

Cube Count Check

Decide whether each claim counts every cube in a prism.

MA.5.GR.3.1 "Explore volume as an attribute of three-dimensional figures by packing them with unit cubes without gaps. Find the volume of a right rectangular prism with whole-number side lengths by counting unit cubes."

NAME _____

DATE _____

COUNTS EVERY CUBE

Use this category when the claim includes all the unit cubes in every layer of the prism.

A prism is 7 cubes long, 3 cubes wide, and 2 cubes high. Claim: It contains 42 unit cubes.

MISSES CUBES

Use this category when the claim leaves out cubes, such as cubes in other layers.

A prism has a 6-by-4 base and 2 layers. Claim: It has 24 unit cubes because one layer has 24 cubes.

1 SORT 8 items

Circle COUNTS or MISSES for each claim; for PROVE IT, choose two items and explain how you knew whether each claim counted every unit cube.

- | | | | |
|-------|---|---------------|---------------|
| 1. | A prism has a 2-by-5 base and 3 layers. Claim: It has 30 unit cubes. | COUNTS | MISSES |
| <hr/> | | | |
| 2. | A prism is 4 cubes long, 3 cubes wide, and 2 cubes high. Claim: It has 24 unit cubes. | COUNTS | MISSES |
| <hr/> | | | |
| 3. | A prism has a 3-by-4 base and 2 layers. Claim: It has 12 unit cubes because one layer has 12 cubes. | COUNTS | MISSES |
| <hr/> | | | |
| 4. | A prism is 5 cubes long, 2 cubes wide, and 4 cubes high. Claim: It has 40 unit cubes. | COUNTS | MISSES |
| <hr/> | | | |
| 5. | A prism is 3 cubes long, 5 cubes wide, and 2 cubes high. Claim: It has 10 unit cubes because $3 + 5 + 2 = 10$. | COUNTS | MISSES |
| <hr/> | | | |
| 6. | A prism has a 4-by-4 base and 3 layers. Claim: It has 16 unit cubes. | COUNTS | MISSES |
| <hr/> | | | |
| 7. | A prism has a 2-by-6 base and 4 layers. Claim: It has 48 unit cubes. | COUNTS | MISSES |
| <hr/> | | | |
| 8. | A prism is 3 cubes long, 2 cubes wide, and 5 cubes high. Claim: It has 30 unit cubes. | COUNTS | MISSES |

2**PROVE IT**

Explain your thinking

Pick two items from Part 1. For each one, tell how you knew where it belonged.

ITEM # _____ **HOW I KNEW** _____

ITEM # _____ **HOW I KNEW** _____

3**MAKE YOUR OWN**

One of each

Write one new COUNTS claim and one new MISSES claim about unit cubes in a right rectangular prism.

COUNTS

MISSES

CHALLENGE

A prism has a 7-by-2 base and contains 56 unit cubes. How many layers high is the prism? Explain how you know.

PART 1 • SORT

#	ITEM	CATEGORY	WHY
1	A prism has a 2-by-5 base and 3 layers. Claim: It has 30 unit cubes.	COUNTS	$2 \times 5 \times 3 = 30$, so the claim counts all cubes.
2	A prism is 4 cubes long, 3 cubes wide, and 2 cubes high. Claim: It has 24 unit cubes.	COUNTS	$4 \times 3 \times 2 = 24$, so the claim counts all cubes.
3	A prism has a 3-by-4 base and 2 layers. Claim: It has 12 unit cubes because one layer has 12 cubes.	MISSES	The claim counts one 12-cube layer but misses the second layer. The total is 24.
4	A prism is 5 cubes long, 2 cubes wide, and 4 cubes high. Claim: It has 40 unit cubes.	COUNTS	$5 \times 2 \times 4 = 40$, so the claim counts all cubes.
5	A prism is 3 cubes long, 5 cubes wide, and 2 cubes high. Claim: It has 10 unit cubes because $3 + 5 + 2 = 10$.	MISSES	Adding side lengths does not count cubes. The prism has $3 \times 5 \times 2 = 30$ cubes.
6	A prism has a 4-by-4 base and 3 layers. Claim: It has 16 unit cubes.	MISSES	16 is the number of cubes in one layer. Three layers contain 48 cubes.
7	A prism has a 2-by-6 base and 4 layers. Claim: It has 48 unit cubes.	COUNTS	$2 \times 6 \times 4 = 48$, so the claim counts all cubes.
8	A prism is 3 cubes long, 2 cubes wide, and 5 cubes high. Claim: It has 30 unit cubes.	COUNTS	$3 \times 2 \times 5 = 30$, so the claim counts all cubes.

PART 2 • PROVE IT

Accept any explanation that names the deciding feature from the rule box for the chosen item.

PART 3 • MAKE YOUR OWN (SAMPLE ANSWERS)

- **COUNTS:** A prism has a 6-by-3 base and 5 layers. Claim: It has 90 unit cubes.
- **MISSES:** A prism is 8 cubes long, 2 cubes wide, and 3 cubes high. Claim: It has 16 unit cubes because one layer has 16 cubes.

Challenge: The prism is 4 layers high. Each layer has $7 \times 2 = 14$ cubes, and $56 \div 14 = 4$.

For PROVE IT, accept explanations that multiply the base dimensions and number of layers, or count cubes in one layer and then count all layers. A correct explanation for MISSES must identify the cubes or layers left out.