

Kelly Udelsman
Dr. Gotwals
Interview Report
10/27/2015

Identification of Students Interviewed

I interviewed five tenth grade Biology students. Cecilia is a very hardworking student, who enjoys school and science, and is one of my highest-level students, but struggles with ADD and has section 504 accommodations. Nadia is extremely quiet in class, so it was great to get to interview her one-on-one and hear her thoughts and responses. Nadia is a very studious and responsible student as well. Bailey is probably the highest-level student I have in this class- he usually acs all assessments and clearly learns and studies the material. Adam is also a higher-level student in my class with a high average and good participation. My final student Zach is a special education student who struggles with more abstract ideas, but participates well and offers up explanations when prodded.

Interview Questions

The Bolded questions correlate to the initial interview question. The smaller bulleted questions were follow up questions I posed based on responses by the students.

1) What do you think is something that all living things have in common?

- Do you think air and water is required for all living things?

2) What is the relationship between molecules- like our organic macromolecules, and water molecules- to living things?

- Do you think these molecules are alive?
- So how living things interact with these molecules?

3) How do certain structures (parts of the living thing) of living things allow them to function?

- Do you think that these structures work the same for every organism or do they change depending on where an organism lives?
- What is something that you think a plant and an animal have in common?
- So what function does that serve?
- So those are things that only humans have?
- Animals can't defend themselves?
- So animals can't defend themselves with words?

4) Do you think that all living things follow a process to life? Do they grow and develop in similar ways?

5) What do you think happens to all living things eventually?

6) Where do living things come from?

- Do you know the process that makes this happen?
- Do all living things come from seeds or from a mother?

7) Do you think all living things respond to their environment? If so, how?

- Do you respond to your environment? Does Eve respond to her environment?

8) Do you think there are living things that we cannot see with our eyes?

- How do you think scientists can test for the presence of these organisms if we can't see them?
- So what would we do with the chemicals?

9) Explain what you think is a scientific theory?

- Do you think theories can change?
- So what do they do with that data that they collect & do you think that a theory can change

10) How do scientists decide if something is true?

- And what do they do with this data
- What kind of tests/ what are they testing

11) What makes science different from some of the other subjects you have in school this year?

12) Do you think it is important to study science? How do you think studying science affects you?

Analysis of Interview Questions

1. Student responses ranged from describing living things as “living,” as well as organic and containing hydrogen. This makes sense to me seeing as we just finished our unit on organic macromolecules and we defined the term organic and had a discussion that all living things are organic. Another student explained (through a series of follow up questions) that all living things need air and water. Bailey responded that living things “have DNA, and they reproduce and have cells.” However, the period before I interviewed Bailey we began our unit on what makes something living; I asked him if he would have had that same response if I had interviewed him before class and he said that he would have said all living things have DNA, but nothing else.

The pattern that I recognize from this question is that my students seem want to answer my question by referencing curriculum from our class, instead of activating their prior knowledge and their inherent knowledge as living creatures. I think it would have been interesting to ask these questions at the beginning of the year before we started with the curriculum- I think the responses to these questions would have been really different!

2) All students explained that living things need these macromolecules to live. Sometimes living things eat the macromolecules, or just have them inside of them, and they allow reactions to happen. One student thought that the macromolecules themselves were alive, but I think she might have been confused by the way I worded the follow up questions- I asked her “so how do living things interact with these molecules, are they alive? She responded simply, “yeah.” All of my students were able to make some sort of connection (some stronger than others) that living things depends on organic macromolecules, and that was the goal of this question.

3) This was a really interesting question to ask because I got some very detailed responses! Cecilia made the connection that the living things had different needs depending on where they

lived. She gave specific examples of animals needing fur to keep warm, or claws to dig. I asked her if all of these structures had the same purpose and she explained that bobcat would use its claws to climb trees and attack a predator, but a mole would use its claws to dig into the ground. I also asked what structure a plant and an animal had in common and she made the connection between a spine and a stem. Other responses that I got were more humanistic- aka focused on what structures humans have. For example, Nadia explained that these structures allow us to walk, run and write. I asked her if these were structures that only humans have, and she reasoned that animals have structures too, but “they can’t speak and defend themselves with words like humans can, but animals defend themselves in different ways.” Zach focused solely on the structures that comprise the cell, which again makes sense considering we had just introduced the topic of the cell.

4 & 5) All students agreed that living things follow a process of life. Several students made the connection that just like animals; a plant will start out as a seedling, and grow into a bigger, mature plant. All students also stated that eventually all living things died, and Nadia elaborated stating that living things “die and do not come back through reincarnation.” Although this made me laugh a little, I realized that it is important to consider my student’s religious and spiritual beliefs (beyond simply being respectful) because it can shape their understanding of biological processes.

6) This was an interesting question. By the time students are in 10th grade, they have been exposed to the idea of sexual reproduction many times. I honestly expected them to explain that living things come from sexual reproduction, or a mom and dad. Although all students said that living things come from other living things, they did not articulate how (or maybe they just did not want to?). Students were better at articulating that plants came from seeds than they were about baby animals. I thought this was interesting and striking. Some students said that living things come from a mom.

7) All students responded that yes all living things respond to their environment, and they described how our snake would go under her heat lamp if she was cold, or would bury herself in her bedding if she was hot, and that she has everything she needs: food, water, heat and a home. However when responding to the original broader question, I got a variety of interesting responses. One student responded: “living things respond to their environment through the process of evolution.” Another described a scenario where “people or animals that are living close to factories could end up in the hospital from breathing in all the gasses, but other people and animals do not live close to factories.” I thought this was a really interesting response, considering the demographic of our district. Manchester is more suburban, but borders large industrial cities. I thought this was a really insightful response on how living things (perhaps my students) respond to their environment and where they live.

8) All students responded that there are living things we cannot see. Some described germs, bacteria, cancer and viruses. When asked how could we test for this, some students took a symptomatic approach stating that if someone was feeling sick or acting weird we could study the effects of what is happening to that person. Other students explained that scientists could use chemicals to test for the presence of these microorganisms, and that “if they were present then the chemicals would turn different colors,” and Adam explained that “we could see them through microscope.” This is interesting to be because I wonder what prior knowledge they are basing indicators off of, and I wonder if they did tests in ninth grade physical science with chemical indicators testing for the presence of certain things. We did use chemical indicators during our macromolecule unit to test for the presence of carbohydrates, lipids and proteins, so I wonder if they inexplicitly made this connection?

9) My students were split here by stating that a theory was a prediction and a theory was a scientific fact. However, they all explained (whether a prediction or a fact) that it was based on evidence gathered by scientists through tests, and that “depending on the environment” theories can change.

10) All students responded simply that scientists would do a lab, or conduct tests and collect data. We spent a good amount of time at the beginning of the school year discussion and applying the scientific method, so these responses were expected.

11) Most students said that science was different because it is more hands on, and they get to learn physically. Some students explained that science is “right now” but it is also the past present and future, and another made the connection “that science is basically a combination of language arts and history and math;” he reasoned that “we read and write in science, but we also do math and look back on things that have happened in science.” Other said it is fun because they actually get to test out and prove what they are learning themselves through labs.

12) Cecilia responded that she is curious and likes to have the answers to things, and views science as a way to get answers. Bailey, Nadia, Adam and Zach responded that it is important to know how things work, especially inside the body, but also things in their everyday lives. Bailey explained that he could look at a table and know that it is made out of atoms.

Reflection

It was fun to ask my students these questions and get a glimpse into how their minds are working! What you think as a teacher is a really simple question with a simple answer is responded to by a student with an elaborate description or connection that you did not even consider. I think they articulated some key understandings about science and inquiry, with respect to science being about discovery and using tests and collecting data to make predictions and theories. Some of the students struggled with I think really drawing from their own ideas and understandings, and were more concerned with answering with what they thought I wanted to hear (aka our curriculum). I did emphasize to students that there were no right or wrong answers, but I think that they struggled at times with really articulating their own ideas. This was an insightful assignment for me because it will help me improve on my questioning strategies- instead of resorting to the IRE model, I will plan for questions that truly do not have a right or wrong answer, but that the results of student’s overall greater understandings and global connections to scientific principles.