Name_____Period_____Assignment #_____

Virtual Lab 12 Animal Behavior

Annotate text

Drosophila melanogaster is an organism that has been studied in the scientific community for more than a century. Thomas Hunt Morgan began using Drosophila melanogaster for genetic studies in 1907. The common fruit fly lives throughout the world and feeds on the fungi of rotting fruit. It is a small fly, and one could question why so much time and effort have been directed to this organism. It is about the size of President Roosevelt's nose on a dime, but despite its small size, the fly is packed with interesting physical and behavioral characteristics. Its genome has been sequenced, its physical characteristics have been charted and mutated, its meiotic processes and development have been investigated, and its behavior has been the source of many experiments. Because of its scientific usefulness, Drosophila is a model research organism. Its name is based on observations about the fly; the fly follows circadian rhythms that include sleeping during the dark and emerging as an adult from a pupa in the early morning.

Choice chambers are designed to give organisms choices to explore how environmental factors affect behavior. Adult fruit flies are attracted to substances that offer food or an environment in which to lay eggs and develop larvae. Typically those environments are rotting or fermenting fruit. Adult fruit flies are attracted to bright light, and their larvae move away from bright light. Adult fruit flies also demonstrate a negative geotaxis; they climb up in their chambers or vials against gravity. Movement toward a substance is a positive taxis. Consistent movement of orientation away from a substance is a negative taxis. In most cases, the, the experiments done in choice chambers available in classrooms will be chemotactic experiments, as indicated by the number of flies that collect on one end of the chamber or another in response to a chemical stimulus.

http://www.phschool.com/science/biology_place/labbench/lab11/intro.html

Read the introduction

1) Define innate behavior and give an example of one (do a Wikipedia search)

2) Define learned behavior and give an example of one (do a Wikipedia search)

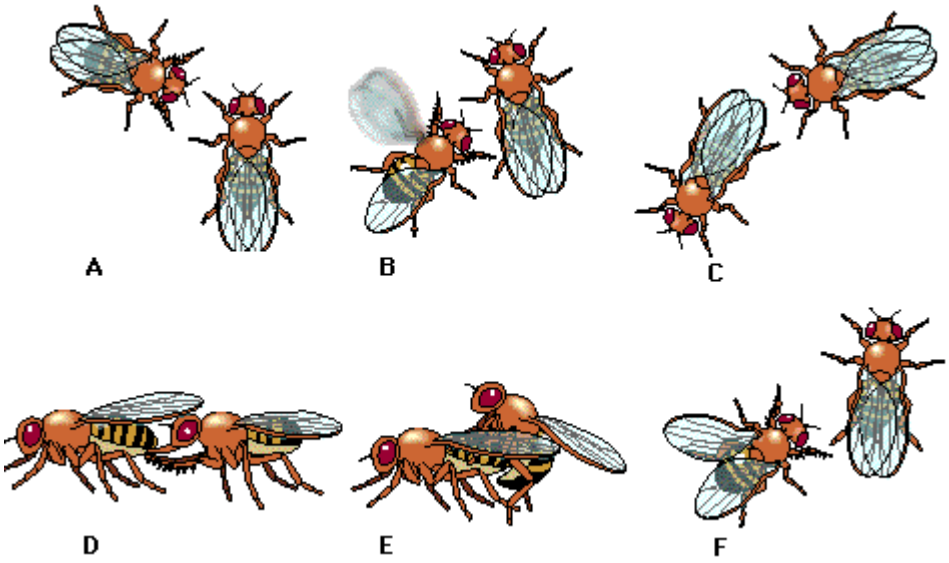
3) Give an example of a behavior that has both innate and learned components (do a Wikipedia search)

Click *Next*

Read Key Concepts

Click *Next Concept*

4) Name the behaviors below



Click *Next Concept*

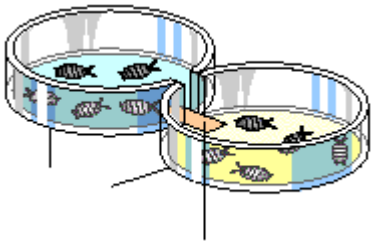
Read Observing Behaviors: Pillbug Behavior

Click *Next Concept*

Read Scientific Sketching

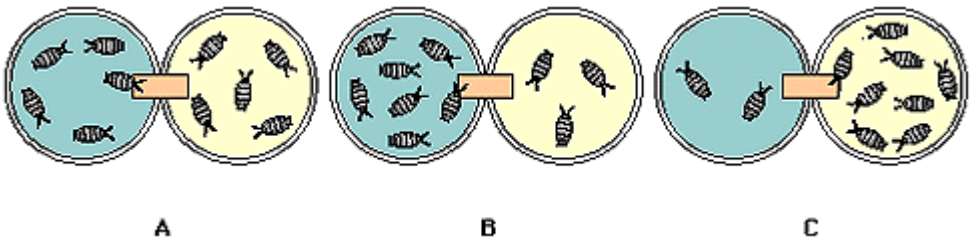
Click *Next Concept*

5) Label the choice chamber below



Click *Next*

6) Label the choice chambers below



7) Pillbugs are crustaceans, and they respire through gills. Because of this characteristic, which situation would you predict to occur — A, B, or C?

8) What is wrong with the experimental design above?

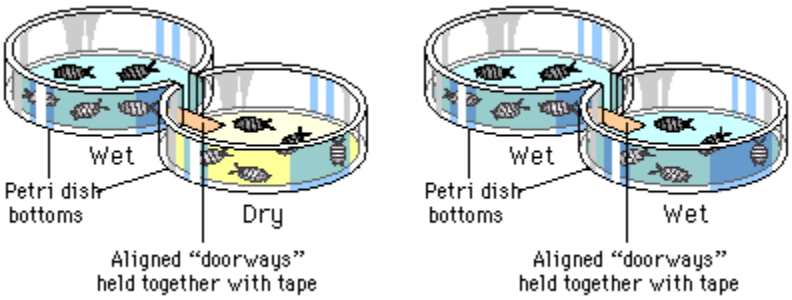
9) What are some things that a choice chamber experiment should control for?

Click *Next*

10) What are the characteristics of a good hypothesis?

(Ignore the examples of hypotheses. Hypotheses are explanations. That's it. Predictions that come from a good hypothesis should not be confused with a hypothesis.)

Click *Next*



11) Which choice chamber is the control group?

12) Explain your answer to the previous question

13) Complete the following sentence: It is not enough to say you will hold all variables constant...

Click *Next*

14) What are 3 key components of a meaningful experiment?

I.

II.

III.

Click *Next*

Click *Self-Quiz*

15) A student wanted to study the effect of nitrogen fertilizer on plant growth, so she took two similar plants and set them on a window sill for a two-week observation period. She watered each plant the same amount, but she gave one a small dose of fertilizer with each watering. She collected data by counting the total number of new leaves on each plant and also measured the height of each plant in centimeters.

What is a significant flaw in this experimental set-up?

16) **Students placed five pillbugs on the dry side of a choice chamber and five pillbugs on the wet side**. They collected data as to the number on each side every 30 seconds for 10 minutes. **After 6 minutes, eight or nine pillbugs were continually on the wet side of the chamber, and several were under the filter paper**. What is NOT a reasonable conclusion from these results?

17) If a student wanted to determine whether pillbugs prefer a moist or a dry environment, what would be the best way to analyze data from the experiment?

Perform a Chi Square analysis using the experimental data in bold above.

Chi-Square Table

p value	Degrees of Freedom							
	1	2	3	4	5	6	7	8
0.05	3.84	5.99	7.82	9.49	11.07	12.59	14.07	15.51
0.01	6.64	9.21	11.34	13.28	15.09	16.81	18.48	20.09

18) State the H_0

19) State the H_A

20) What is the Chi Square statistic?

21) What are the degrees of freedom?

22) What is the p-value?

23) Explain the results in terms of H_0, H_A, and the p-value.

Chi square calculation			
	Observed (o)	Expected (e)	$\frac{(o-e)^2}{e}$
Wet side			
Dry side			
$X^2 =$ the sum of all $\frac{(o-e)^2}{e}$ values			+ _____