Notes for

“3D Spatial Reasoning and the Cross Product”

Online Lab

Summary

This lab was designed so that students can perform it at home with teacher guidance via teleconferencing. Students draw arrangements of objects on a table surface, from multiple perspectives. A pencil object quickly becomes simply an arrow, and the dot-and-cross notation for in/out of the page arises naturally. The 3D skills are applied to smartphone coordinates and to visualization of the cross product. A future version will oblige a collaborative component between two online students via sharing of their camera perspectives.

Goals:

Develop skills in

* visualizing diagrams involving 3 dimensional features
* drawing diagrams from perspectives along different axes

Applying these skills to

* interpretation of the 3D axes of a smartphone held in different orientations
* visualizing the cross-product concept

Equipment:

* a water bottle; a book ; pencils or pens;
* a smartphone
  + instructions are provided for downloading and using the app
  + students are given the instructions before the lab, and are able to set up and use it on their own.

Assessment:

Students submit two pieces of paper on which they have drawn, by hand, many small diagrams. A visual answer key is provided for teachers.

Comments:

Lab instructions also provided as word document: Edit and modify as needed. Share the result with others!