## Video Transcripts

### The Beauty of Math: Activity Design

*Heather McIntosh (Teacher):* Everyone is doing really great things already and so you just need to notice and name and nurture and go slowly. Just take an old project that you liked and really notice where your curricular competencies are.

Students create a picture and then they put their functions into Desmos and they make a nice math picture. They restrict all of their functions and we then can export it and then 3D print it which is kind of neat. So students actually get something that we can celebrate and they can show off to their friends and family.

So you don't have to 3D print this project to make it good. You can also just make a picture onto Desmos and you can print the picture and show it off as well. I like 3D printing because I think Pre-calc students often don't get to use 3D printers and I think it's a nice introduction to making things and designing things.

So students are connecting a picture to functions that we are learning in the classroom and then they are reflecting all the time during this activity. For example if they are making a flower they're, "oh, does that petal look the way I want? What can I do? How do I change that function to make it work the way I want?" So it is a constant continual reflecting and connecting the functions to a picture.

I work on communication a lot, so they always have to explain to me what they did, why they did it and what kind of trials and errors they had during the process.

Next time I do this activity I would like to introduce the personal social aspects of the core competencies a bit more, and I would like to make bubble blowers out of them. Just make sure everything is connected and then it can be a bubble blower. And I would like to help a local hospital, give them to a local hospital, or we have a daycare just around the corner that would love bubble blowers.

### The Beauty of Math: Activity Delivery

*Heather McIntosh (Teacher):* In this project we're playing with all the functions that we've learned so far in this year. And we're going to make a picture and then we can export it and 3-D print it. So first off, what functions could we use?
What functions come to mind?
Student: parabola
Parabola! What's the equation?
Student: $y = x^2$
And what can we do with this parabola?
So what if I wanted to move it up, what would I do?
Yeah, $y=x^2 + 2$
So Logan can you just write $y = x^2$ on the board nicely, and then draw a little parabola?
And then what else do you have? Show me with your hands what other functions?

If you need to review your functions I have this student desmos, you can go in it has all the functions, ok? And if you have your function book you can take it out and go over your functions. Just start playing. And then we can talk about making a picture. What we saved was a PNG file, ok? And I need an STL file for my 3D printer.

*Natasha (student):* For this activity I started by drawing out what I wanted it to be so that I had a better understanding of what I envisioned in my head and could put onto something physical, so I drew the horse, and then I went from there in figuring out what functions would fit with what lines I wanted to use.

*Grace (student):* When I first started I had no idea, really, what I was doing. But I took the formulas that I have in my little notebook, and I started plugging in numbers til it worked. And then once it did and I started to get the hang of it, I knew how to do it on my own. And I was excited to bring it home and show it off to my little sister. She thought it was the coolest thing in the world, so I was super happy.

*Jessica (student):* So, like, these are all of my different functions and then this is my like final product at the end. So all of these like little like lines are all my different functions and it created a cat. I feel like it's really cool having a 3D object because it's something you can bring home and you can remember that, hey, I did this in math class.

**The Beauty of Math: Activity Reflection**

*Heather McIntosh (Teacher):* I noticed my students grasped the concepts better than if I were to do worksheets. And I think my students really had a good grasp of how to move the functions around, how the transformations worked and what those functions looked like.

*Jason (student):* I would plug in a number and see how that affected my function. And after seeing that, I would go back and change the different parts of it. Basically repeating over and over the same trigonometric functions and learning how to move them about the grid really helped like, solidify that for me.

*Abbey (student):* I did definitely have a lot of trial and error. It was trying to figure out the limitations on them on the project like getting the function to stop in certain spots, making sure it lined up with everything else, but I got there. It made me feel a little more confident in my math skills because I could actually see what I was doing with it and not just seeing numbers, I was seeing a picture being made.

*Maya (student):* This project is really different than anything else that I've done in the past because you just don't learn it put it on a piece of paper and forget about it. You have a project you get it done and you have a physical copy of it. It was just a really cool experience to do. I am really proud. It took some effort.

*Heather:* I think they were really happy to be able to celebrate their math and to show it off and to really have something great to show from because they work so hard in Pre-calc 12. It's such a hard course, and really they can't go tell their friends "oh look at this good trig proof I did," but they can say "look at this great picture I created. Look at this 3D printed object."

*Abby (student):* I love the 3D printing part of this. It's fun. I like actually getting something out of it. I was pretty surprised that we can actually draw pictures with math equations because usually in math you're just doing notebooks and works and stuff.

*Soleil (student):* I felt really accomplished when I finished, like a lot more than I would if I just did a test or some work on it. Because with math, usually you don't get an opportunity to show off what you've accomplished, but this lets you do that so people can see what you've learned and how you've applied it to skills.

*Ashley (student):* I'm someone who learns from a board to notes to a worksheet. That's just how I learn things. I've never been hands-on. I was, like, "This is not going to turn out good." But then once I realized that I actually knew how to do this stuff, and realized that this is something that I do know and I can understand this, then it was fun to be able to show my math and put it into something that you can actually hold in your hand.