Title: Orthographic Drawings

(Key words: Isometric, orthographic or 3 D drawings   Summary – see Ohio state standard below)

Existing knowledge: Students should be familiar 3 dimensional drawings, duplicating 3D block models and be comfortable discussing spatial sense of a 3D object. Understanding of the terms “front, top, side, face, vertex, edge and block/cube” is necessary.

Materials: Computer with Cabri Geometry II software

NCTM Strands: Use visualization, spatial reasoning, and geometric modeling to solve problems. Students should use two dimensional representations of three dimensional objects to visualize and solve problems such as those involving surface area/and or volume.

Ohio Content Standards: (Geometry and Spatial Sense I.) Identify and draw 3 D objects from different views (top, side, front and perspective)

Materials: Computer lab or set of calculators equipped with Cabri Geometry II software, lab worksheet, physical model (blocks). Optional materials for extension problems include: paper, straightedge, pencil and blocks.

Introductions: Whole group discussion with various 3 D block models strategically placed around room for students to observe, touch and manipulate.

Attention Getter: Pose this problem. The FBI needs you to draw specific views of their top secret building. They need the front side and top views to accurately cover the building with a new see through type of indestructible armor. (The location of doors and windows does not matter.) Should you choose to accept this mission and successfully complete your secret drawings you will achieve the highest achievable status of satisfactory math student, orthographic drawings.

Objective: Using Cabri software the 7th grade math student will be able to draw the top, side, front and perspective drawings of given 2 Dimensional drawing showing a block model construction. (see included suggestion).
Assessment: Assessment types are left to the discretion of the instructor. Some suggestions would be: completed lab with top, side, and front drawings of perspective model.

Procedure: Group students into pairs. The instructor should choose the method to determine pairings.

Help for turning on grid: Click on the button on the far right and select show axes. Click on this button again and select define grid. Then click on the coordinate (0,0) and the grid should appear. Next click on the button once more and select hide axes. Click again and select hide/show. The grid should appear very faint click once on one of the dots of the grid and the grid should be more visible.
Perspective Drawing Lab

Team Members: ____________________________

Lab Goals: Students will draw the front, side and top views of a perspective drawing using Cabri Dynamic Geometry II Software.

Lab Procedures

1. Open Cabri software.

2. Show grid on new page.

3. After studying the perspective drawing below use segments tool on grid to draw the top, side and front views of the building below.

4. Use the comments tool to label the views.

5. How many faces do you see from the front? _______ From the side? _______ From the top? _______

5. How many cubes are used to construct the entire model? (assuming all cubes are visible) ______

![Perspective Drawing](image)

Extension As an architect you are asked to draw a perspective (isometric) view of a city block containing the YMCA and public library. Use dotted paper or cabri software with grid and draw the city block showing a compass rose (created with cabri) indicating direction. Give the dimensions (length, height and width as well as surface area) of each building on your block. Assessment will be based on creativity and accuracy.