

Sow Bug Habitats

Task Information

Subject: Biology

Content:

- Biology Regents Syllabus p. 43
- Syllabus Laboratory Skills #1, 3, 9, 14, page, X.

Format: Manipulative

Purpose:

Conducting an experiment to determine what type of environment sow bugs prefer.

Skills:

Primary: Predicting, interpreting data

Secondary: Collecting data, recording data, inferring

Time: 30-40 minutes

Materials:

- beaker of water
- stack of paper towels
- scissors
- masking tape
- eyedropper
- 1 sheet black construction paper
- clock/timer
- a petri dish with 10 sow bugs
- 1 extra petri dish lid

Preparation:

Sow bugs/Pill bugs are scavengers which are easy to culture. You can order a kit from various science supply houses. Another option is to establish your own culture. These animals can be easily found under rocks and rotting logs. A plastic shoe box with holes melted in the lid with a hot dissecting needle will serve as a container. Place several centimeters of soil in the bottom of the box. The soil should be from a wooded area with much organic matter. There should be wood chips, leaves, and stones. Be certain to keep the soil moist since sow bugs are crustaceans and use gills to breathe. Sprinkle a little oatmeal on the surface of the soil and add some potato slices and a few lettuce leaves or carrot peels. Place your culture where it won't be disturbed being certain to keep it moist and to periodically add vegetable scraps.

Sow bugs can be placed into petri dishes a day or two ahead of time only if the sow bugs are provided with a source of moisture. A wet piece of paper towel can be used. Remove prior to the start of the experiment by the teacher. To remove sow bugs from the paper towel, gently shake or move them with forceps or small paint brush. At the end of the experiment, return wet paper towel to petri dishes. Approximate time to set up 10 petri dishes with 10 sow bugs in each: 20-30 minutes.

Safety: N/A

Extensions/Modifications: None

Part B**Question 3****3 points total**

3 points "Yes, most or all of the sow bugs were on the moist/dark side or dry/light side." They may say "Yes, 7 of the 10 sow bugs were on the moist/dark side." or "No, 6 bugs were on the moist/dark side and 4 were on the illuminated/dry side." The students should use the numbers of sow bugs located in the various parts of the setup. As long as they have an appropriate response based on what they discovered and recorded on their chart and answers are written in complete sentences.

2 points In the case of partial answers, for correctly deciding "yes or no" based on their numbers for preference.

or

For properly using the numbers of bugs in various locations as evidence but with a weak explanation.

*** Deduct 1 point if complete sentences are not used. ***

0 points Incorrect response even if in complete sentence, or no response provided.

Question 4a.**3 points total**

3 points "No. Movement to the moist/dark side could be evidence that the sow bugs prefer darkness and have nothing to do with the moisture." Students should indicate that there are two variables involved, not just one. Answers should be written in complete sentences.

2 points Identifies only one of the above variables,

*** Deduct 1 point if complete sentences are not used. ***

0 points Incorrect response even if in complete sentence, or no response provided.

Question 4b.**3 points total**

3 points "No. Movement to the dry/light side might indicate preference for a dry environment. It might not be related to the amount of light available." Again, students should indicate that there are two variables involved, not just one. Answers should be written in complete sentences.

2 points Identifies only one of the above variables.

*** Deduct 1 point if complete sentences are not used. ***

0 points Incorrect response even if in complete sentence, or no response provided.

Question 5**1 point total**

1 point Student responds, "No."

Question 6**2 points total**

2 points Student explains that two (2) variables were used at the same time. Answers should be written in complete sentences.

1 point Student gives a correct explanation for answer, but not in complete sentences.

0 points Incorrect answer even if written in complete sentences.

Question 7**2 points total**

- 2 points** Student suggest a procedure to eliminate the problem of two (2) variables, such as, "The construction paper screen could be left off the petri dish. That way the sow bugs would be selecting between a moist and a dry environment." **Or**, "The towels on the bottom of the petri dish could all be dry or all moist, with the construction paper shading on one side and the other side illuminated." Answers should be written in complete sentences.

*** Deduct 1 point if complete sentences are not used. ***

- 0 points** If student responds that the design is fine as it is, even if it is written in complete sentences.

Question 8a**2 points total**

- 2 points** The sow bugs prefer a moist environment because they respire with gills. They must have moisture to keep their gills so that the diffusion of gases can occur.

or

The sow bugs prefer a dark environment because it keeps them from being easily spotted by predators. It also keeps them cooler and prevents them from drying out.

or

The sow bugs prefer dry environments so that they are not drowned. They must have the proper moisture level. Answers should be written in complete sentences.

Answers should be written in complete sentences.

*** Deduct 1 point if complete sentences are not used. ***

- NOTE:** There are other possible correct answers. Use your discretion in deciding if the choice is reasonable based on the findings and that the survival factors are based on sound, biological reasoning.

Question 8b.**2 points total**

- 2 points** There is no preference since neither the moist and dark or the dry and light are a detriment to the animal's survival, and neither condition is needed for their survival.

or

In order to maintain a proper homeostatic balance, the sow bugs must move back and forth between the two environments.

Answers should be written in complete sentences.

*** Deduct 1 point if complete sentences are not used. ***

- 0 points** If either choice (a) or (b) is selected and is not based on a reasonable interpretation of the lab results even if it is written in complete sentences.
- 0 points** Incorrect response, even if written in complete sentences, or no response provided.

Highest possible score - 24 points

Student ID _____ Scoring Form - Sow Bug Habitats

Circle the student's score for each question. Add the points for each question and write the total score at the bottom of the scoring form.

Student Setup

Building a sow bug habitat 0 1 2 3

II Answer sheet

Part A

1. Predicting the reaction of the sow bugs to their habitat 0 1 2 3

2. Explaining their prediction 0 1 2 3

Part B

Data Table 0 1 2

3. Drawing conclusions from data 0 1 2 3

4. (a or b) Identifying the two (2) variables 0 1 2 3

5. Validity of experiment 0 1

6. Explanation of # 3 0 1 2

7. Changes in experiment design 0 1 2

8 (a or b) Factors for survival 0 1 2

Total Score _____
Total Possible score - 24 points

Sow Bug Habitats Answer Sheet

Part A

1. Using complete sentences, predict what you think the sow bugs will do, if they are released into a habitat with different areas of moisture and light.

I think the sow bugs will go mostly to the moist towel in the dark.

2. Using complete sentences, explain why you think the sow bugs will be arranged in the way you predicted?

The sow bugs will need water for survival. I usually see sow bugs in soil which is moist and dark.

Part B

	Environment	Number of Sow Bugs
Start time <u>8:49</u>	Moist/Dark	10
Stop time <u>8:59</u>	Dry/Light	0

3. Did the animals prefer one environment to another? State evidence for your answer in complete sentences.

Yes, they preferred the dark, moist side. All of the sow bugs were found in the moist, dark side at the end of the ten minute period.

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4. For this question, answer either (a) or (b).

- a) If most of the animals were found on the dark, moist side of the container, would this be proof that sow bugs prefer a moist environment to a dry one? Explain your answer in complete sentences.

No, the results would be inconclusive because you can't be sure they chose it because it was dark or because it was moist.

- b) If most of the animals were found on the illuminated, dry side of the container, would this be proof that sow bugs prefer light to darkness? Explain your answer in complete sentences.
- _____
- _____
- _____

5. Based on the way this experiment was run can you say the sow bugs behavior was due to differences in light conditions alone?

No.

6. Using complete sentences, explain your reasoning to question #5.

Two variables are being tested at the same time. It would be more ideal to test for "amount of moisture" or "different amounts of light", but not both during the same experiment.

7. How could the variables in this experimental set up be changed to allow for better conclusions to be drawn? Answer in complete sentences.

The removal of the black construction paper would allow the sow bug to choose either a moist or dry environment. This would test for one variable not two.

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8. For this question, answer either (a) or (b) depending on your results.

a) If there is a preference, how does it relate to their survival? In other words, how do the environmental factors of light/dry or dark/moist make it possible for them to be better able to survive?

In a dark moist environment, the temperature of their surroundings would be lower. The lower temperature would prevent them from drying out and dehydrating.

b) If there is no preference, explain why this is the case in terms of sow bug survival and life processes.

Sow Bug Habitats Answer Sheet

Part A

1. Using complete sentences, predict what you think the sow bugs will do, if they are released into a habitat with different areas of moisture and light.

They will migrate or move to the moist dark side

2. Using complete sentences, explain why you think the sow bugs will be arranged in the way you predicted?

their natural habitat is moist and usually dark, so the moist dark side would be the appropriate choice

Part B

Data Table

	Environment	Number of Sow Bugs
Start time <i>9:00</i>	Moist/Dark	<i>10</i>
Stop time <i>9:05</i>	Dry/Light	<i>0</i>

3. Did the animals prefer one environment to another? State evidence for your answer in complete sentences.

yes, They all moved toward the moist/dark side almost immediately.

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4. For this question, answer either (a) or (b).

a) If most of the animals were found on the dark, moist side of the container, would this be proof that sow bugs prefer a moist environment to a dry one? Explain your answer in complete sentences.

Yes. Their natural environment is moist and dark which is the reason why they chose the dark side.

b) If most of the animals were found on the illuminated, dry side of the container, would this be proof that sow bugs prefer light to darkness? Explain your answer in complete sentences.

5. Based on the way this experiment was run can you say the sow bugs behavior was due to differences in light conditions alone? Yes or No.

Yes

6. Using complete sentences, explain your reasoning to question #5.

Considering they live in darkness they chose to move to the darker side.

7. How could the variables in this experimental set up be changed to allow for better conclusions to be drawn? Answer in complete sentences.

leave the black cloth or paper off the dish and keep the moist dry towel, then watch to see which side they chose with no light difference.

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8. For this question, answer **either (a) or (b)** depending on your results.

a) **If there is a preference**, how does it relate to their survival? In other words, how do the environmental factors of light/dry or dark/moist make it possible for them to be better able to survive?

*moistness helps them with their respiration
They have gills to breathe. They may also need
moisture for their bodies. Light may affect them
or dry up the moisture*

b) **If there is no preference**, explain why this is the case in terms of sow bug survival and life processes.

Part A

1. Using complete sentences, predict what you think the sow bugs will do, if they are released into a habitat with different areas of moisture and light.

The area with the moist moisture I think
The bugs will go to.

2. Using complete sentences, explain why you think the sow bugs will be arranged in the way you predicted?

Because even though they live on land they
have gills so they ~~can breathe~~ can carry
on respiration

Part B

Data Table

	Environment	Number of Sow Bugs
Start time _____	Moist/Dark	10
Stop time _____	Dry/Light	0

3. Did the animals prefer one environment to another? State evidence for your answer in complete sentences.

based on the data they all went
to the moist/dark environment

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4. For this question, answer **either (a) or (b)**.

- a) If most of the animals were found on the dark, moist side of the container, would this be proof that sow bugs prefer a moist environment to a dry one? Explain your answer in complete sentences.

Yes, because if they didn't they would have went to the dry/light side.

- b) If most of the animals were found on the illuminated, dry side of the container, would this be proof that sow bugs prefer light to darkness? Explain your answer in complete sentences.

5. Based on the way this experiment was run can you say the sow bugs behavior was due to differences in light conditions alone? Yes or No.

No

6. Using complete sentences, explain your reasoning to question #5.

It was both light and the amount of moisture

7. How could the variables in this experimental set up be changed to allow for better conclusions to be drawn? Answer in complete sentences.

Only have one variable instead of two

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8. For this question, answer either (a) or (b) depending on your results.

a) If there is a preference, how does it relate to their survival? In other words, how do the environmental factors of light/dry or dark/moist make it possible for them to be better able to survive?

the bugs need moisture for ~~B~~ respiration and the darkness retains more moisture.

b) If there is no preference, explain why this is the case in terms of sow bug survival and life processes.