

## SP 713 January 15, 2010 Summary

### *First Activities*

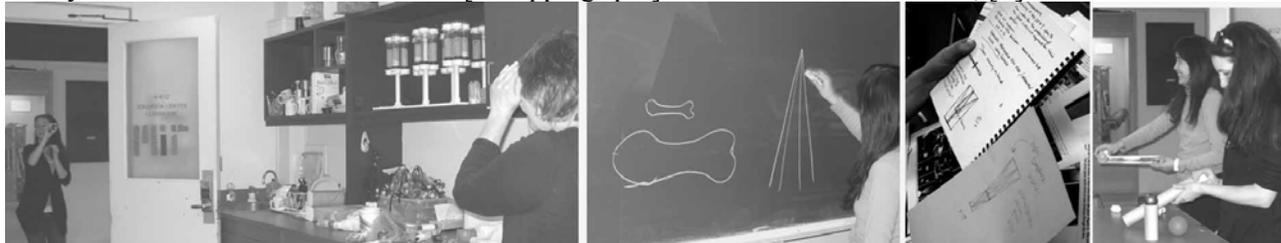
Trying out a telescope made in the library (photo 1) “It’s still upside down” – “We decided she was doing Galileo’s experiment playing with lenses to see what happens. We were actually working on Kepler’s ideas.”

Redrawing on the board, the diagram of dog and horse bone, and perspective, from the library books (photo 2)

-“what Galileo ignored?” – “Maybe he was more interested in motion. We can’t ask him!”

-[lens viewing] “that place where it[image] starts to flip..”

-“Maybe we can measure this distance [to flipping spot]. With the less convex lens, [it] is further”



### *Discussion of Instrument Collection, Rare Book Library, and readings*

Sagredo’s letter to Galileo 1618: “I forgot to mention in order to purify the glass it should remain at least a month in the furnace in accordance with the uses of the glass founders, which however creates considerable difficulty”

Kepler’s letter to Galileo 1611 “Here at Prague I cannot readily find someone to make a convex lens; with their own equipment they accomplish little. They pretend to despise my instruction.”

-“I loved the library sensual .. so much of another place.. The thing struck me most I could touch a book made so long ago! !!! it was not under glass where you can’t even touch it!”

-“We saw a lot of diagrams that looked like the ones we drew on the board, the perspective one, light diagrams! This diagram was in my journal (photo 3 above) page 19 of Kepler’s book! I was like dude! That’s cool!”

-“*Starry Messenger*, how he described the moon, to that level of detail, all the experiences I believe he had to have in order to do that! .. you really get a sense of how he is as an observer! I was amazed I am learning this recreation thing that is what it is doing for me really insights into observer, the development of an idea, a thought”

-“I feel everyone can take away more from learning hands-on even a book learner.. It just gets you so much more invested and involved in the subject .. my best science teachers got us working with our hands and playing.”

-“I wonder what else is going on in Galileo’s world?.. What else is happening, adding to his understanding? It makes me want to know every other detail surrounding him, that contributed to his thought process”

-“when everything revolved around earth.. we say that’s so stupid .. but if you look at the time, it again, it makes it so much more valuable and important, if you think what they had to go through.”

-“in my previous understanding, the craftsmen, glass blowers have not to do with science and Galileo has not to do with gardening. ..but actually the glass blowers, they can contribute .. Someone talking to him said: “you don’t have to work in garden, do not let it take your time” Galileo said: “don’t deprive me of the joy of these things.””

-“ I begin to appreciate all the small things that happen around me. Even the way the thing something not so significant that probably is normal. I see the instruments [in gallery] I start to think: what is the use? of that instrument and how it functions? I try to think: mirror; I try to relate them together, how it works.”

-“Do you mean you start to think about ordinary things you took for granted?” -“Yes. I treasure my life to observe”

-“if we think just Galileo is doing science; glass blowers do only technical things, then we understand that we are not science persons and we don’t have to think much. But in reading that every people think about what they are doing, and think about what they observe! It is joyful to think about those things!”

### *Motion Activities*

Can you see the motions described by traditional view[heavy and light; uniform speed; density of medium, fixed earth]? Where might you notice ambiguity in your observing of motion relating to that interpretation?

*To throw up two balls at the same time*, put one ball in each hand, and jump up; balls fly off the hand during the jump, not always together! Or place them on a board and throw up the board like a paddle (photo 4)

Or, line up several balls on the table, and push them all from behind with a tube, setting them rolling at once.



*Rolling balls* of different sizes down a tipped tube onto the table (photo 4, 5), especially a gentle angle. This experiment transforms into releasing all the balls from the top of a short board, to roll down and across the board. After a few tries, some marbles go further than others; they start off together and separate out. This experiment transforms again into releasing marbles from a tipped board in front of a wall (photo 8) – one ball gets down ahead of the other. The next experiment involves releasing balls from ramp into a container of water (photo 9, 10) Do two balls released into the water at the same time hit the bottom of the container at the same time? Many of the balls float (photo 11). –“I am figuring out, how fast they sink..this one sinks and rises again... I wonder if there is anything that would sink to the bottom of the container and then come back up?” Ball drops, bounces out. “That answers that question.”

*Ramp:* A cardboard tilted and supported by a pile of books (photo 6): different balls are released at the top: a hollow ball and two denser balls.

*Ramp:* a cardboard tipped; a box at the lower end to catch the marble when it gets to the bottom; timing the ball. –“Did Galileo consider friction? Trying to figure out what it had to do with.”

*Pendulum* hung on a handle

A bowl[or curved mirror] with marble or ball released at the top edge (photo 12, 13); the ball goes back and forth. –“How could you figure out: does it[marble] go up the same height on each side[of bowl]?”

“Do you think that, golf ball, ping pong ball, marble all go the same?” “Some balls tend to be more circular motion [in bowl] and some go more back and forth.”



### ***Lens Activities***

Several images appear in an arrangement of light, lens, lens, black paper (photo 14). One image floats in air. –“she experimented different distances away from the mirror how much larger or smaller it was.. discovered the concave lens at a certain distances was distorted, then upside down and at further it was upside down and smaller!”

***Cosmic View*, K Boeke, 1957 picture book**

***Powers of Ten*, Charles and Ray Eames, 1978 film**

***Powers of Ten*, Philip Morrison, Eames Office, 1982 book.**

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January IAP 2010

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