Appendix

*Items from the Self-determination, Purpose, Identity, and Engagement in Science (SPIRES) survey.*

**Self-System Processes**

1. **Competence**
   - I am good at science. (+)
   - I find it easy to understand the things we are learning in this class. (+)
   - Even if they are challenging, I can do well in my science classes. (+)
   - I don’t have the intelligence/brains to succeed in science. (-)
   - When I do poorly in a science course, I usually can’t figure out why. (-)

2. **Autonomy/Ownership**
   - Why do I do my classwork and homework for this course?
     - Because I want to understand the subject. (+)
     - Because I want to learn new things. (+)
     - Because doing well in science is important to me. (+)
     - Because it's fun to answer challenging science questions. (+)
     - For this class, I just learn the stuff I have to in order to pass the test(s). (-)

3. **Relatedness/Belonging**
   - This course is a good place for students like me. (+)
   - This is the right course for me to be taking now. (+)
   - In science courses, I feel like an outsider. (-)
   - I fit in well with the other students in this class. (+)
   - I’m not really sure that science is the right major is for me. (-)

**Engagement vs. Disaffection**

4. **Behavioral Engagement**
   - I pay attention in class.
   - I study for this class.
   - I try hard to understand the professor’s lectures.
   - I keep up with the work for this class.
   - I try hard to do well in this class.

5. **Emotional Engagement**
   - I enjoy the time I spend in this class.
   - The material we cover is interesting.
   - It’s exciting to make connections between the ideas learned in this class.
   - The material we cover in class is challenging (in a good way).
   - The readings for this class are interesting

6. **Behavioral Disaffection**
   - It’s hard to make myself come to this class.
   - Outside of class, I don’t put much work in on this course.
• Anything I do for this class is always last minute.
• I don’t really study for this class.
• I work on other things when I’m in this class.

7. Emotional Disaffection
• When in class, I feel bored.
• This class is stressing me out.
• This class can be pretty dull.
• When I’m in this class, I can’t wait for it to be over.
• This class is no fun.

Identity as a Scientist

8. Science Identity
• I am the kind of person who can succeed in science. (+)
• I think that science is fascinating. (+)
• I feel at home in science. (+)
• Sometimes I feel like I don’t belong in science. (-)
• I don't think I could ever really feel comfortable in science. (-)

9. Science Career Plans
• For the career I want, I need a degree in science. (+)
• I am planning on a job that involves science. (+)
• Science is important for my future career. (+)
• I’m just not cut out for a career in science. (-)

10. Purpose in Science
• Science can help solve many of society’s problems. (+)
• I believe that science can help make the world a better place. (+)
• I can see lots of ways that science makes a positive difference in our everyday lives. (+)
• If everyone in our society learned more about science, we could all make better decisions about important things like politics, medicine, and the environment. (+)

11. Positive relationships and collaborations
• I have gotten to know other students in this class. (+)
• In this class, I have found people to study with. (+)
• In this class, I know people I could ask for help with assignments. (+)
• Some students from this class and I are thinking about taking another course together. (+)