

I enter this class with particular interests. First, having just learned more deeply about critical exploration, I want to be immersed in the process, so I can feel what it is like to engage in content that is new to me, to sit in the messiness of learning, and to gain deeper insight about the learning-teaching process. Second, after viewing the Galileo exhibit at the Franklin Institute, I was captivated by Galileo and the influence of the times on his work and ideas. I felt this class would offer me an opportunity to get to know Galileo through experimentation and reading. Third, as a 5th grade science teacher, I would like to build my understanding of lenses and mirrors and begin the process of creating a unit of study of light. As the course progresses, I do hope to use these ideas to frame my reflections and learning and at the same time, remain open to possibilities.

Class Activity Reflections

Framing Questions:

- What is perspective?
- How does it frame what we see?
- How do you represent it?
- Why was this procedure so cutting edge?

YY, DS and I situated ourselves in the architecture building at the head of a long hallway, lined with a series of three paneled glass windows and doors. We set up the viewing tool and began to experiment with how our view changed as the object (a person) moved away from the viewer. The more distant the object, the smaller it appeared. In fact, in this case, the object was only seen in its entirety when at the very end of the hallway. When traced on the plexi-glass frame, the object was only about 2 inches in height and a small fraction of the actual height (not sure how tall DS is, maybe 5'10" or so).

Next, the object viewed and the frame remained in the same location, the viewer moved back. As the viewer, moved away from the object and frame, while maintaining the same height, the object appeared to get smaller and smaller. Seems this was the same effect as the first experiment. We also noted that the viewer and the object each had different perspectives.

Another exploration involved moving the viewing frame, while keeping the viewer (person seeing) and the object (what is being viewed) in the same location. As the viewing frame moved towards the object, the viewing frame appeared to take up less of the viewer's total field of vision; the proportion of the object that could be seen was decreasing (from entire object to only a portion of object); the net effect was that the object appeared to be magnified; it seemed to take up more and more of the view frame space.

A last exploration involved varying the height of the viewer. What was seen by each viewer was very different and very much related to where our eye level was.

Student Work

Recording these observations was a bit of a challenge for me. I found myself more engaged in the exploration and less interested in drawing and recording what I saw. I did try a few different techniques. First, I traced the outline of the object on the plexi-glass. I was surprised by the difficulty of this task. First, to be accurate, I had to keep my eye on the object and draw. Once I moved my eye, I had to relocate the point from which I had been viewing. When I examined the various devices used in the 15th century, I noticed that many of them had some type of device that involved some kind of sighting device that allowed you to take your eye off of the object and then return to the same perspective. The brief use of tubes at the end of class, helped me see that circular openings narrow your field of view. The smaller the circular opening, the more focused the view became. Experimenting at home, I discovered that a narrow circular opening proved to be the most effective for keeping my sight in the same perspective. Second, I had to be close enough to the drawing surface to draw. This restricted my movement. Third, when it came time to talk about relationships between size and distance, I found myself wishing I had some kind of tool that would easily help me draw sighting lines or help me figure out measurements. We did improvise. We used our feet as measuring tools and used the structure of the environment (door panels) to help mark out distance. I noticed that Devin oriented his work along the grid lines in his notebook. I have graph paper pages in my notebook. Initially, I was trying to draw what I see and did not use the grid to help me. As I experimented more and more, I found that these grid lines were essential. They helped me mark the center point where my eye was drawn and helped me to draw lines from the edge of a surface to this center point. This also seems to be a technique that painter/architects used during the 15th century.

From these explorations and observations, I came away with these ideas about perspective.

1. Eye level determines the view that you see.
2. The further away an object is, the smaller it appears.
3. A frame focuses your attention on a certain area; it serves the purpose of narrowing your field of vision and eliminating the noise around this point of view.

I left with a few questions or ideas for exploration

1. What is the relationship between distance and size of object?
2. This type of looking seems very geometric. How can you use the idea of similar triangles to create the sense of depth and perspective?
3. Who is the observer – the frame or me? [Devin asked this. It feels like another take of perspective.]
4. How are these elements of linear perspective articulated in one of the drawings we viewed in class? Can I identify them?
5. Can I build and use one of the perspective devices? What will I learn about perspective?

Perspective Reflections

At the moment, my ideas of perspective are not rooted in mathematics; they are rooted in losing my centric way of seeing, developing an understanding of others' point of view, and seeing the facets or argumentation elements of a stated position. To be drawn into a center point in a picture and know how to connect the various lines, while seeming simple, is for

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me, a mathematical puzzle filled with mystery. I want to name the formula, but cannot remember. I must rely on drawing and seeing relationships. They are fascinating. As I was creating different pictures with different eye centers, I began to see how a shift in just tiny increments makes subtle shifts in the scene; a shift in large increments, changes the entire view. I also noticed that when the relationships between size, distance, and alignment were off, the picture did not make sense. It was difficult to make sense of a coherent whole. It appears that mathematics, when used descriptively, orders observations and forms the basis of solid argumentation. Is this the freedom that Galileo and other like-minded individuals of his time were experiencing? Mathematics ordered their ideas and described what they were seeing. Once they were able to define one idea mathematically, did it not open the door to uncover other laws and ways of being? Was this the beginning of mathematics as a way of defining scientific knowledge? Last, I am realizing that even though I was centered on one point, that the world doesn't work from one perspective only, but many. In the end, it seems that this tiny experience with linear perspective is opening up my viewpoint and encouraging me to understand particulars so I can move outward and make sense of more than one center.

Reflections on Galileo's Story

After reading, "Galileo, a biographical sketch" by Stillman Drake, I am struck by Galileo's persistent pursuit of knowledge, especially when his conclusions and explanations were counter to the times. What influences and what about his character allowed him to persevere? First, I think that his father must have played a central role. Perhaps Galileo learned to question authority, to trust his ideas and instincts, and to experiment from working and living with his father. Second, perhaps having a deep understanding of mathematics served as a platform for knowing. Mathematics ordered things in logical ways. Maybe it is easy to trust and believe in when the source of describing is something that is reliable. Third, it seems clear that Galileo, was a keen observer. He noticed anomalies between what he saw and what others explained. These discrepant events pushed his thinking, fueling his desire to look more closely and perhaps in a different way. Fourth, I think that Galileo was comfortable with not knowing, sitting in places of confusion, and taking time to make sure what he stated was logical and accurate. Drake comments that Galileo's unpublished manuscripts showed the evolution of ideas; by the time he published, his ideas had evolved into true knowledge. It seems to me that Galileo was confident and had a strong sense of himself as a learner.

Reflections on the learning process

Yikes! This first experience with perspective was so challenging for me. I have a difficult time seeing depth and to encounter perspective in drawing and seeing in this way pushed me to think outside the box. I found myself gravitating towards reading others' ideas rather than trying out myself. Yet, it wasn't until I sat down and did the work, putting what I saw down on paper, drawing grid lines, labeling eye centers, and making errors that I began to see what perspective was. Doing helps me make sense of what I come to know. I am also aware that I needed much more exploration time with the tools and materials. It wasn't until last night when I was trying to figure out how to maintain the same sight line,

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that I understood the beauty of the frame and tripod that we used in class. The tool we used I think is a similar device to those used during Galileo's time. Now, having had some different experiences, I might use the tool differently.

Second, as I was rereading the summary notes from Monday's class, I was struck by the diversity of approaches and ideas. We all started out with the same sheet of paper and instructions. Yet our environment and our previous experiences and approaches to how we work, created vastly different perspectives. When we shared, these perspectives just showed different facets of the same topic and placed a many different ideas into a community space. These ideas are now there for all of us to improve upon. I am curious to know how we, as a group, will use this community space to deepen our individual and collective understandings of Galileo.

Third, once again, the value of recording ideas and reflecting is coming home. I find that thinking about ideas, finding themes, and putting them together in a cohesive (or not so cohesive) framework, builds deeper understandings, raises questions, and demonstrates where the fuzziness exists.

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