

## SP713 IAP 2010

### Reflective Paper Assignment REVISED

For this assignment, you may refer to your notebooks, drawings, photos, recordings; the class notes by your classmates; my summaries, photos, the course website readings and resources; tours in MIT museum; Harvard Instrument collection; Houghton Library, Wallace observatory and MIT glass lab.

**Experimental Research** Include in your writing below specific examples from your involvement in class activities: picture frames, space and frame constructions, geometry, mirrors, lenses, instruments of calculation, observing the sky, museum and library visits, motions of rolling, falling, throwing, running. You may include extensions of these activities that you did outside of class time.

**History** Include in your writing below references, quotes, or descriptions of one or more historical examples, such as: Galileo's writings such as *Starry Messenger* and *Dialogue* (including the copies in the rare book library); Stories about early spectacles, glass and telescopes; Galileo's geometrical compass and exercises; paintings and diagrams by historical perspective artists; the antique instruments in the museums, Settle's study of Galileo's motion experiments, responses by others to Galileo (Kepler, Scheiner, Einstein).

You should reference any of these materials using proper citation.

### Writing to Galileo about your experimenting and learning

Galileo had a wide association of correspondents, collaborators and contacts who exchanged ideas and experiences with him in various areas of science and life. You read parts of Kepler's letter to Galileo in response to his telescope and the *Starry Messenger*. Some of you read parts of *Galileo's Daughter*, where daughter Virginia (Suor Maria Celeste) wrote letters to Galileo her father. I read in class parts of letters by Galileo and Sagredo about the glass and glassblowers.

You too are part of Galileo's extended community. You are Galileo's students at the present time, in a special way. You are not just trying to understand what Galileo found out, established and wrote about. You are also trying to be curious observers, explorers, investigators and inventors, like him.

Write to Galileo about your experiences in (and beyond) class. You could write to him in the form of letters, or a report, or a dialogue, or a mixture. Describe in detail specific observations and experiments, using diagrams or illustrations. Tell him about your journey: what you notice, what you are curious about, what confuses you.

Include examples where you were *looking* (frames, mirrors, lenses, night sky, glassblowing, watching others) where you *interacted with things or other people*: lenses or motions; constructing; moving yourself; changing a set-up; participating with others.

Discuss what you tried, built, observed, wondered about, including your struggles and uncertainties.

You might ask questions of him, quote or refer to something that he did or struggled with, and share your own response. Document for him what goes on as you come to new views, experimental arrangements, and understandings.

Write an overall reflection to Galileo on your insights through being his student in this special way, including:

- Your deepening curiosity for the world around you;
- Play and exploring with materials and nature
- Talking, listening and participating with your classmates
- Times when you doubt, question and reevaluate your assumptions and knowledge
- Activities, discussions, and readings (by him) that move your outlook to consider other interpretations

Analogies you find between your explorations and his, as described by Settle in *Galileo's Experimental Research*, such as: trying things out without a fixed idea of what will happen (or a wrong idea);  
coming up to dead ends; being surprised, delighted, awed;  
developing a network of research interests, not a single concern;  
conjecturing beyond what evidence shows while learning from it...  
Share with Galileo what you would like to explore further.

**For the teachers:**

You could add the reflection below to your essay above, or you might choose to present it as separate commentary.

Reflect on how history and experiment infuse and extend the possibilities you envision for involving students in their own explorations. Consider your own experiences as a learner in this course, and those of your classmates. Relate observations, insights and questions about learning and history that have emerged for you while being on the inside of the experience of experimenting. What do you begin to understand about developing understanding and experience? You might consider how themes like the “overrepeating story” have expressions in these experiences of history and learning. Imagine Galileo and his story continuing through teaching, for students who will be students of Galileo?

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EC.050 Recreate Experiments from History: Inform the Future from the Past: Galileo  
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