

# **SOLAR BUG LAB**

## Middle School Student Lab Page

### **1. Testable Question.**

How do the positions of the Solar Bug legs impact its movement?

### **2. Background Knowledge.**

What is the difference between a dependent and independent variable?

Draw a sketch of a solar panel here.

### **3. Hypothesis.**

If (independent variable), then (dependent variable), because (rationale).

### **4. Materials.**

- Student Lab Page
- Pen / pencil
- Stopwatch
- 2V solar cell
- vibrating motor
- 2 chenille stems
- wood bodies for insects
- 2 O-rings

## 5. Procedure.

- a. Read through all of the instructions before you begin.
- b. Gather all materials.
- c. Construct your Solar Bug using the given materials and instructions.
- d. Try the Solar Bug to make sure that it is moving alright.
- d. Put the Solar Bug legs into the first shape on the Observations / Data section:  
BOTH LEGS POINTING DOWN
- f. Time the Solar Bug moving for 10 seconds.
- g. Record the approximate path of movement for the Solar Bug.
- h. Repeat D - G for the remaining 5 leg positions.
- i. Write a conclusion section.

## 6. Observations / Data / Results.

BOTH LEGS POINTING DOWN

Independent Variable - Sketch of Solar Bug's **legs**

Dependent Variable - Sketch of Solar Bug's **movement**

ONE LEG POINTING DOWN, ONE LEG FOLDED FLAT

Independent Variable - Sketch of Solar Bug's **legs**

Dependent Variable - Sketch of Solar Bug's **movement**

ONE LEG POINTING DOWN, ONE LEG OFF THE GROUND

Independent Variable - Sketch of Solar Bug's **legs**

Dependent Variable - Sketch of Solar Bug's **movement**

TWO LEGS FOLDED FLAT

Independent Variable - Sketch of Solar Bug's **legs**

Dependent Variable - Sketch of Solar Bug's **movement**

ONE LEG FOLDED FLAT, ONE LEG OFF THE GROUND

Independent Variable - Sketch of Solar Bug's **legs**

Dependent Variable - Sketch of Solar Bug's **movement**

TWO LEGS OFF THE GROUND

Independent Variable - Sketch of Solar Bug's **legs**

Dependent Variable - Sketch of Solar Bug's **movement**

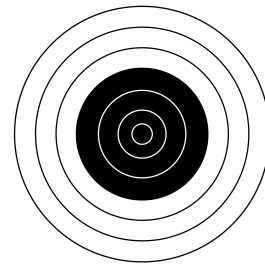
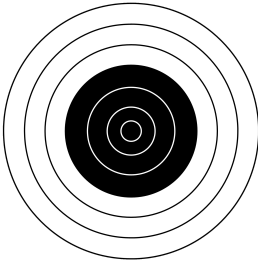
## **7. Conclusion.**

Write a paragraph to summarize your results. Include at least a sentence answer for each of the following:

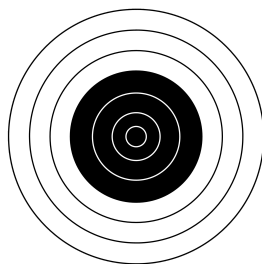
- a. What is the question for this lab?
- b. What was the hypothesis?
- c. Was the hypothesis supported? Why or why not?
- d. What is your interpretation of the data? What did you see happening?
- e. What are some possible errors made and improvements that could be made to this lab?
- f. Further directions: What is something slightly different that could be tested next time?

## **ELABORATION PAGE**

1. Using your knowledge of the movements when the legs are in various positions, you are going to attempt to hit all three bullseyes in 10 seconds.
2. As a group, discuss which leg configuration you think will be able to hit all three.
3. Start the Solar Bug in the center and release.
4. If unsuccessful, try again until you are able to get all three.



**START  
SOLAR BUG  
HERE**



## LAB REPORT SELF-EVALUATION

Make sure all of the answers to the questions are Yes, Sí, or はい.

<b>Question/Problem/Purpose</b> - Is your question testable? - Is it <u>not</u> a yes/no question?	<b>/ 3</b>
<b>Observation/Background Research</b> - Did you include notes, info or observations?	<b>/ 3</b>
<b>Hypothesis</b> - If _____, then _____, because _____.	<b>/ 3</b>
<b>Procedure</b> - Did you follow directions step-by-step?	<b>/ 2</b>
<b>Materials</b> - Is your list thorough and complete?	<b>/ 2</b>
<b>Observations / Data</b> - Did you include a data table? - Did you include a graph or visual representation? - Did you write a paragraph explaining your results? What do your results show? What specific evidence do you have? What are some potential errors?	<b>/ 6</b>
<b>Conclusion</b> - Did you restate the research question? - Did you restate the hypothesis? - Was the hypothesis supported? - What are some potential solutions to the errors? - What is a change that could be made to the lab to make it better or test something slightly different?	<b>/ 6</b>
<b>TOTAL</b>	<b>/ 25</b>

**Comments:**