

3D Solids and Their Projections

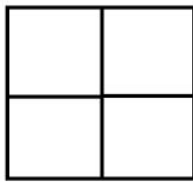
Use the blocks you have brought for this question.

1. Build a 3D structure over a 2×2 square base so that it fits into a cube of size $2 \times 2 \times 2$. (This means that you will use no more than 8 blocks. You do not have to use all your blocks!)

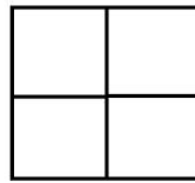
Shade the grids below to indicate the top, front and **LEFT** side projections of the 3d shape you have built:



FRONT



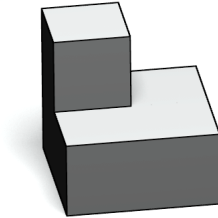
TOP



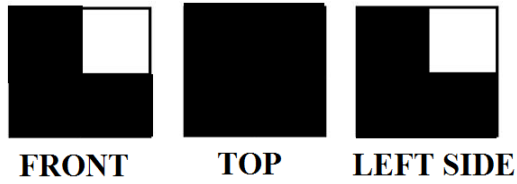
LEFT SIDE

2. Share the top, front, and side projections of your solid with a partner. Are your projections the same? Are your solids the same?

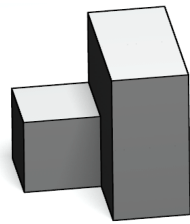
3. Travis built the following solid:



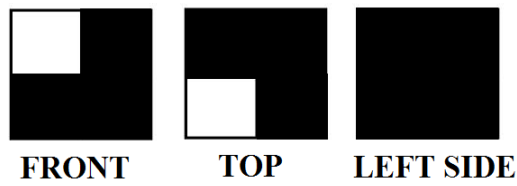
a. Draw the front, top, and left projections of Travis' solid:



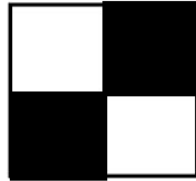
4. Katherine built the following solid:



a. Draw the front, top, and left projections of the solid.



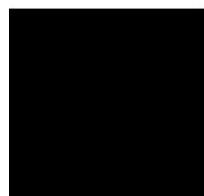
5. Katja drew this projection:



Is it the top, front or side projection? How do you know?

Solution: It is the top. If it were a front or side projection, it would mean that you have a block on the second row without one on the bottom row, which is impossible.

6. Build two different solids that have the same projections. Fill in what those projections look like:



FRONT

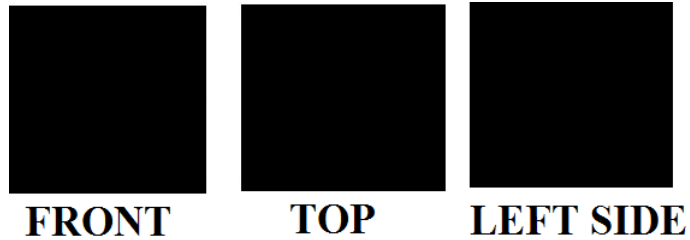


TOP



LEFT SIDE

7. Make a 3D solid that has the following projections.



a. Find all possible solids that have these projections.

b. For each of these solids, count the number of cubes used and record in the table:

| Solid | Number of ⁶ cubes used |
|-------|-----------------------------------|
| 1 | |
| 2 | 6 |
| 3 | 7 |
| 4 | 7 |
| 5 | 7 |
| 6 | 7 |
| 7 | 8 |

c. How many different solids have these three projections? **Solution:** 7