

SP713 January 20, 2010 Summary

Discussion of Tom Settle's "Galileo's Experimental Research"

- "I find him[Settle] to be incredibly fascinating! ..Galileo didn't write [his published work] from exploration. Galileo put down his hunch, a series of experiments that led to discovery but there is a lot more ...it reminded me of messiness of learning .. it takes a lot of experimentation.."
- "Galileo didn't have those laws sitting in a textbook and absorb it. . it is very humbling he did so much with so little it makes me feel a little better ... I feel frustrated. .. I feel vindicating to hear.."
- "Galileo's observational ability to see something swinging and say why? Where as my notion is ok that's interesting, something swinging: I'm going to look it up on Google!! ...He figured it out.."
- "Because all the substances goes toward the center, that makes the earth a round ball so the observation that people get by using the telescope is: planets ..are round. Does it mean they are also the center? of the universe and that is contradictory to the existing theory about the universe.."
- "Piaget..research on children and they seem to show children are making models ..to understand their experiences .. as adults we continue .. whenever I am looking at something I can't explain..I see a flash .."
- "I would say intuition and hunches are equally important as learning from existing perspectives theories textbooks. When Galileo started free fall,, he was trying to confirm the truth of Aristotle."
- "when young, I did music... Settle asked questions in the reading which I also had! In my mind!"
- "Panama canal ship sunk... he took medical heart surgery technique and applied it. Inflate ping pong balls inside the ship hull--they raised ship, got it out!"
- Settle in person said: "Physics is a biography. Galileo is a biography. He had 50 years to chew on these things. He realizes he is going nowhere; he stops. The father and the son experimenting together say: "we are taught this. Is it really so?" Galileo was "a guy up to his neck in problems!"

Vincenzo Galilei, *Fuga, 1584*, *Renaissance music for Two Lutes*, Titanic Records, 1978.

Discussion of Motion activities

- "at the end Elizabeth gets Galileo's textbook...she ..says look Galileo was doing this.. then we were exploring this thing [rolling balls in mirror] we were trying to figure out how long it took to come to complete rest...." I also noticed different approaches to experiment [in our class].."
- "I like your hunch about parabolic dish, linear and circular motion. I think you might be onto something. I have the hunch that might be a good idea worth exploring...." I am going to really push to figure out how these lenses work as soon as possible, because the sooner we figure it out the sooner we can order our equipment and build something in the machine shop and start making something more sustaining."
- "I went outside ..watching cars, I noticed, I found watching the tires, the wheels was really helpful."

Motion Activities in Class

Trying out balls on a curved ramp (photo 1); releasing a ball from the highest tip of the curve, watching it roll. It goes down, up on the other side, and back almost to where it was. Trying different balls on the curve;

"We want to measure how high it went.. how far this would go .. it still reaches that point, I didn't expect it to."



Again rolling marble inside a mirror bowl; trying to watch what way it goes; path in water or oil?

Two half sphere mirrors (inside surfaces) put together (photos 2, 3, 4, 5). A marble appears to float above the top mirror, while a real marble is below it in the lower mirror. “Oh my gosh! It’s not there!” Laughing. “It is the first time I’ve understood people who don’t want to study the moon!” Using a colored gelatin in the mirror, over and around the image. “it feels weird to touch a transparent glass. oh my goodness! oh that ‘s so cool!!! I have been wanting a mirror sphere for a very long time!” “it’s amazing how it[marble] popped up!” “how many magicians in the world know this trick?” “Cooking!”

Rolling a ball on the curved ramp again: colored tape is put alongside the ramp. A mark is made on the tape at the highest point of each time the ball returns. These marks are labeled; the three tapes from three runs are put on the board. The distance between one mark (highest point of one roll) and the next mark (highest point of the next roll) are measured and put in a table (photo 9, 10). “we wanted to see what was the distance between that point and that point; we did it several times” “It resembled the pattern of the spiral.”

“the felt weight of iron ball much heavier and it appeared much harder to watch it.”[was it faster?]



Swinging and spinning a pendulum (photo 5); trying the lute (photo 6)

Lens experiments (photo 7) and discussion of lenses (photo 8)

“convex lens: the image is large and blurry, by itself but when you put the concave lens close to your eye, the lens makes the image smaller and clearer, that is what we know.” “what’s weird why it works both ways, if we are having concave lenses doing one thing and convex another.”

“she has a space ship!”

Running and throwing a ball while running, like the horse and rider example of Galileo.

“I was saying, I throw it upward, I can catch. But if I throw it forward and I run very fast, I cannot catch it. I want to see track of this ball.”

Outside in the Great Court

Looking at the moon with our Galileoscope (photo 11, 12, 13)

Toast to Galileo (photo 14)



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