

Purpose of the Study:
 Science education needs to be dynamic, connect to real-world problems, inspire curiosity and be student driven. The purpose of this study was to examine the effects of providing my classroom with the opportunity to learn through lab or research investigations that were entirely student designed. This action research project enabled me to closely examine how allowing students to design their own investigations in a science classroom impacts student engagement, student attitudes about learning, and my role as an educator.

Student Comments:
"Science brings up so many questions and when I make an investigation I feel I can get a very strong answer."
"Things that make someone good at science are that they observe the world around them and try to solve problems that they see. They ask questions, make a hypothesis and find answers."
"I like how in the investigations, we know what we have to do and what to get accomplished. We don't need to be told what to do. We get to work on our own ideas and be in control of what we do."
"I feel like there is a different quality of learning in figuring out stuff on your own."
"We are teaching ourselves and learning from our own mistakes."

The Role of the Student:
 Students were given the knowledge and tools to design their own investigations to answer questions they were curious about, relating to our unit of study. All students were encouraged to let their curiosity drive their learning as they designed the investigations.



Students examining aphid infested pepper plant

Outline of the Process:

- We spent a two weeks honing observational skills, question asking techniques and journaling methods.
- I introduced students to concepts, vocabulary and processes associated with Ecology.
- Students developed researchable or investigable questions that intrigued them.
- The students designed investigations in an attempt to answer the questions.
- Findings were shared with the class through presentations, posters, written labs and videos.



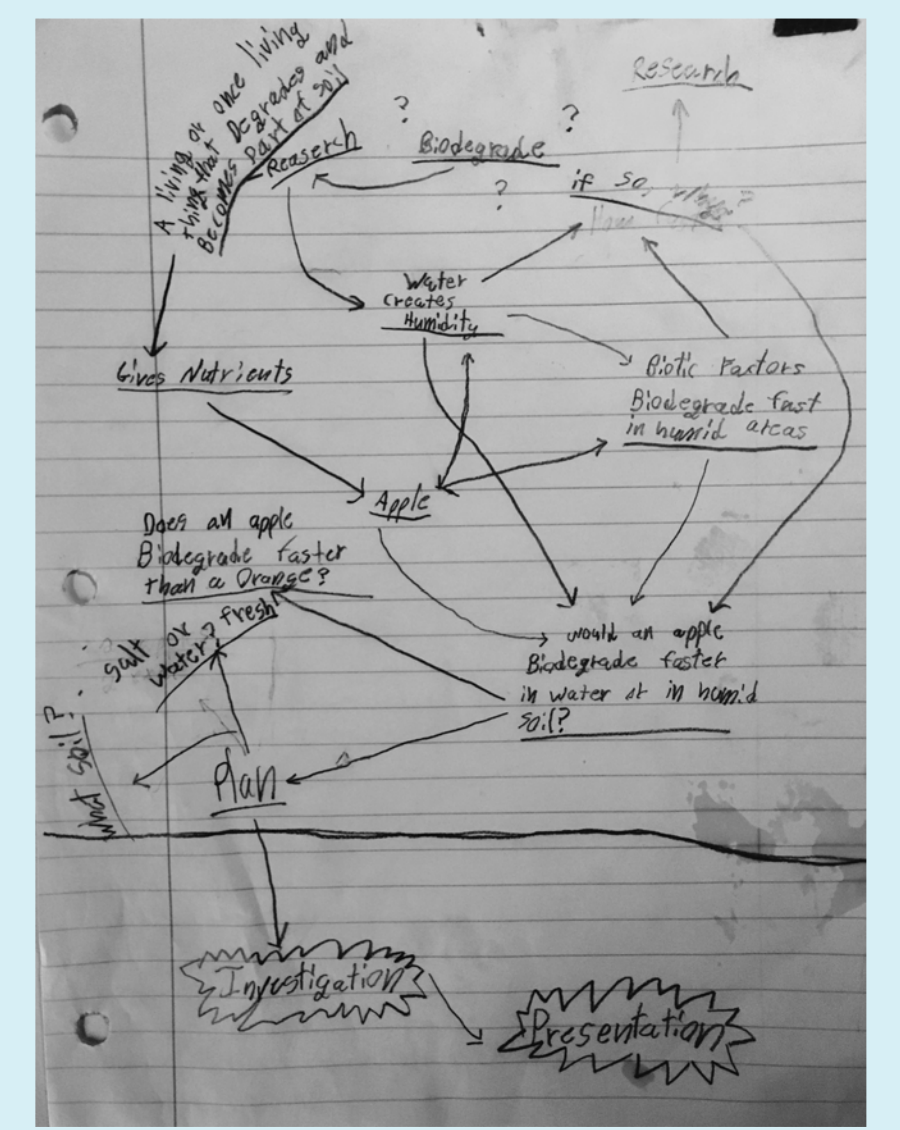
Collecting macroinvertebrates with the class

Research Questions:

1. How does allowing students to design their own investigations in an elementary science classroom affect student engagement?
2. Does allowing students to design their own investigations affect attitudes about learning?
3. How does allowing students to design their own investigations impact me as a classroom teacher?

Data Collection Methods and Analysis:
 From October through January, I used four different tools to collect qualitative data to help answer three research questions.

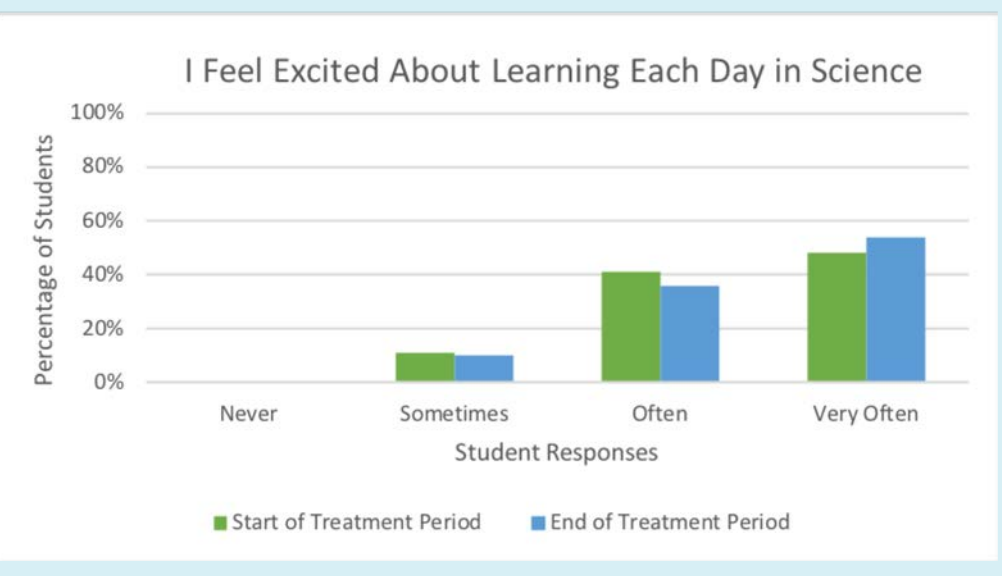
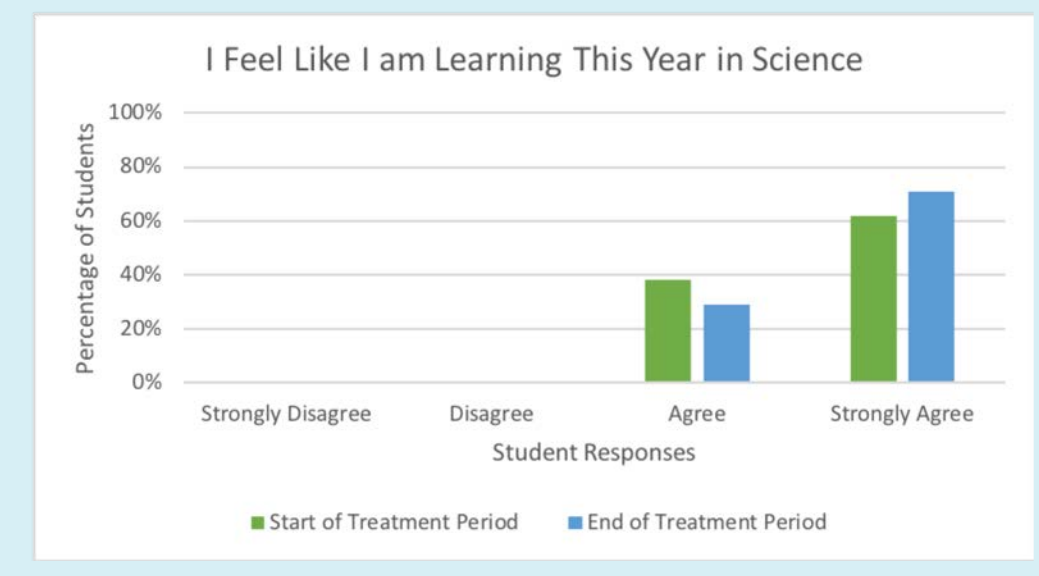
Research Question	Observation	Student Interviews	Student Survey	Reflective Journal
1	X	X	X	X
2		X	X	
3				X



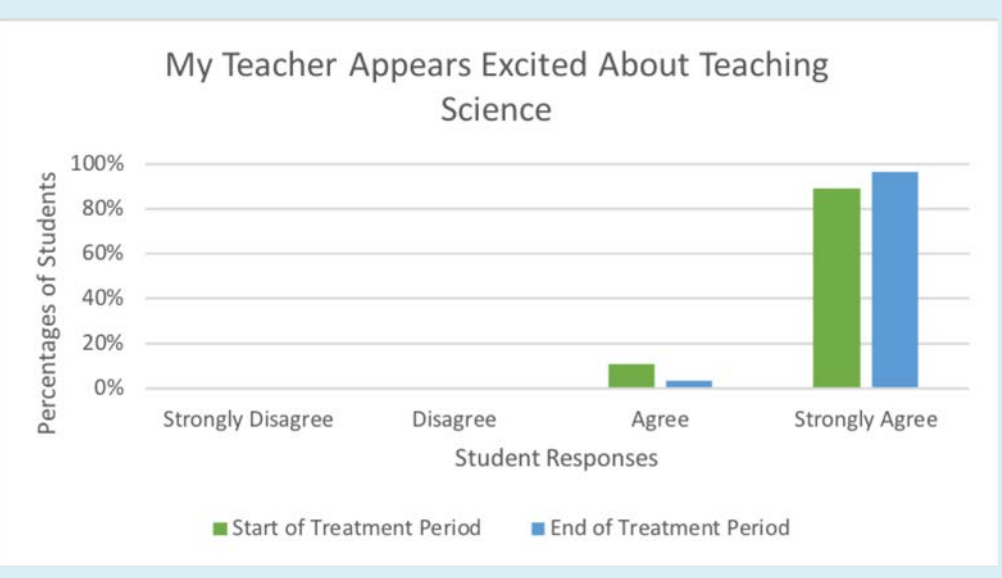
Student Work Sample: "The Questioning Process"

Examples of Student Developed Questions:

- How does light impact bacterial growth?
- What is water's role in decomposition?
- How does soil type affect plant growth?
- What is Photosynthesis?
- How do different light sources affect plant growth?



Preparing Petri Dishes for an investigation



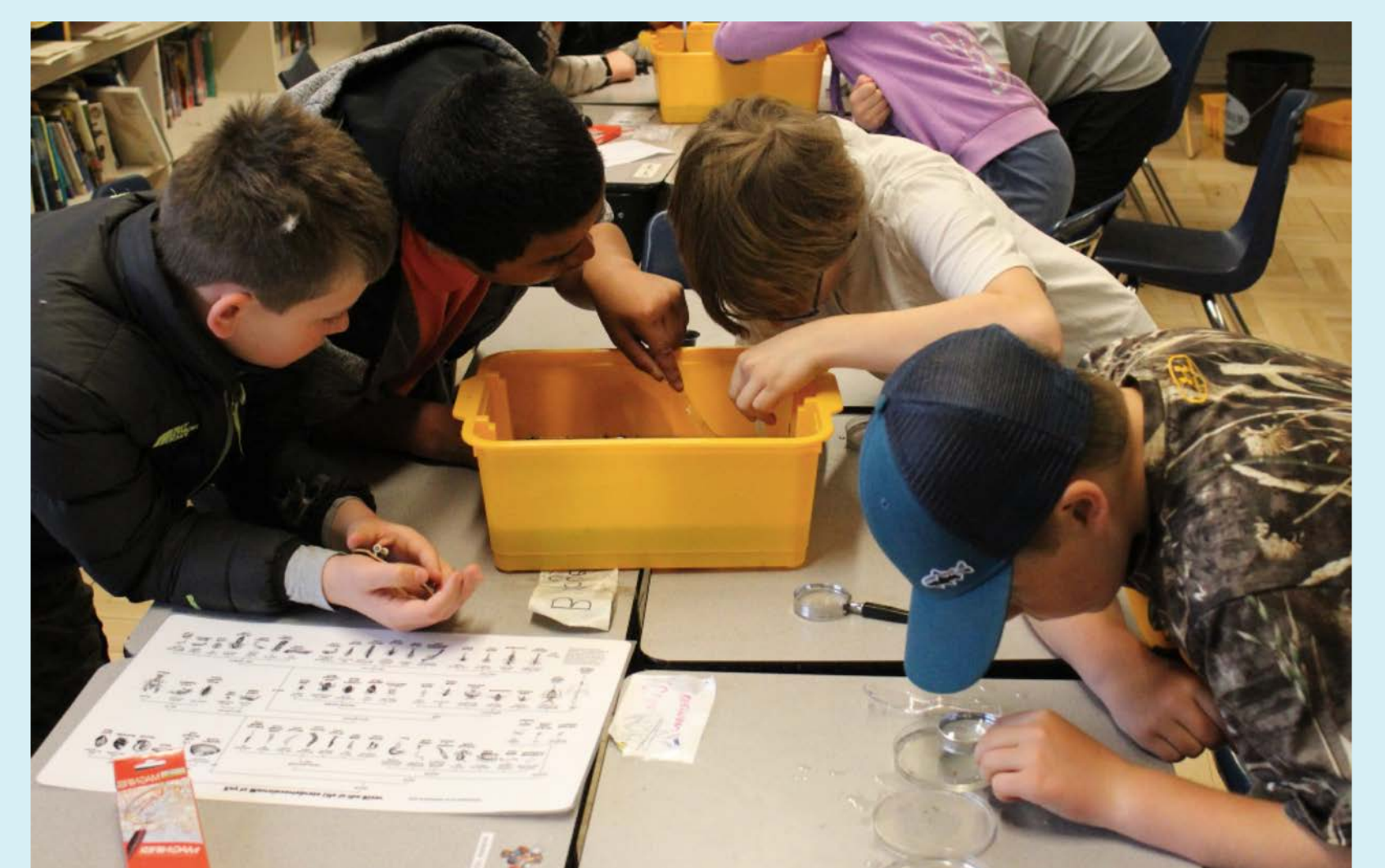
Findings of the Study

Impacts on Students

- Outstanding focus during work time
- Increased engagement outside the classroom
- Decreased behavioral concerns
- Improved self-confidence as learners
- Contagious excitement for learning
- Heightened curiosity and awareness

Impacts on Educator

- Increased engagement and excitement for learning in the classroom
- Less time spent teaching, more time spent guiding and assisting
- New challenges associated with managing time and covering content



Students identifying and sorting macroinvertebrates