Data Visualization: High School Course & iBook Development

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LA-SiGMA Louisiana Alliance for Simulation-Guided Materials Applications

Abstract:

A Science/Math/Art elective called "Introduction to Scientific Visualization" was developed for the Louisiana School for Math, Science, and the Arts (LSMSA). Students worked on a variety of project themes that blend Art, CS, Math, Humanities, and Science using software (mostly free) such as Excel, Powerpoint, ImageJ, VisIt, ParaView, VMD, and Sage Notebook. They also explored emerging software such as Blender and Augmented Reality. Survey results thus far show a modest variety of students are taking the course. Large % gains in CS and Science interest are seen with modest gains in Art. Large % gains are also seen in perceived skill levels in spreadsheet, visual arts, and presentation skills.
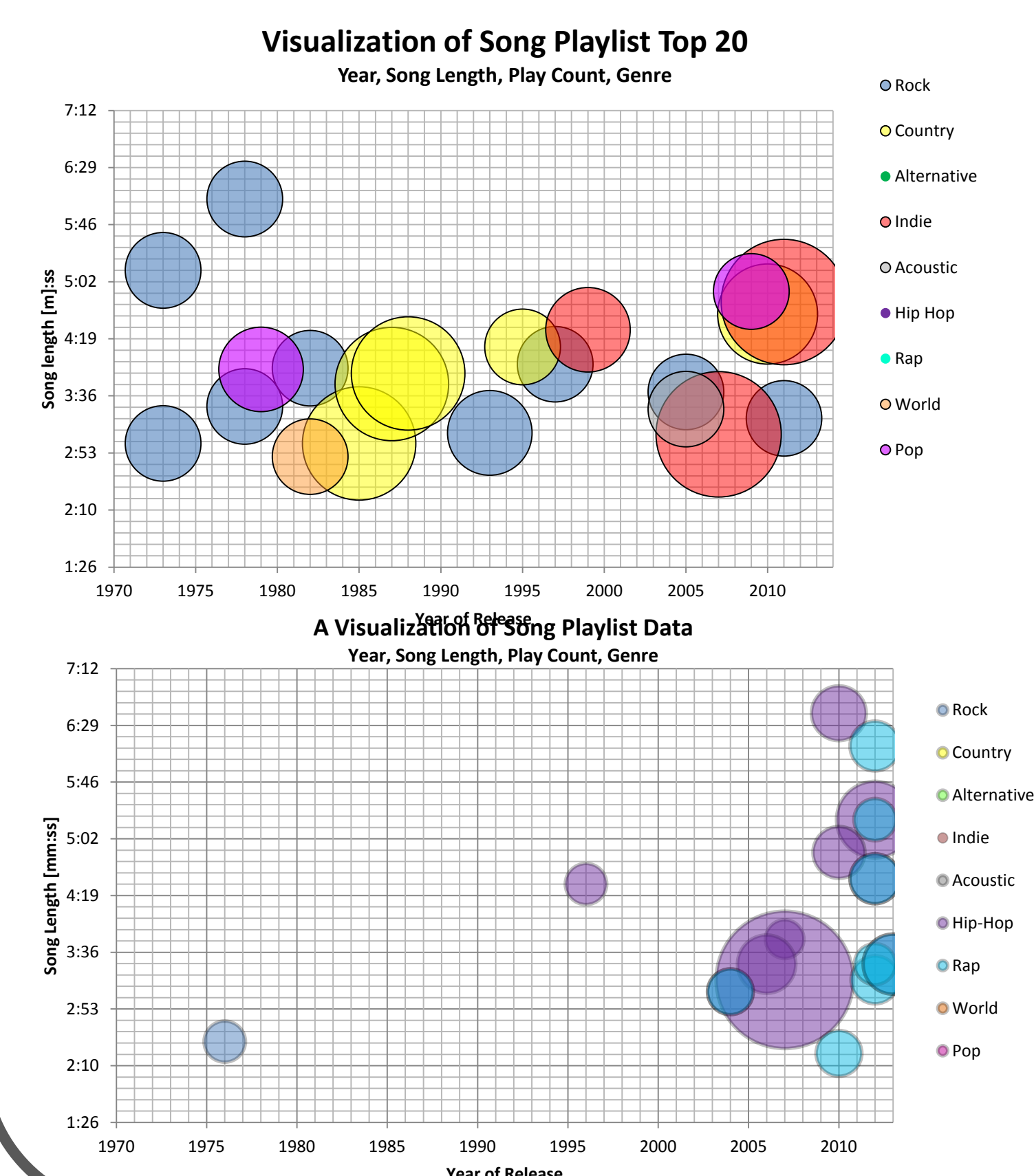
Background:

Located in Natchitoches Louisiana, LSMSA is a three year residential high school for high aptitude and motivated students. This course development is an opportunity for students from Arts, Computer Science, Humanities, Math, and/or Sciences to develop cross-disciplinary skills in the rapidly emerging professions of scientific visualization.
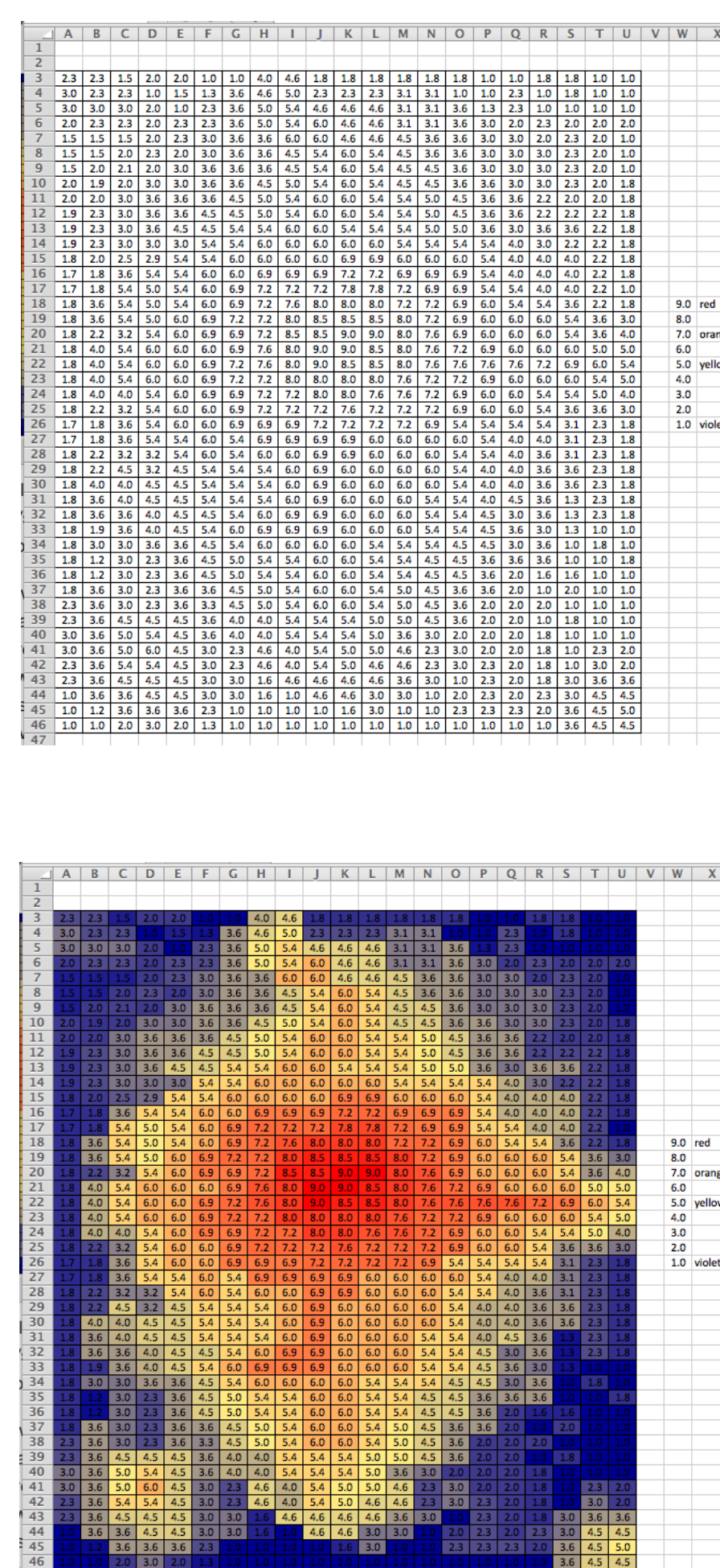
The ISV course is being developed in iBook using iBook Author to take advantage of iPad presentation. The iBook/ allows for a variety of teaching styles: reading, step by step Galleries, short video clips, links to bookmarks and webpages, and interactive pop-ups and self-quizzes. The material will also be created in powerpoint format.
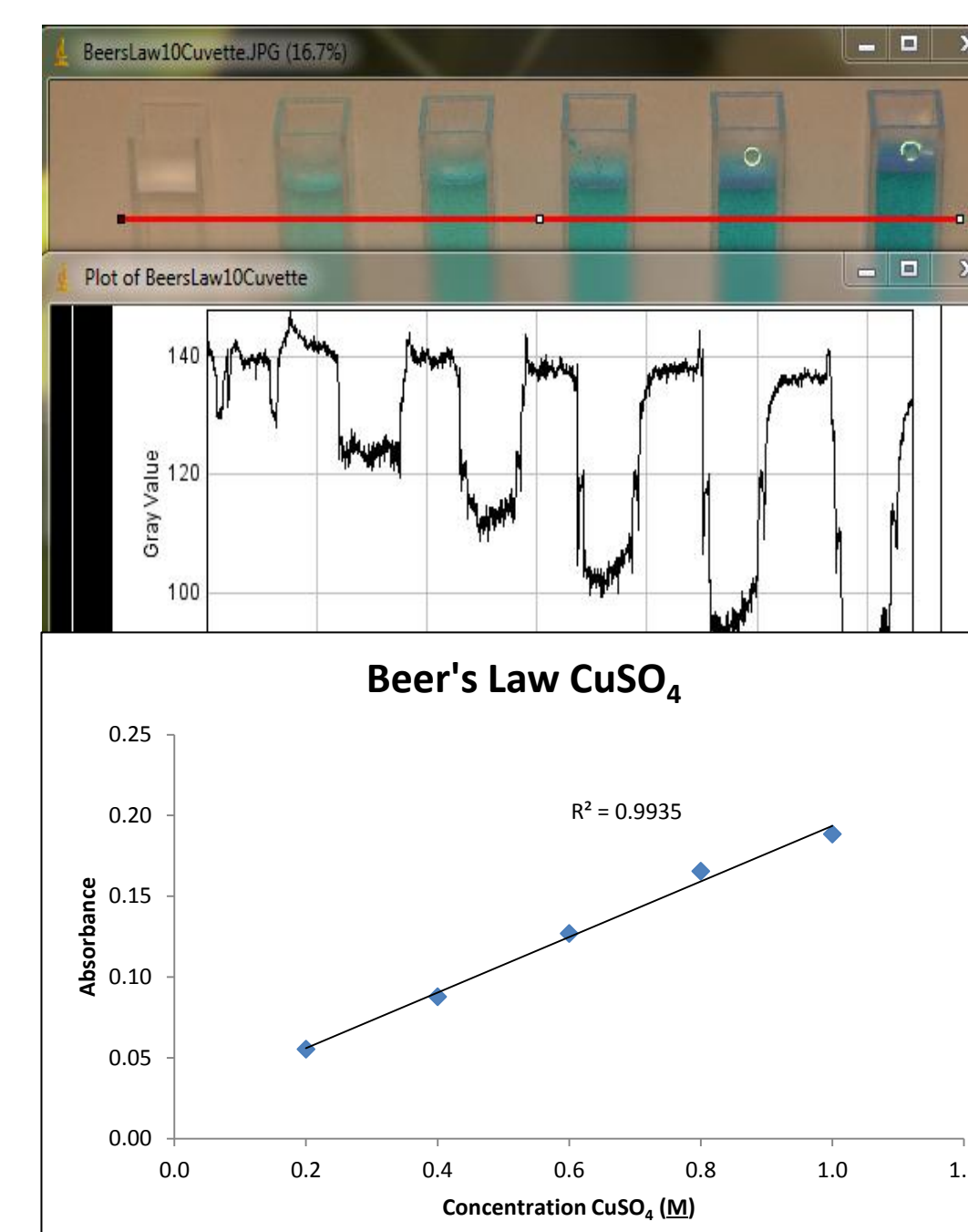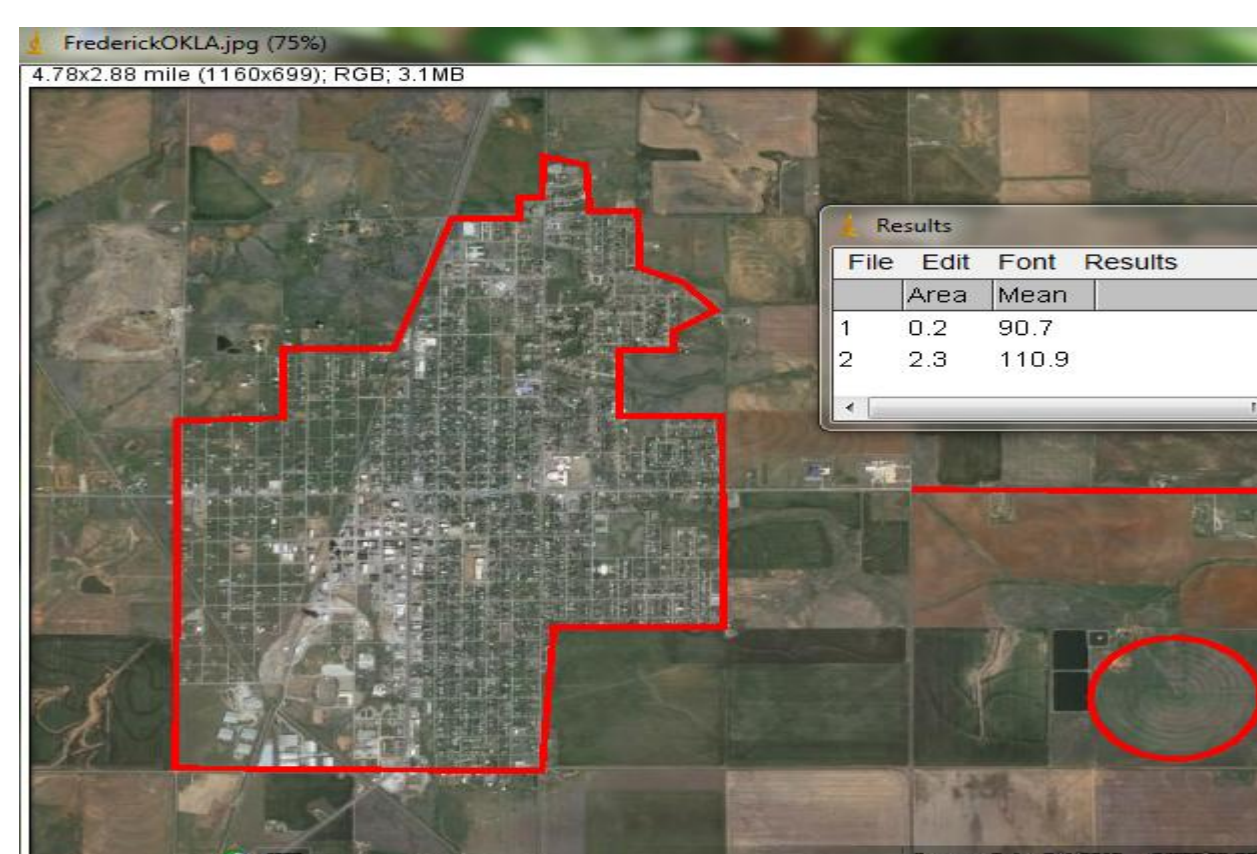
Student projects:

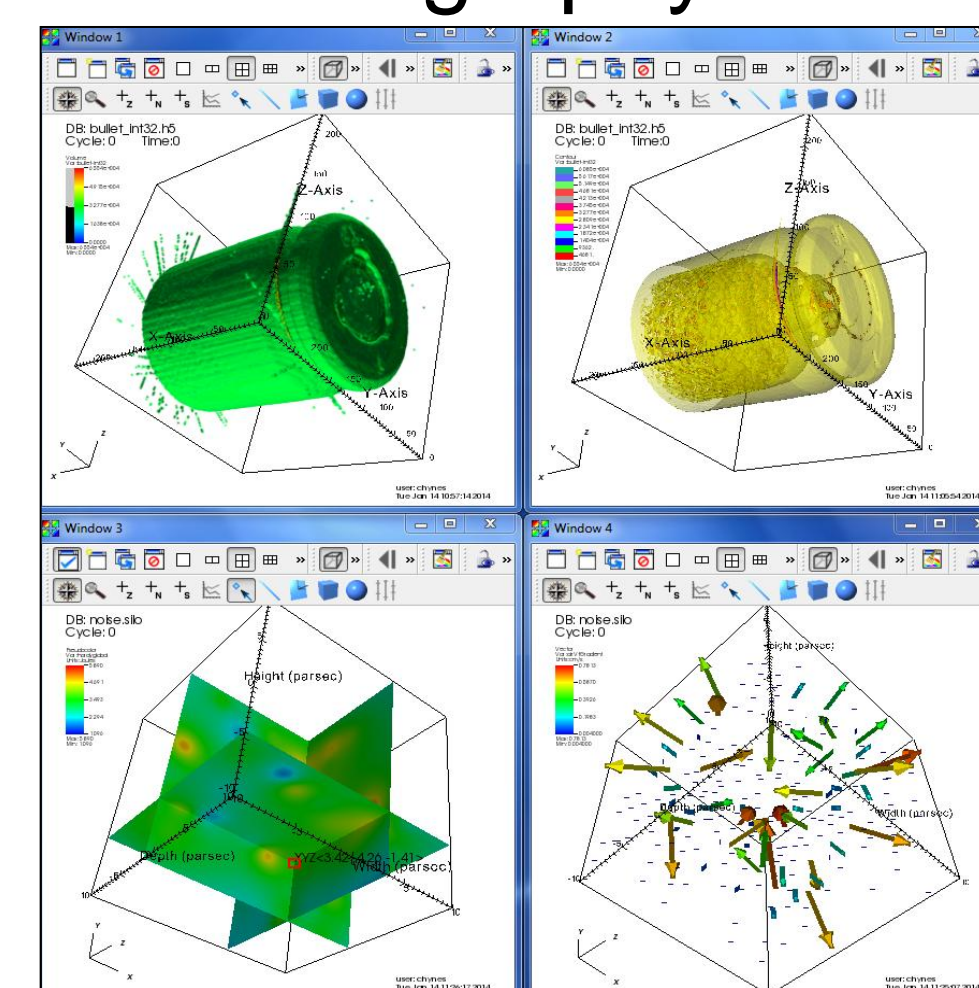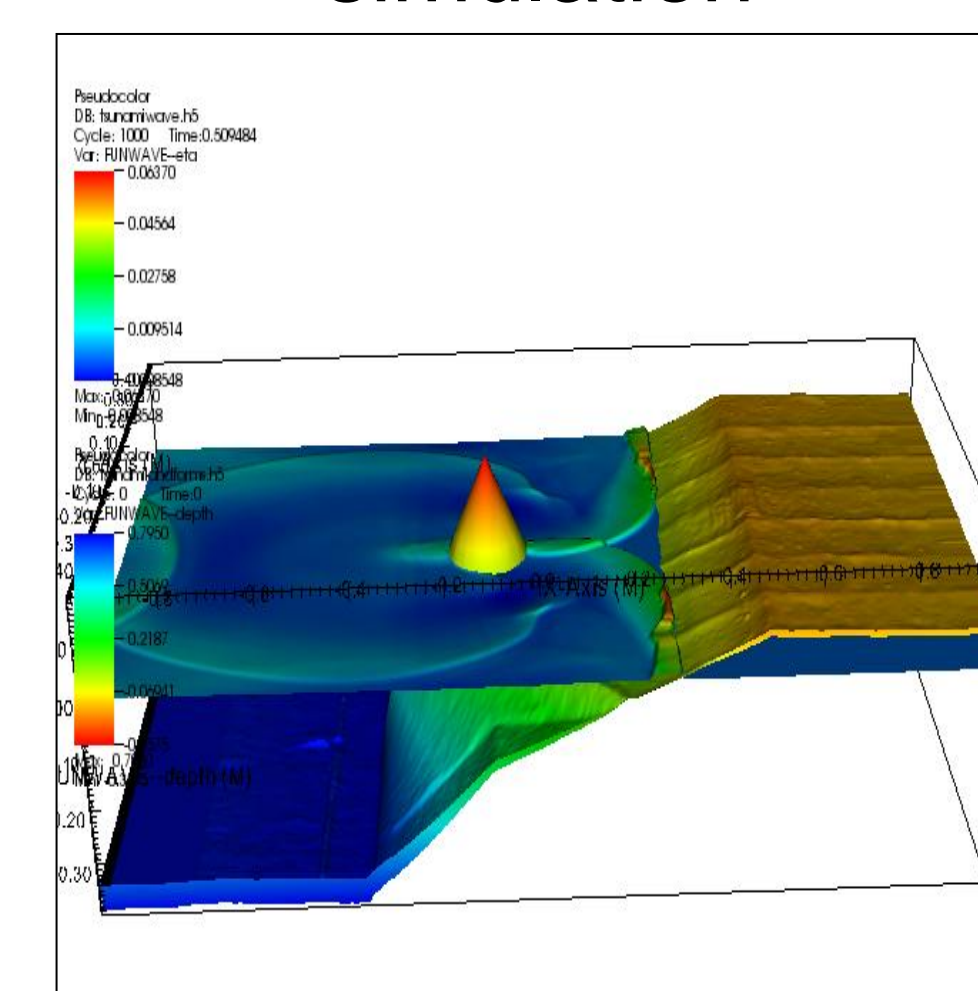### Excel: Profiling Music Interests

Excel: Colorizing

Student projects:

ImageJ: Find Lengths and Areas
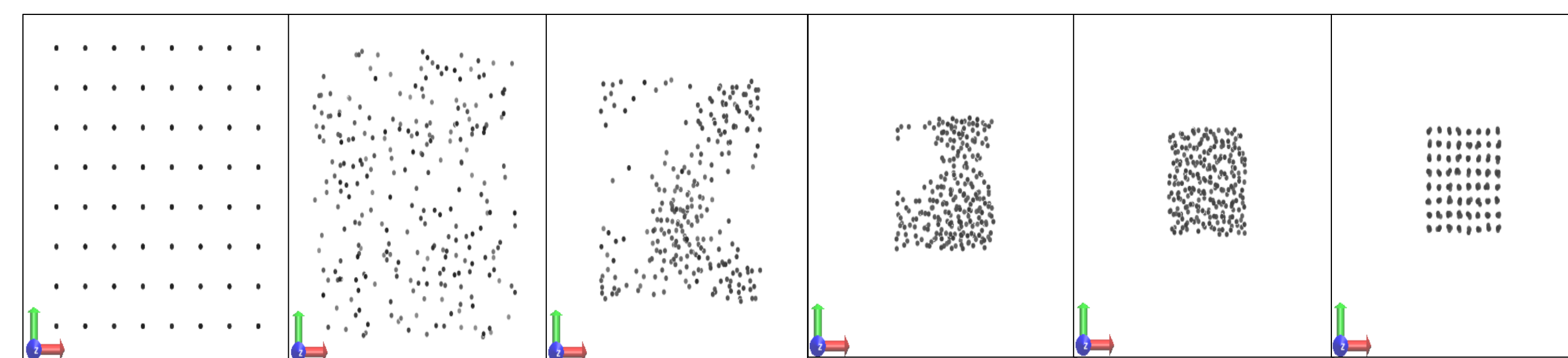

ImageJ: Plot Profile-Beer's Law
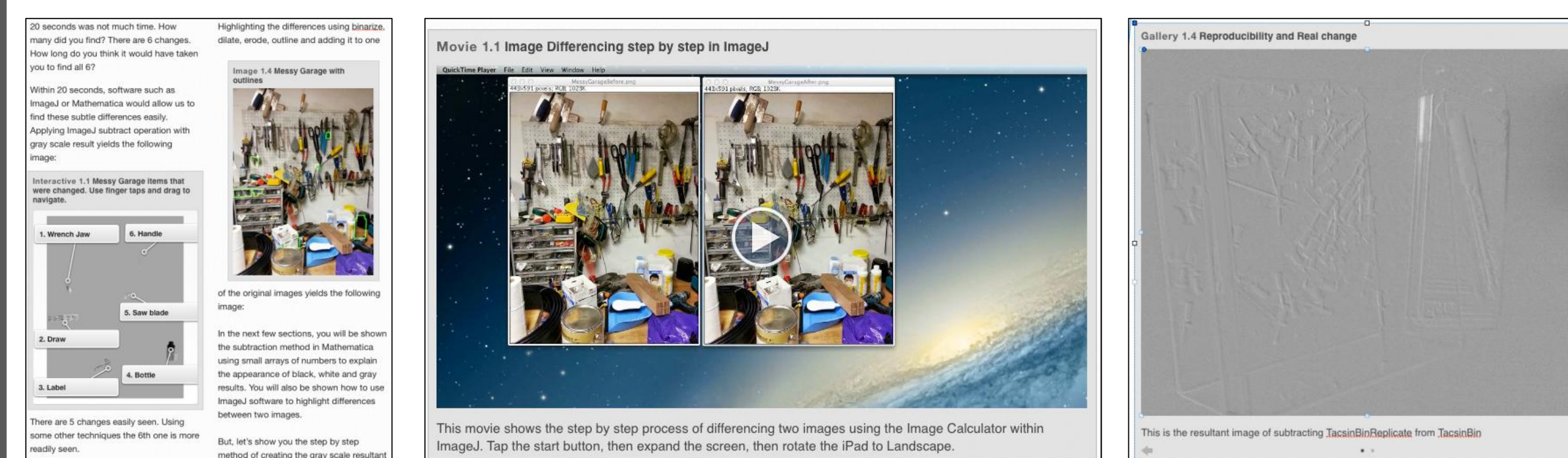

VisIt: Visualizing bullet tomography

VisIt: Visualizing Tsunami simulation

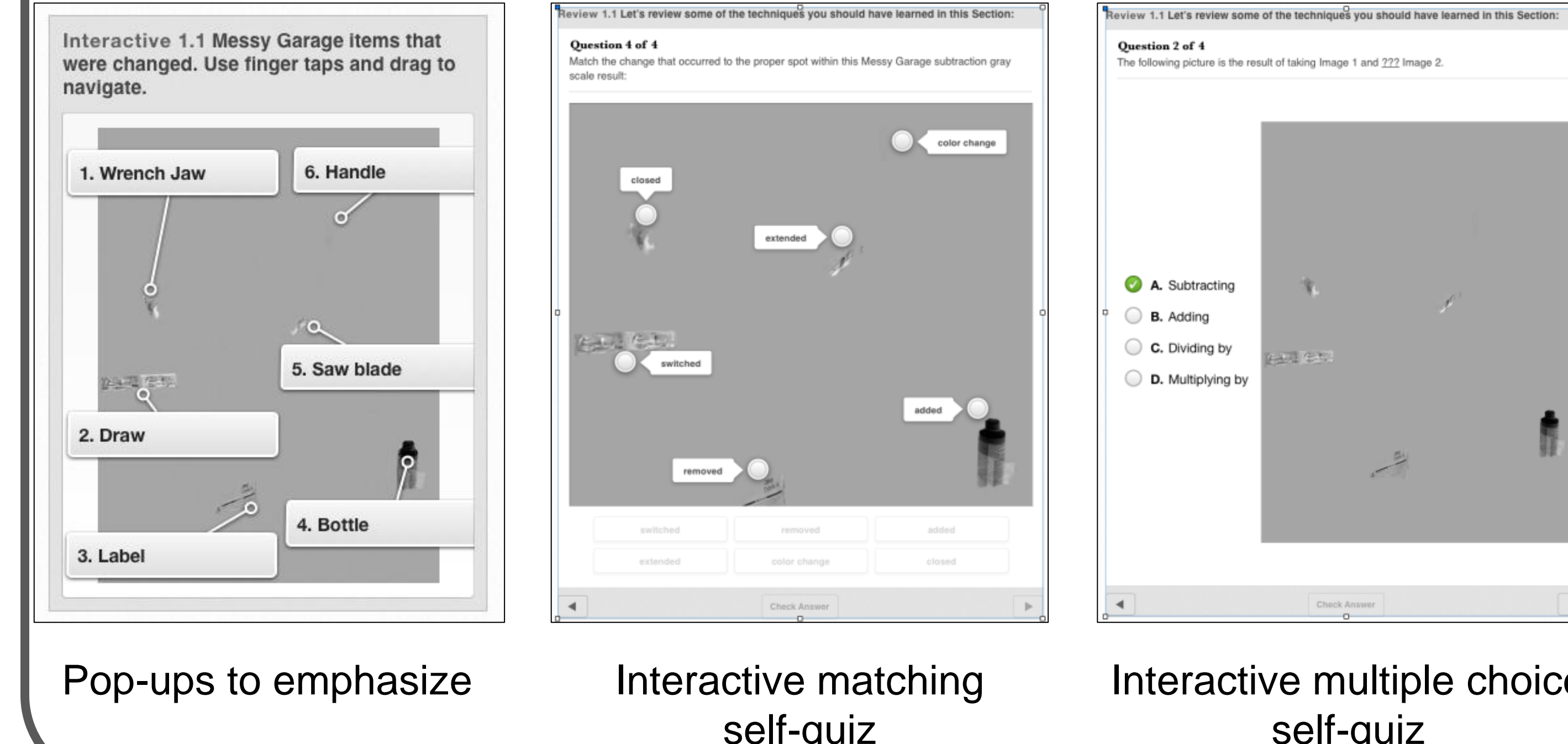### VMD: Animating HPC simulation of phase changes

iBook:

Pop-ups to emphasize

Interactive matching self-quiz

Interactive multiple choice self-quiz

iBook:

Two column page style

Instructional Movies

Gallery: touch activated step by step instructions

Course Survey Results:

Course Offerings: 2   Sample size: 11   64% Male   36% Female

	Art	Comp Sci	Engineer	Math	Science
Declared Major:	14%	7%	29%	7%	43%
Change in interest:% of expectation	40%	100%	50%	20%	120%

	Spread sheet	Visual Art	Computer Science	Math	Science	Imaging, Drawing, Presentation
Skill level % of 100:	64%	40%	31%	65%	67%	45%
Change in skill: % of expectation	140%	120%	80%	30%	60%	130%

Future Work:

Answer the question: In what manner can this iBook be marketed?
Evaluation of the iPad/iBook format as a teaching tool for ISV.
Making the material accessible to teachers, students and the general public
Explore the feasibility of adding AUTODESK© 123D©

Acknowledgements: