

Sketching Views of 3-Dimensional Figures Using *The Geometer's Sketchpad*[®] (GSP)

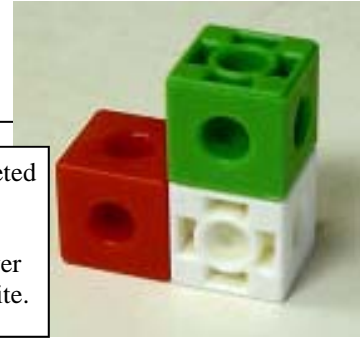


Fig. 1 - Image of the completed 3D figure, oblique view showing front face. Top right cube is green; lower left is red; lower right is white.

Before drawing, construct a 3D figure using snap cubes; Figure 1 shows an image of the cube used in this example.

When the 3D figure is finished, turn it so the front side is facing you (you decide which face is the front), then follow these steps in order:

One:

- Open a new, blank sketch;
- Make a grid: **Graph > Show Grid** (fig. 2)
- The grid will have numbered axes and 2 control points - these need to be removed;
- Select the numbered axes and the two control points (fig. 3).

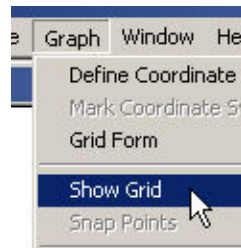


Fig. 2

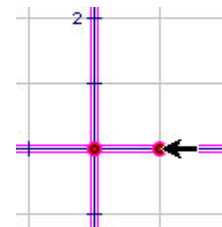


Fig. 3

Two:

- Hide them using **Display > Hide Objects** (*do not delete*) (fig. 4);
- Tell the grid to organize your points and segments for you by snapping to it: click **Graph > Snap Points** (fig. 5).

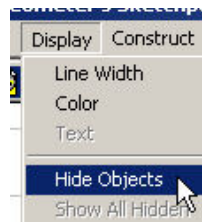


Fig. 4

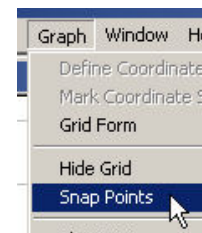


Fig. 5

Three:

- Click the straightedge tool (fig. 6);
- Move the mouse to an intersection on the grid, and draw a segment that is the width of one grid square - you will see the points and segment "snap" onto the grid;
- Repeat this until you have drawn a square that represents one of the cubes on the front of your 3D object;
- Repeat these steps until you have drawn the entire front of your 3D shape (fig. 7).



Fig. 6

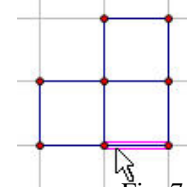


Fig. 7

Four:

- De-select everything;
- Click the 4 vertices of one square (fig. 8), then construct an interior: **Construct > Quadrilateral Interior** (fig.9);
- [In this case, I have constructed the interior that represents the top (green) cube of the 3D shape]
- Right-click on the "waffles" of the square, and select from the pop-up menu, **Color > [Green]** (fig. 10a and 10b);
- De-select everything.

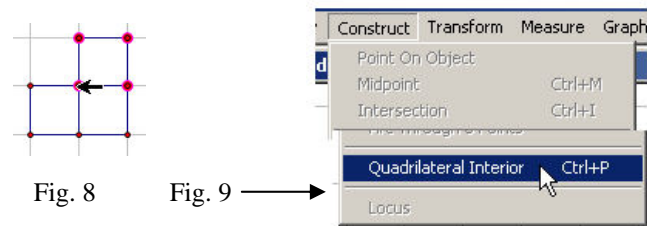


Fig. 8

Fig. 9

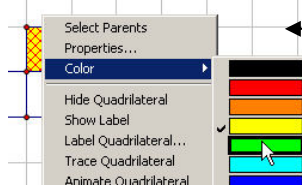
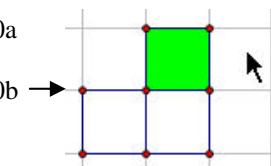


Fig. 10a

Fig. 10b



Five:

- a. Repeat for the red face (figs 11a and 11b);
- b. The white face can be left blank;
- c. De-select everything.

Six:

- a. You have now completed the front of your 3D shape - now to label it, click the Text Tool (fig. 12a);
- b. When you move your cursor onto the work area, you will get a "pointy hand" (fig. 12b);
- c. When the "pointy hand" is in about the right place, click it to get a text box - type "Front" into the box (fig. 13);
- d. De-select everything;
- e. You can move the text box to an exact place by moving the selection arrow over it (fig. 14) and either dragging the box or using your arrow keys to nudge the text to an exact place;
- f. De-select when finished this step.

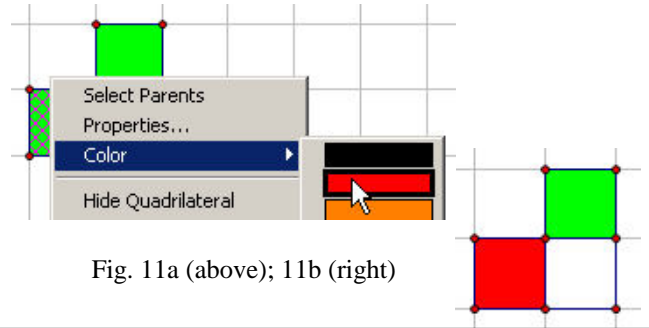


Fig. 11a (above); 11b (right)

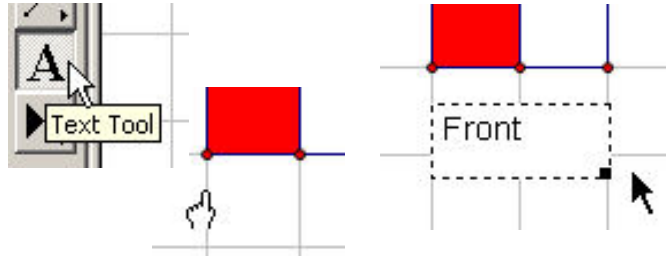


Fig. 12a

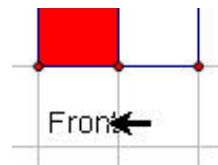
Fig. 12b

Fig. 13

Seven:

- a. Turn your 3D figure so you see just the left side;
- b. Repeat all of the above steps for the left side.

Fig. 14



Eight:

- a. Repeat all of the above for the right side, back, top, and bottom;
- b. You will end up with six drawings in total (fig. 15).

Nine:

- a. Use a text box to put your name on the completed diagram;
- b. Print the page and hand in with your 3D shape to your teacher for checking;
- c. Save the completed diagram in your "My GSP" folder.

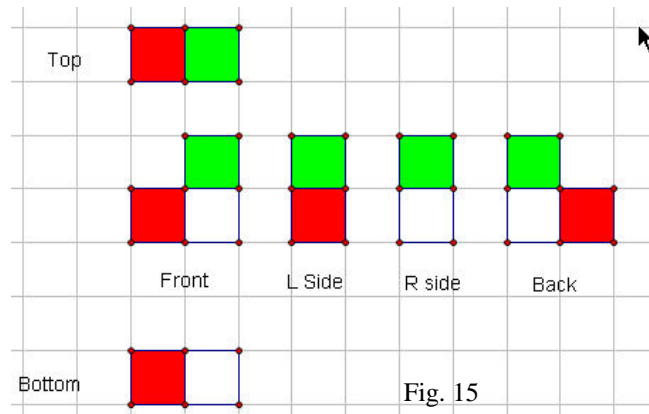


Fig. 15

Kicking this up a notch or two:

- Make a digital image of your 3D figure. Either print the image separately, or make it part of your GSP diagram by doing these steps:
 - a. Using a photo editor (e.g. *Photoshop Elements*), crop and re-size the image so it is about 100 pixels wide by 100 pixels high;
 - b. Copy the image, then open your drawing in GSP, and paste the image (Edit > Paste);
 - c. You can move the image around by clicking and dragging it. Remember to **save!**
- Is it necessary to show all six faces of an object? What is the minimum number of faces you need to be able to accurately and completely represent a 3D figure? Research "technical drawings" to find out what experts say.