Lab #1: Pill bugs and the scientific method

Synopsis of Today's Lab.

In this lab you will work with animals with which you most likely are not familiar- Pill bugs. You will conduct observations of these animals and design your own experiments to answer some basic questions about the behaviors of these animals. You will communicate the results of your investigation to your class mates and make some statements about the behavior of these based on the sum of all the knowledge acquired.

Objectives for This Lab.

At the conclusion of this lab,

(1) you will have an appreciation of the process by which scientific knowledge is constructed -the scientific method

(2) you will have designed, carried out and communicated the results of an experiment

(3) you will learn science by doing science

(4) you will start keeping Pill bugs as pets 😊

Equipment Needed for Lab This Week.

§ petri dishes
§ filter paper, sand, soil
§ Pill bugs.

Exactly What Is Due.

Absolutely nothing, this one is on us 😊

Note: This lab handout was developed by Dr. Itzick Vatnick, Department of Biology, Widener University, 1 University Place, Chester, PA, 19013 (610-499-4245). It was adapted from Sally Kneidel's book: Creepy Crawlies and the Scientific Method.
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Introduction

Insects were among the first invaders of land from the sea, a place in which life first evolved. All cells require water to function and keeping hydrated on land requires special features. Insects have evolved a number of physiological adaptations that protect them against dehydration. Among these adaptations are an efficient tracheal respiratory system that minimizes water loss during respiration, efficient excretory systems that minimize water loss in excretion of toxic nitrogenous waste (the function of urine), and a waxy covering that reduces water loss through the skin.

Pill bugs are crustaceans (e.g. crabs, lobsters, crayfish etc) which are mostly aquatic animals. They have moved onto land recently in evolutionary time and therefore have not evolved many of the physiological characters that aid insects to survive and flourish on land. Pill bugs do not have a waxy cuticle and therefore lose water through their skin especially in low moisture environments. They breathe through gills that must remain moist in order to function in gas exchange. Most animals main concern is staying alive so how do Pill bugs that are so poorly adapted to their land environment survive? They compensate with behavioral adaptations.

Procedure

1. Observe and draw a sketch of your creature. Is it an insect? How can you tell?

2. At this point assemble in inquiry groups and based on the preceding nuggets of knowledge and your observations predict what one such adaptive behavior may be.

3. Reassemble as a class and collectively design an experiment to test out one hypothesis. The trick is to design the experiment in such a manner that by joining forces it can be carried out in the remainder of this lab period and will provide a pretty definitive answer to the hypothesis tested. Examination of the materials available to you may provide useful clues for your course of action.

4. Of course after you conduct your experiment and collect your data, you will need to find the most effective way to summarize it and communicate your findings.