



Why do Animals Behave the Way They Do? Course Summary

“I learned that everybody in their own way is a scientist. I am a scientist because I can observe things in my own way and make hypotheses.” --Walter Doyle, 8th grade student of “Why do Animals Behave the Way They Do?” at the Arthur Morgan School.

“Before I thought science was only in the lab. I learned there are many branches of science. You can do [science] in the classroom or outside by observing.” --Walter Gainer, 8th grade student of “Why Do Animals Behave the Way They Do?” at the Arthur Morgan School.

With *Exploring Animal Behavior in Laboratory and Field: An Hypothesis-Testing Approach to the Development, Causation, Function, and Evolution of Animal Behavior*¹ as my guide, I designed a course to allow middle school students to explore animal behavior for themselves with the guidance of a few key principles.

The class learned together about key concepts in animal behavior, biology, and science in general. We used the phylogenetic tree to broaden our understanding of the relationship between species. We explored the scientific definitions of “hypothesis,” “theory,” and “law.” Most importantly, we discussed the implications of the Theory of Evolution by Natural Selection and used that simple concept as a tool for understanding a wide variety of behaviors in animals and in humans.

We also discussed key concepts for animal behavior research including: methods for observing particular animals; how to describe, classify, and quantify particular behaviors; how to interpret behavior without anthropomorphizing; how to set up experiments (particularly: how to control for variables and how to decide how variables that cannot be controlled for will impact an experiment's conclusions).

The class benefited from reading selections from and discussing:

Goodenough, Judith, Betty Mcguire and Robert Wallace. *Perspectives on Animal Behavior*. New York: John Wiley & Sons, 2001.

Judson, Olivia. *Dr. Tatina's Sex Advice for All Creation*. New York: Henry Holt, 2002.

Constantz, George. *Hollows, Peepers & Highlanders: An Appalachian Mountain Ecology*. Morgantown: West Virginia University, 2004.

Sapolsky, Robert. *A Primate's Memoir: A Neuroscientist's Unconventional Life Among the Baboons*. New York: Simon & Schuster, 2001.

Diamond, Jared. *The Third Chimpanzee: The Evolution and Future of the Human Animal*. New York: Harper, 1992.

I asked students to develop independent projects with only three firm guidelines: 1) Projects must include the careful observation of at least one local animal species readily available during class

¹ Ed. Ploger, Bonnie J. and Ken Yasukawa. New York: Academic Press, 2003.



time; 2) Students must have a way to present some of what they learned at the school's Open House; 3) Students must use efficiently, effectively, and appropriately the in-class free-time they are given for working on their projects.

Following you will find information about and excerpts from the resulting student projects.

-Stuart Jeckel, Science Teacher, The Arthur Morgan School

Maxx Rosenthal chose to study honey-bees. He studied four local hives, putting on a bee suit and examining the inside of the hives. He examined dead bees under the microscope, observed behavior outside the hive, and experimented with the bees' attraction to different colors and smells. He also studied the mite problem currently sweeping honey-bee populations in the United States. Maxx noted that the source of the problem was the lack of genetic diversity in U.S. honey-bee populations.

From Maxx's writing about his project: "In a worker's life she only makes ½ teaspoon of honey. For the colony it takes 10,000 trips to make 10oz of honey. For a colony of 15,000 to 45,000 it doesn't seem that difficult, but when the food source can be anywhere in a 5 mile radius it becomes a harder task."

Grace Martin chose to study the chickens we keep at school. After reading an article about a study that tested the effect of music on egg laying patterns in hens, Grace attempted a similar study herself. Looking back on her project she said, "Chickens don't make good test subjects...even though my first attempt failed, I learned to find a more controlled environment."

From Grace's writing about her project: "Humphrey, the oldest rooster...is at the top of the pecking order... He has rights to all the hens and has first dibs on all food... Humphrey is the only male that mates with the females. He mates with all of them, whenever he pleases. I have observed a female be placed back in the pen, and Humphrey immediately coming over and mating with her. He will attack any male that tries to mate... The females all have highly erratic egg laying patterns (we only get 1 – 4 eggs a day). The hens will all start sounding the alarm call if an egg is removed..."

Walter Doyle chose to study woolly bears, which become Isabel tiger moths, and praying mantids. He observed insects of all types, and collected several caterpillars and observed one change to chrysalis.

From his writing on his project: "The bristly hair on the body serve as a deterrent so as to make it harder for birds or other predators to pick up and eat the woolly worm. The bands serve as a defense by breaking up it's silhouette and making it harder for predators to see it... they produce anti-freeze chemicals from glands they store in their woolly hairs."

"The 'praying' mantis acquired its name from the way it holds its front legs in a 'praying' position while standing on its back legs. When hunting, the praying mantis stands in its praying position waiting patiently for its prey to come near enough for it to bra a hold...the mantis' front legs are equipped with rows of sharp spines that allow it to hold onto its prey with a vice-like grip. After the mantis has its prey...it bites it on its neck...this bite paralyzes its prey."

Walter Gainer chose to study the red fox and harvester ants. He had harvester ants mailed to the



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school and put them into an ant farm to observe them. After the project he noted that, “I learned how they dug the tunnels. I was limited on what I could learn because there wasn't a queen ant.”

From Walter's writing about his project: “[The harvester ants] have been digging for about six weeks and still are. They seem to have a system: a couple ants start to dig, shoveling away the dirt, then a lot of ants will get the dirt, carry the dirt while weaving through other ants, then dump it somewhere else... [Some] ants will bury food that they harvested.”

“[Red foxes have] three scent glands that are located around the butt, two of them are voluntary and are used to mark things. Another use of these scent glands is to communicate things like their physical identity (like age, sickness, injuries, and other traits) and sexual identity (like if they're sexually active or not).”

Samantha Higgins chose to study communication in animals. She focused on primates, whales, and local songbirds. Samantha made a naturalist notebook to present at Open House. The drawings that follow were pages in that notebook.





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From Samantha's writing on her project: "When a bird is tweeting outside your window in the morning did you ever think that he was trying to seduce another female bird?...Most of the calls of animals...are for mating purposes or territorial reasons." "When a male humpback moves someplace new, he changes his song to match those coming from nearby whales. The traditional explanation for why whales do this is that males are signing to seduce female whales, and that females get really turned on by songs that are currently in style... so singers need to keep current to compete... Some whale species sing in different dialects depending on where they're from."

