11.1 Drawing Views of Cube Structures

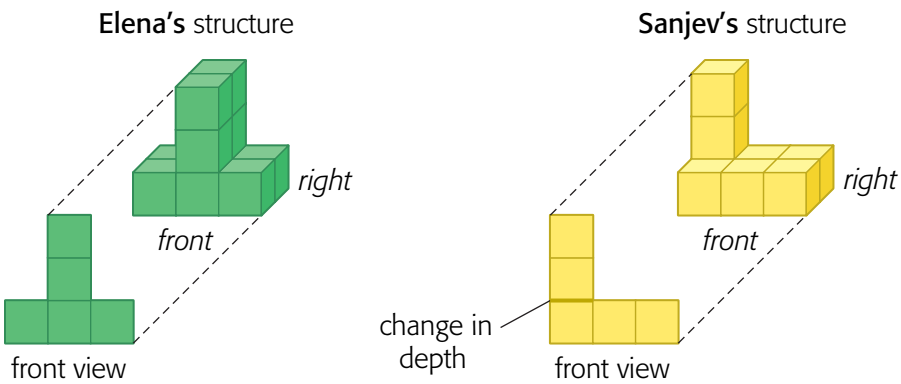
YOU WILL NEED
- linking cubes
- grid paper

GOAL

Use grid paper to draw top, front, and side views of a cube structure.

LEARN ABOUT the Math

Elena and Sanjev each used linking cubes to represent a building in their community. They want to draw different views of their models.



How can you make top, front, and side views of a cube structure?

A. How do you know that the drawing of each front view is correct?

B. Draw what you would see if you looked at the top view of each structure. Explain how you did it.

C. Draw what you would see if you looked at the right view of each structure. Explain how you did it.

Reflecting

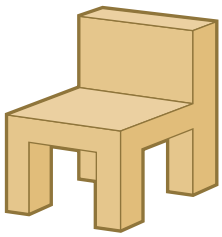
D. Why do the different views of a cube structure not always show the same number of cubes?

E. Can two cube structures have the same front view but different side views? Build models to help you explain.

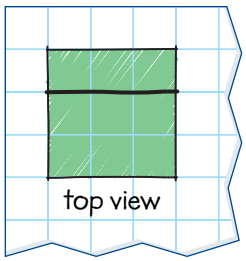
WORK WITH the Math

Example 1 | Drawing views of a cube structure

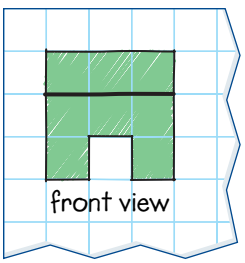
Nolan made a model of a chair using linking cubes. How can he represent the top, front, and right views of his structure?



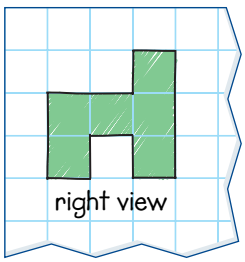
Nolan's Solution



To draw the top view, I looked down at the structure from directly above. To represent what I saw, I drew a 3-by-3 square. The top is not really a square, though. I drew a darker line to show where the surface changes in depth.



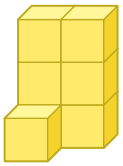
I repeated this for the front view. I represented what I saw when I looked straight at the front of the structure. Then I drew a darker line to show the change in depth.



For the right view, I turned the chair so that I was looking straight at the right side. This view had no change in depth.

A Checking

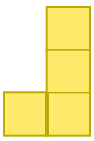
1. This structure is built with 7 linking cubes. Visualize what it will look like from the top, front, and right side. Identify each view below as top, front, or right side.

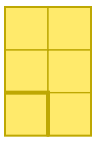


right

front

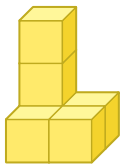
a) 

b) 

c) 

B Practising

2. **a)** Build this structure with linking cubes.
b) Rotate your structure so you can see the top, front, and right views.
c) Draw each view, using a thick line to indicate a change in depth.

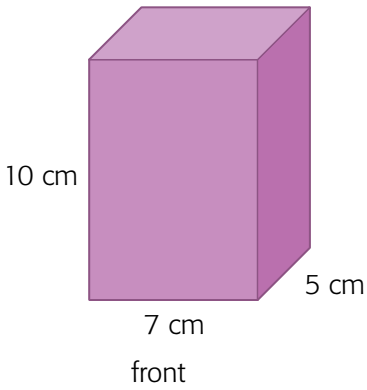


right

front

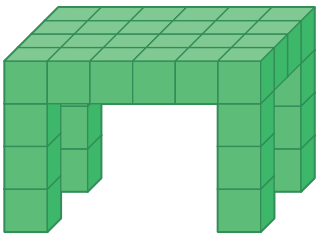
3. Make a rectangular prism out of linking cubes. Draw the top, front, and side views.

4. What would the top, front, and side views of this prism look like? Explain how you know.



5. **a)** Use up to 20 linking cubes to make an airplane that looks different from the top, front, and sides.
b) Draw the top, front, and right views of the airplane.

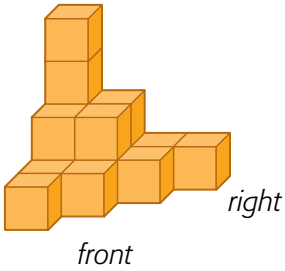
6. Draw and label three different views of the table.



7. **a)** Build this structure with linking cubes.

b) Rotate your structure so you can see the top, front, and right views.

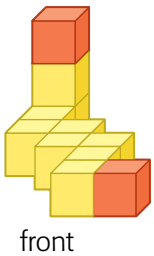
c) Draw each view, using a thick line to indicate a change in depth.



8. **a)** Build this structure with linking cubes.

b) Draw the top, front, right, and left views of the structure.

c) If you take away the red cubes, which views would look different? How would they be different?



9. Look at the structure in question 8.

a) How could you add a cube so only the top view does not change?

b) How could you add a cube so the number of depth lines is the same in both the left and right views?

10. How are the top, front, and side views of a rectangular prism alike?

11. Can you always tell how many cubes are used in a structure if you know the top, front, and right views? Explain.