MATHEMATICS · GRADES 4-6

Area versus volume

Difficulty level: Intermediate

Mathematics: Grades 4-6

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Overview of the concept

This is how you tell the difference between covering a flat surface and filling a space. Painting a wall is area, filling a box or a fish tank is volume, and the two need different amounts and different units. Mixing them up is how you end up buying paint when you needed soil, or soil when you needed paint.



Rule

Area versus volume: area covers a flat surface, in square units. Volume fills a space, in cubic units.

Area is length × width. Volume is length × width × height. A flat surface needs area, a space to fill needs volume.

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Worked examples

EXAMPLE 1

Q Painting a wall: area or volume?

SOLUTION

Wall is a flat surface

Area: length × width

Painting uses area (units^2)

A wall is a flat surface with no depth to fill.

Covering it needs area: length × width.

Units: units^2

EXAMPLE 2

Q Filling a tank: area or volume?

SOLUTION

Tank is a space to fill

Volume: length × width × height

Filling uses volume (units^3)

A tank is a space with length, width, and height.

Filling it needs volume: length × width × height.

Units: units^3

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Practice questions

1 Wrapping a box uses area or volume?

- A Area (surface area)
- B Volume

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2 Filling a box uses area or volume?

- A Area
- B Volume

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3 What is the area of a 5 cm by 4 cm rectangle?

- A $9\ cm^2$
- B $20\ cm^2$
- C 20 cm
- D $18\ cm^2$

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4 What is the volume of a 5 cm by 4 cm by 3 cm box?

- A $20\ cm^3$
- B $60\ cm^2$
- C $60\ cm^3$
- D $120\ cm^3$

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5 What unit is area measured in?

- A cm
- B cm^2
- C cm^3
- D m^2

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6 What unit is volume measured in?

- A cm^2
- B cm
- C cm^3
- D m^3

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7 Which of these needs volume?

- **A** Painting a wall
- **B** Filling a pool
- **C** Wrapping a gift
- **D** Tiling a floor

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8 A box has length 5 cm, width 2 cm and height 3 cm. Which multiplication gives its volume?

- **A** 5 + 2 + 3
- **B** 5 × 2
- **C** 5 × 2 × 3
- **D** 5 × 3

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9 **Which rectangle has the bigger area: 4 cm by 5 cm, or 3 cm by 7 cm?**

- A 4 cm by 5 cm
- B 3 cm by 7 cm
- C They are equal
- D Cannot tell

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10 **Which is larger: the volume of a 2 cm by 2 cm by 2 cm cube, or a 3 cm by 3 cm by 1 cm box?**

- A The 2 cm cube
- B The 3 cm by 3 cm by 1 cm box
- C They are equal
- D Cannot tell

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ANSWER KEY

1. Area (surface area)

2. Volume

3. 20 cm^2

4. 60 cm^3

5. cm^2

6. cm^3

7. Filling a pool

8. 5 × 2 × 3

9. 3 cm by 7 cm

10. The 3 cm by 3 cm by 1 cm box

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