

zation

iews

outs, scrap paper and pencils

computers, snap cubes

Estimate

Expendable materials

Reusable materials

(used for all workshops)

Summary

Students learn how to create two-dimensional representations of three-dimensional objects by utilizing orthographic projection techniques. In a four-station workshop structure, students rotate through different group-oriented activities that call on various learning styles to solidify the concept. Students use cube blocks to build 3D models and then draw orthographic views of those shapes, which are the three side views—top, front, right—with no depth indicated. Next, they individually practice workbook problems and check their answers. Then, working in pairs, one blindfolded partner describes a multi-cube shape by feel as the other partner draws what is described. Lastly, online activities provide additional practice and concept explanation.

Engineering Connection

Orthographic projection is a useful skill for engineers that helps them take ideas that only exist in their minds and create visuals in order to communicate with other engineers. Orthographic views are especially helpful for detailing manufacturing and construction designs. Mechanical engineers provide orthographic drawings of parts to machinists for fabrication. Civil engineers provide orthographic drawings of structures to construction crews. Orthographic drawings depict objects from multiple perspectives (top, front and side). The combination of these views help to make sure that components can be accurately created in accordance with engineers' requirements.

Pre-Requisite Knowledge

Students should be familiar with the Cartesian coordinate system and its x-, y- and z-axes. The instructor may want to administer a spatial visualization test such as the [Spatial Visualization Test \(PSVT:R\)](#) as a pre-test to establish student skill baselines, and then administer the same test after the seventh lesson/workshop in this series as a post-test to measure learning and skill gains.







