



Activity #2

# Holding On To Water Lab

● ● ● **Class Period One** *Holding On To Water Lab (1/2 to 1 period)*

## Materials & Setup

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- A sunny window sill or lamp
- Fan

*For each lab group of two to four students*

- Small sponges (four sponges of similar size and shape for each lab group)
- Water
- Natural materials such as leaves, sticks, rocks, nut shells, soil
- Small dishes or other impermeable surfaces
- Balance scale

*For each student*

- Student Page “Holding On To Water Lab” (pp. 19-20)

## Instructions

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- 1) Divide the class into lab groups of two to four students.
- 2) Hand out the Student Page “Holding On To Water Lab Sheet” to each lab group.
- 3) Explain that the sponges in this activity represent insects that live in the alpine/aeolian environment near the summit of Haleakalā. In this environment—as in other dry environments—water is at a premium. The wind and intense sunlight have drying effects to which plants and insects in this environment have adapted.  
Each sponge-insect has a limited amount of water. The students’ job is to conserve that water over a 24-hour period. During that time, students are to protect their sponge-creatures in a manner that will best achieve this goal using only natural materials.

- 4) Have lab groups do steps one to three on the lab sheet.

● ● ● **Class Period Two** *Holding On To Water Lab, Continued*

## Materials & Setup

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*For each lab group of two to four students*

- Balance scale

*For each student*

- Student Page “Learning From the Lab” (p. 21)



## Instructions

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- 1) Have individuals or groups share their experiments and results with the entire class. Afterward, conduct a class discussion reflecting on the activity.
  - a) Were there any patterns in lab results among groups? (For example, was the combination of sun and wind more drying than the sun alone?)
  - b) Which methods seemed to work better than others? Why? (Which lab groups had the smallest percent change in the weight of the protected sponges?)
  - c) Are the same methods effective for protection against the sun and wind? Why or why not?

Help students relate their strategies to insect adaptations (and those of other animal and plants) in the alpine/aeolian environment. (If you did Activity #1 in this unit, ask students to draw on what they learned for this discussion. If you did not do Activity #1, use the “Alpine/Aeolian Challenges and Adaptations Answer Key” on pages 10-11 as background to help you guide the discussion.)

- 2) Assign the Student Page “Learning From the Lab” as homework.

## Journal Ideas

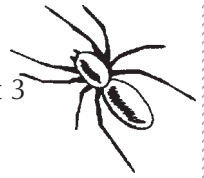
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- Relate how plants and animals have adapted to living in dry environments to things that humans do to protect themselves against dry, windy, sunny conditions.

## Assessment Tools

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- Student Page “Holding On To Water Lab Sheet”
- Lab conduct and methods
- Student Page “Learning From the Lab”



# Holding On To Water Lab

In this lab, you (or your lab group) will receive four small sponges. Each represents an insect that lives in the alpine/aeolian environment near the summit of Haleakalā. In this environment—as in other dry environments—water is at a premium. The wind and intense sunlight, in particular, have drying effects to which plants and insects in this environment have adapted.

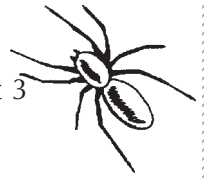
Each sponge-insect has a limited amount of water. Your job is to conserve that water over a 24-hour period. During that time, you are to protect your sponge-creatures in a manner that will best achieve this goal using only the natural materials your teacher provides.

## Divide the four sponges as follows

- Sponge #1 Protected from the sun according to your design and placed in a sunny window sill or under a lamp (that's turned off at night to simulate the sun).
- Sponge #2 Placed in the sunny window sill or under the lamp with no protection (a control sponge).
- Sponge #3 Protected from the sun and wind according to your design and placed under a fan AND in a sunny window sill or under a lamp (that's turned off at night to simulate the sun).
- Sponge #4 Placed under the fan AND in a sunny window sill or under a lamp with no protection (another control sponge).

## Instructions

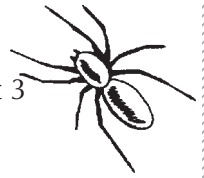
- 1) Soak each sponge with water. To measure the beginning moisture content, weigh your sponges and record the results on the next page.
- 2) Plan a strategy for using the materials provided to protect one of the sponges from the sun and one from sun and wind. Write down this strategy along with predictions of what will happen.
- 3) Protect your sponge-insects according to the strategies you devised and place them in small dishes or on other impermeable surfaces in the appropriate location. Use labels to distinguish each sponge from the others and your group's sponges from the rest of the class's.
- 4) At the end of the allotted time (roughly a 24-hour period), weigh sponges again, record weights, and make comparisons on the table on the next page.



# Holding On To Water Lab Sheet

- 1) On the following page write down the questions you are trying to answer through this lab.
- 2) After you've filled in the lab sheet, write your conclusions on the same piece of paper.

	Exposed to sun		Exposed to sun and wind	
	Protected	Unprotected (control)	Protected	Unprotected (control)
	Sponge #1	Sponge #2	Sponge #3	Sponge #4
Beginning weight (after being soaked with water)				
Describe your strategy for protecting the sponge-insect from drying and why you think it will work. (This is your hypothesis.)				
Prediction of the weight of the sponge after 24 hours				
Actual weight of the sponge after 24 hours				
Difference between the beginning and ending weights				
Percent change				



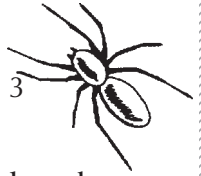
# Learning from the Lab

## Answer This Question as You Begin the Lab

- 1) What questions are you trying to answer through this lab?

## Answer These Questions After You Have Completed the Lab

- 2) What are your conclusions from the lab? In other words, what answers did you receive to your questions?



- 3) Compare your strategies for protecting the sponges in the lab to the adaptations of animals and plants in the alpine/aeolian ecosystem.
- 4) If you were going to do the sponge lab again, what new ideas for protecting your sponge could you draw from the organisms that live in the alpine/aeolian ecosystem?