

Behavior is a response to stimuli

Stimuli - external or internal and examples

Innate behavior is (see above)

Learned behavior is (see above)

### Activity - (25-30 min.)

Repeat - lab will involve looking at insect behavior in a lab setting

Assign students to groups

Hand out experiment worksheet

Each group will be assigned an insect to study

Each group will design an experiment that can be completed within 15 minutes (5 min)

Give an example of a simple experiment showing a hypothesis, experimental design, prediction, and data table.

Show examples of poorly designed hypotheses and experiments.

Each group will develop a data collection sheet (5 min.)

Each group will be responsible for preparing a brief oral and visual (overhead projector) report of their results to the rest of the class (5 min.)

Worksheet and overhead transparency will be turned in at the end of the class period

Monitor group activity - formative assessment of hypothesis and experimental design

### Conclusion - (10 min.)

Student reports on overhead (formative/summative assessment)

Name insect group and state group's hypothesis

Explain group's experimental design

Ask other groups to predict what will happen based on experimental design

State group's prediction

Show visual of results on overhead projector

Collect group worksheets and transparencies

Briefly summarize how using a simple experimental design and observation has led to increased understanding of how stimuli influences behavior and how an organism's behavior is directly influenced by the environment in which it lives.

Introduce take-home evaluation

Design an investigation in a natural setting based on what was learned about the three insects in this lab and the information accompanying the evaluation

### **Materials**

Insects (mealworms, box elder bugs, crickets, ants, etc.)

Petri dishes

Plastic spoons

Paper cups/plates for food

Sugar water

Various stimuli (oat bran, sawdust or pine shavings, potato, apple, papertowel (for dampening), sand, light source (flashlight), ice pack, heat pack, black paper for obstructing light).

Observation trays - two cell and five cell (or any type of large dish where separate areas can be distinguished).

### **Evaluation (take home)**

Given what you have learned about insect behavior in this lab and using background information provided on the lab insect of your choice, form a hypothesis related to the behavior of that insect and design an experiment to test your hypothesis. The site of your experiment needs to be a natural setting rather than a laboratory setting.

# INSECT BEHAVIOR INVESTIGATION

Names of people in your group:

---

---

Insect being observed: \_\_\_\_\_

Question we will investigate: \_\_\_\_\_

Predict the outcome of your experiment \_\_\_\_\_

---

Describe your investigative design in enough detail that someone else could replicate it.

(Remember to replicate the experiment yourself.)

---

---

---

---

What data will you collect and what method will you use to collect it?

---

---

---

What conclusions did you draw from your data?

---

---

Compare your conclusion(s) to your prediction(s)?

---

---

**TAKE-HOME EVALUATION**

**Student** \_\_\_\_\_

Given what you have learned about insect behavior in this lab and using background information provided on the lab insect of your choice, form a hypothesis related to the behavior of that insect and design an experiment to test your hypothesis. The site of your experiment needs to be a natural setting rather than a laboratory setting.

Insect of Choice

\_\_\_\_\_

Question(s) You Would Like to Answer

\_\_\_\_\_

\_\_\_\_\_

Hypothesis

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Methods and Materials

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Grading Rubric**

Proficient



Not Proficient

<b>Question and hypothesis utilize what is already known about this insect</b>		4	3	2	1
<b>Question is clearly stated and can be addressed thru an experiment</b>			3	2	1
<b>Hypothesis follows logically from question and is testable</b>		4	3	2	1
<b>Experiment is designed to answer the question, test the hypothesis, and demonstrates an overall understanding of the scientific method</b>	5	4	3	2	1

**Maximum Points Possible - 16**

Student Grade - /16