

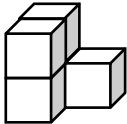
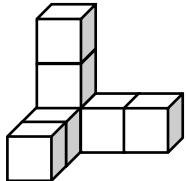














First Name: _____	Last Name: _____	Grade: _____
Teacher: _____	Parent's email: _____	

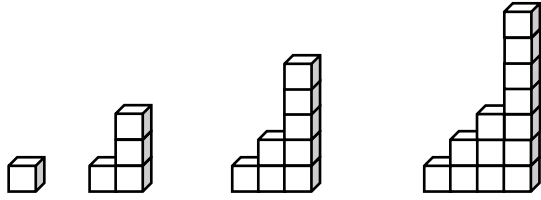
## Playing with Blocks

Welcome to Math Challenge #10. This time, we're diving into the world of blocks and cubes, where math meets imagination. Get ready to stack, build, and explore as we solve problems inspired by construction, patterns, geometry, and spatial reasoning. Whether it's building towering structures, uncovering hidden patterns, or tackling tricky puzzles, this challenge will keep your mind sharp and your creativity flowing. Let's start playing with math—one block at a time!

**Kinder & First Grade: solve at least 3 problems.**  
**Second & Third Grade: solve at least 7 problems.**  
**Fourth Grade and above: solve at least 12 problems.**

	<i>Answer</i>
<p>1.  Vedah is playing with blocks. She stacks them as shown in the picture. How many blocks did she use?</p>	
<p>2. Ronald would like to stack blocks to make a tower like in the picture on the right. He has only 4 blocks. How many more blocks does he need?</p> 	
<p>3. Tom arranges blocks to form a pattern:</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;"> <i>Figure 1</i></div> <div style="text-align: center;"> <i>Figure 2</i></div> <div style="text-align: center;"> <i>Figure 3</i></div> <div style="text-align: center;"> <i>Figure 4</i></div> <div style="text-align: center;">? <i>Figure 5</i></div> </div> <p>How many blocks will Tom use in the next figure?</p>	
<p>4. Siuyin is building a tower using a number of blocks. Each layer of the tower uses 4 blocks. She needs to build a tower with 6 layers. If Siuyin has 18 blocks, how many additional blocks does she need to complete building the tower?</p>	
<p>5. If each pattern continues, how many blocks are there in the next figure?</p> <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="width: 45%;"> <p>a.  <i>Figure 1</i></p> <p> <i>Figure 2</i></p> <p> <i>Figure 3</i></p> <p> <i>Figure 4</i></p> <p>?</p> </div> <div style="width: 45%; text-align: right;"> <p><i>a.</i></p> <p><i>b.</i></p> </div> </div> <div style="display: flex; justify-content: space-between; align-items: flex-end; margin-top: 10px;"> <div style="width: 45%;"> <p>b.  <i>Figure 1</i></p> <p> <i>Figure 2</i></p> <p> <i>Figure 3</i></p> <p> <i>Figure 4</i></p> <p>?</p> </div> <div style="width: 45%; text-align: right;"> <p><i>b.</i></p> </div> </div>	

6. Raina builds towers using blocks to form a pattern:

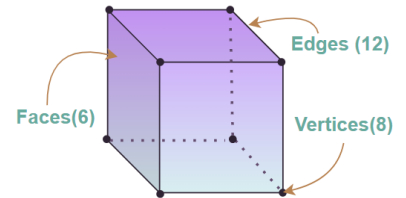


How many blocks will Raina use in the next tower?

**What is a Cube?**

A cube is a solid shape with six square faces. The blocks mentioned in questions 1 through 6 are examples of cubes. **Each square face has the same side length and therefore all the faces are the same size.**

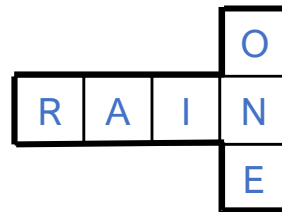
A cube has 12 congruent edges and 8 vertices. Each vertex refers to a corner where three edges of a cube meet. You must have seen 3 × 3 Rubik’s cubes, which is the most common example of a cube in real-life. Other real-life examples include 6-sided dice, sugar cubes, square tissue boxes, etc.



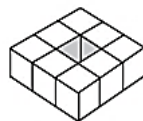
7. A single cube has 6 faces. If you place one cube on the table, there will be 5 faces that are visible.
- If you stack two cubes on top of each other and place them on the table, how many faces are visible?
  - If you line up three cubes side by side in a straight line and place them on the table, how many faces are visible?

a.  
b.

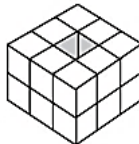
8. The figure at the right is cut out along the thick lines and folded on the thin inner lines to form a cube. Which letter will be on the face of the cube opposite the letter N?



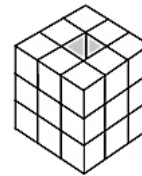
9. Study the following design of a well. Each was built using cubes. How many cubes are needed for an 8-layer well?



This well uses 8 cubes

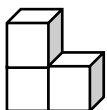


This well uses 16 cubes



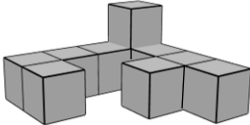
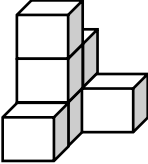
This well uses 24 cubes

10. Marissa glued 3 cubes together (as shown in the picture). She then painted **all** surfaces with blue paint. How many faces did she paint?



Registration for **2025 Math Challenge Tournament**® and locations information can be found at:  
<https://www.ellipsisacademy.com/2025-mct-students-registration.html>.

For tournament format, levels/divisions, and sample problems, please visit [2025 Math Challenge Tournament](#).

11.		How many more cubes are needed to make a large cube that is 4 cubes in length?	
12.		The figure below is made of 7 cubes glued together. If the figure is dipped in a bucket of blue paint and allowed to dry, how many square faces will have paint on them?	
13.	Peter has 12 identical cubes. He needs to arrange them to form rectangular prisms. How many unique rectangular prisms can he build? Note that a $1 \times 1 \times 12$ rectangular prism is the same as a $1 \times 12 \times 1$ rectangular prism.		
14.	A cube with dimensions $4 \times 4 \times 4$ is made up of 64 smaller unit cubes. The entire center, which is 2 blocks thick in all directions, is removed, leaving only the outer layer. How many smaller cubes remain?		
15.	<p>A large cube with a side length of 12 cm is made up of smaller cubes, each with a side length of 3 cm.</p> <p>a. How many smaller cubes are there in total?</p> <p>b. If the large cube is painted on all its faces, how many smaller cubes will have paint on exactly 2 faces?</p>	<p>a.</p> <p>b.</p>	
16.	Two cubes are connected by one face. Each cube has a side length of 5 cm. What is the total surface area of the combined shape?		
17.	A rectangular prism has dimensions of $8 \text{ cm} \times 5 \text{ cm} \times 3 \text{ cm}$ . Amiya paints all faces of the prism. How much paint would she need to cover the rectangular prism if $1 \text{ cm}^2$ requires 0.5 ml of paint?		
18.	A box has dimensions of $24 \text{ cm} \times 18 \text{ cm} \times 12 \text{ cm}$ . Cubes with a side length of 3 cm are used to completely fill the box. How many cubes fit in the box?		

*Solution is available on February 21, 2025*  
[www.mathinaction.org](http://www.mathinaction.org)

Registration for Math Challenge Tournament® and locations information can be found at:  
<https://www.ellipsisacademy.com/2025-mct-students-registration.html>.  
**Don't miss it. Registration will close on March 4, 2025.**