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Sketching for Engineering Communication

**Introduction:**

Line types are important to know when trying to show an engineering design. Sketching and drawing are the first step in communicating a new design. The designer must use the correct line types and drawing styles in order to effectively communicate their design.

**Standards for Technological Literacy:**

* The use of symbols, measurements, and drawings promotes a clear communication by providing a common language to express ideas. (17.6-8.K)
* There are many ways to communicate information, such as graphic and electronic means. (17.9-12.P)
* Technological knowledge and processes are communicated using symbols, measurement, conventions, icons, graphic images, and languages that incorporate a variety of visual, auditory, and tactile stimuli. (17.9-12.Q)

**Relative Advantage:**

Students will be able to learn how to sketch and draw using the different line types even if they cannot be in the physical classroom. Having videos integrated into the lesson allows the students to review the material while they are practicing it. Having the proper technique available immediately when they are practicing will allow them to practice correctly. If they miss class, they can review the material they missed, and still be able to practice correctly.

**Timeline:**

The timeline for this lesson is two hours. A student should be able to complete the activities in about two hours, or roughly two class periods.

**Materials:**

Isometric graph paper

Drawing tool ie. Pen or pencil

Computer or other device capable of streaming online video

[Isometric graph paper](http://www.printablepaper.net/preview/grid-isometric-portrait-letter-4)

[Isometric Sketching Worksheet](http://weebly-file/1/1/7/9/11794469/isometric_sketching_practice.pdf)

[Isometric Dorm Room Examples](http://weebly-file/1/1/7/9/11794469/wemp_isometric_dorm_example.pdf)

**Grouping Strategies:**

Ideally, each student should have availability of a computing device. This lesson can be worked in groups up to four though. In a classroom setting, the lesson would be worked through as a class, and the videos would be available for supplemental help.

**Learning Activities:**

Students will review at least one of the two videos on line types. [Line types part 1](http://youtu.be/RFszdM3szXw?list=PLtL450Z6KHFY2VnOUodJAWp-jS1_ajKjL) is an animated version of how to use construction and object lines. If the student prefers a live action version, they can watch and follow along with [Line Types part 2](http://youtu.be/cy4mem7aqbc?list=PLtL450Z6KHFY2VnOUodJAWp-jS1_ajKjL). The student will follow along with the video and be able to reproduce the example that is provided.

After the student feels proficient with the different line types, they will move forward to isometric sketching. Students will follow along with the [Isometric Sketching](http://youtu.be/tvGoN4XFlrk?list=UU_Q2KC5SCeisZnPIvku320Q) video. They will practice along with the video, pausing or re-playing as necessary, until they feel comfortable with the methods of creating isometric sketches.

Once the students have gotten comfortable with drawing in Isometric view, they will need to do some practice shapes. They will need to complete at least three of the six shapes correctly before moving on to the Isometric Dorm Room. The Dorm Room will provide a real world situation that the student would be familiar with. Examples of the final product have been provided as a guide of the expectations.

* Dorm Room – Students will sketch using the isometric drawing style, to create a cutaway view of a dorm room or bedroom that suits their desires. They can add any amenities to the room as long as it all fits into a scale 14 X 12 foot room. The drawing will be expected to have the two furthest walls added, and the two nearest walls removed.

**Assessment:**

Student work will be assessed by their drawings. Online students could snap a photo of their work and deliver it electronically to be evaluated, and students in a classroom will have their sketches evaluated by the instructor. Students would also be asked to make an isometric sketch of an object from their home. This item will not include a walk through, so they will need to employ their sketching skills to accurately re-create the item in isometric style.

**Adaptations:**

Adaptations could include translation of the videos to another language through the closed caption feature in YouTube. This would require inputting a written script into the video, and it is advised that the translation be checked before using. Students with mechanical limitations with motor skills would have a modified amount of required sketches to complete. They could also be allowed to demonstrate proficiency in sketching by creating shapes and figures that are different from the provided examples.

**References:**

Ryan, V. (2012). Isometric Projection - Personal Stereo. Retrieved from http://www.technologystudent.com/designpro/isocube2.htm

Savetz Publishing. (2014). Printable Isometric Graph Paper with 1/4-inch figures on letter-sized paper. Retrieved from http://www.printablepaper.net/preview/grid-isometric-portrait-letter-4

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