

Project Idea Assignment

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***all names and identifiers have been masked/changed to retain anonymity*

Prompt 1

The mathematics topics which underlie the manipulative I plan on creating are base-level multiplication and the “times table.” I have decided to work with these topics primarily because the focus student for my project is beginning to work with multiplication in her second grade classroom. Though we did not work on any such problems during our first interview, she expressed how difficult the concept had been for her to grasp, as she was still working with multi-digit addition and subtraction. It is worth noting that she and her classmates had only engaged in an introduction to multiplication, working with fundamental concepts. Nonetheless, the tool I plan to create will not only bolster said introduction, but also give my student an edge in memorizing the “times table.”

One of the best features of this tool is that conditions can be changed at will. Though it is based on the myth of the hydra, the ancient creature that grew back two heads for every one lost, users can experiment by setting parameters for three heads to grow back, or even four, instead of just two. In doing this, users are modeling fundamental multiplication. For instance, two heads growing back for one lost models $2 \times 1 = 2$. Users can be encouraged to write such equations down on a blank “times table” to be used for later practice.

Prompt 2

As mentioned, my planned design for the tool I hope to create is based on the ancient Greek myth of the hydra. I arrived at this idea after noting two critical points from mine and my student’s first interview. She had initially regarded math as being “boring,” so I knew right away that my tool had to be as engaging and fun as possible. Secondly, I had heard her talk about playing “Prodigy” in math class, for which her character had a pet dragon. I made the connection between the two, and expanded upon it by brainstorming different types of dragons and serpents

in myth and folklore. From there, the link between the hydra and fundamental multiplication became clear. Please see Appendix A for early design drafts. Details on said drafts are provided in the following prompts.

Prompt 3

When it comes to a child's learning, I believe it should be both exciting and fun. In that regard, I do think I've come up with a "good" idea. That being said, the mathematical applications are somewhat half baked and, therefore, need to be fleshed out. My notion of learning with a manipulative stems from our syllabus' definition of the term, that it is made "specifically for mathematics" or "another purpose." I have somewhat married these two ideas as to not remain necessarily bound to Tinkercad. Though the base or several components of the manipulative may be created using a 3D printer, everyday objects, such as push pins or pipe cleaners, can be used in demonstrating mathematical concepts. For example, my manipulative may include the hydra's three traditional heads, each of which could be removed, but may also have a bed for clay or another pliable material to insert pipe cleaners or push pins into. I think that marrying an object created specifically for math, but which can also be used with everyday objects, maximizes its potential to be used outside the classroom, which is also where learning can take place.

Prompt 4

With regard to teaching, I'm not entirely sure how "good" of an idea my manipulative is. It's meant to be more of an explorative tool for students. In other words, I am seeking to put the ball in the students' courts as much as possible with this manipulative. That being said, it's also highly subjective. Not every student may like dragons, hydras, or mythology. I guess this

manipulative's saving grace is that any number of household objects can be used to represent multiplying heads. I think it would be incredibly beneficial to allow students to explore the tool given a condition (i.e. two heads added for every one lost) and have them note any patterns they find in doing so.

Prompt 5

I am very excited to continue working on this project and create the Math Hydra. While the actual putting together of the tool is a bit daunting, given my unfamiliarity with Tinkercad, I can't wait to see it being used. One of my core beliefs is that learning should be fun, that it should include the use of one's imagination. The ability to imagine is an incredible gift which I think has the potential to make any subject engaging. My hope is that the Math Hydra does just that for my focus student, as well as any other student who uses it.

Appendix A: Early Design Drafts

