



# Helping With Math

**USA**  
GRADES

## Surface Area of a Cube

*Suitable for students*  
**aged 10-12**



This pack is suitable for learners aged 10-12 years old or 6th to 7th grades (USA). The content covers fact files and relevant basic and advanced activities involving surface area of a cube.



**Every 24th day of January is International Education Day.**



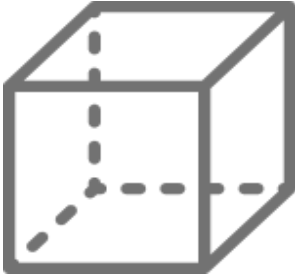
The United Nations General Assembly proclaimed 24 January as International Education Day.

- This event marks the importance of education in achieving national development and world peace.
- As of 2021, 258 million children and youth do not attend school
- Twice the number of it has difficulty in reading and calculation.



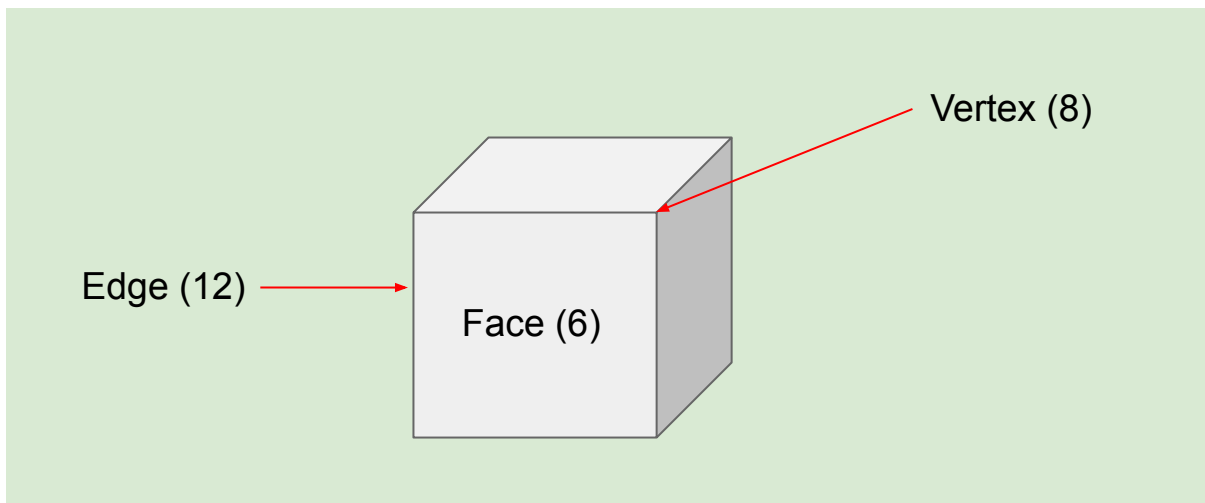
## CUBE AS A SOLID FIGURE

**Solid figures** are three-dimensional objects with length, width, and height. Some of the commonly recognized solid shapes are cube, pyramid, prisms, cone, sphere, etc.



- A cube is a solid figure with six square faces.
- All the sides of a cube are equal in length.
- Cube is also a regular hexahedron and is part of platonic solids.

### Cube



- It has twelve edges — a common boundary shared by the faces of a cube.
- It has eight vertices — the point where three edges meet.



## SURFACE AREA OF A CUBE

### Surface Area

It is a measure of the total area that the surface of the object occupies.

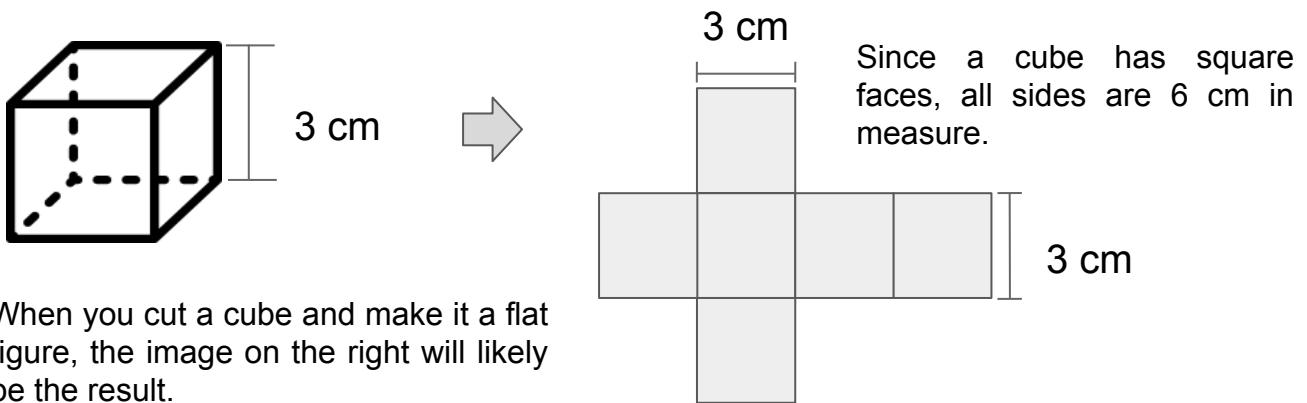
To calculate the surface area of a cube, the formula is:

$$\mathbf{SA}_{\text{cube}} = 6s^2 \quad \text{where } s \text{ is the length of the side of a cube.}$$

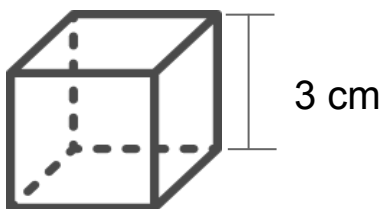
The surface area of a cube is the product of the square of side length and six.

## ILLUSTRATIVE EXAMPLES

Examples: Calculate the surface area of the following solid figures.



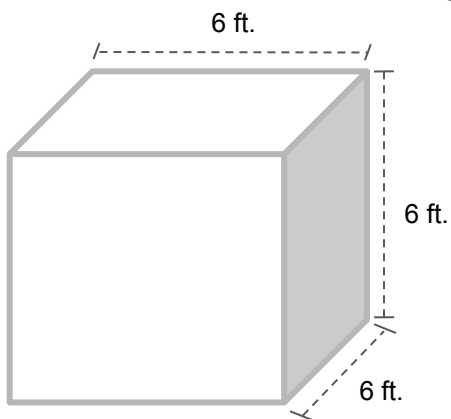
To solve for the cube's surface area use the formula  $S.A. = 6s^2$ ,



$$\begin{aligned} S.A. &= 6(3 \text{ cm})^2 \\ &= 6(9 \text{ cm})^2 \\ &= \mathbf{54 \text{ cm}^2} \end{aligned}$$



## ILLUSTRATIVE EXAMPLES



Solve for the surface area of the given cube.

To solve for the cube's surface area use the formula  $S.A. = 6s^2$ ,

$$\begin{aligned} S.A. &= 6(6 \text{ ft}) \\ &= 6(36 \text{ ft}^2) \\ &= \mathbf{216 \text{ ft}^2} \end{aligned}$$

## Finding the side length of a cube using its surface area

The surface area of a cube is  $96 \text{ cm}^2$ . What is its side length?

$$SA \text{ of a cube} = 6s^2$$

$$96 \text{ cm}^2 = 6s^2$$

$$\frac{96 \text{ cm}^2}{6} = \frac{\cancel{6}s^2}{\cancel{6}}$$

$$16 \text{ cm}^2 = s^2$$

$$\sqrt{(16 \text{ cm})^2} = \sqrt{s^2}$$

$$\mathbf{4 \text{ cm} = s}$$

Draw the given cube here. Make sure to include its dimension.



# TABLE OF ACTIVITIES

Ages 10-11 (Basic)		6th Grade
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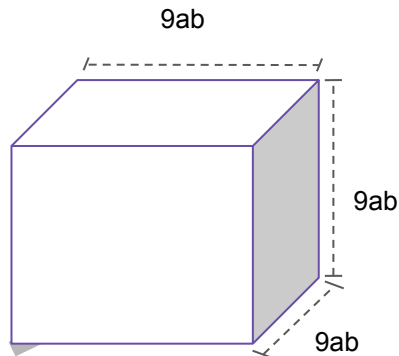


# FIRST DAY OF SCHOOL

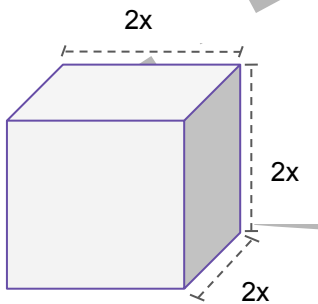
G6  
Basic

James is very excited about his first day as a 6th grade learner. While traveling to school, he saw a few empty boxes. He now wonders about the surface area of those boxes. Can you help him feed his curiosity?

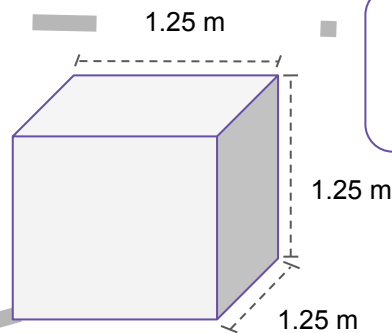
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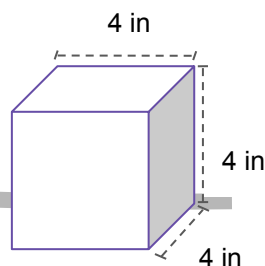
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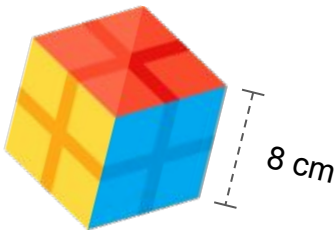
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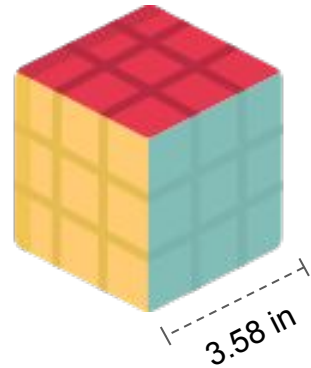
# RUBIK'S CUBE ROOM

G6  
Basic

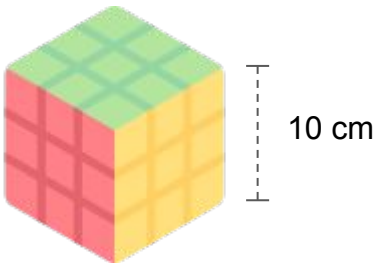
The Rubik's Cube can be used to study fractions, ratios, and proportional reasoning. This makes it a good object to engage students in learning mathematics. The following are different sizes of Rubik's cubes. Solve for their surface area.



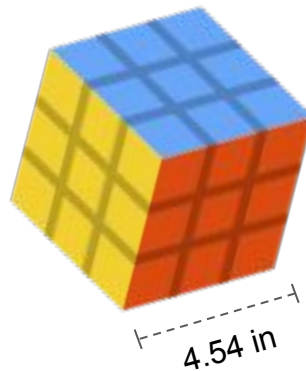
1.



3.



2.



4.



*Rubik's cube original name was "Magic Cube" when it was released in 1974.*



Math develops our minds to think logically and solve problems creatively. Using the perimeter of a cube's face, solve for its surface area.

1.  $P = 24 \text{ cm}$

2.  $P = 52 \text{ in}$

3.  $P = 300 \text{ mm}$

4.  $P = 128 \text{ in}$

5.  $P = 8a \text{ units}$

6.  $P = 195c \text{ units}$

7.  $P = 40.26 \text{ cm}$

8.  $P = 0.95 \text{ m}$





Because of a pandemic, children all over the world diverted to online learning so that education will continue. Show that online learning can help us study math by solving the following word problems below.

1. The surface area of a cube is  $864 \text{ cm}^2$ . What is the length of its edges? What is the perimeter of its faces?

2. The surface area of a cube is  $1944 \text{ cm}^2$ . What is the length of its edges? What is the perimeter of its faces? Draw the given cube with its dimensions.

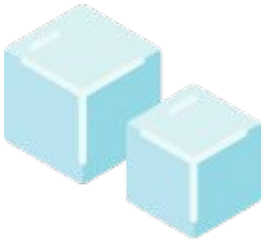


# ICE MATH, ICE MELT

G6  
Basic

The essence of education is to apply your learning to solve real-life problems. Use your understanding of the surface area to solve the problem below.

Suppose two ice cubes that differ in size were left on a room-temperature plate. The smaller ice cube has a side length of 3.57 cm while the larger one is 4.86 cm.



- Using a ruler and pen, sketch the given ice cubes. Make sure to include its dimensions.
- Compute for the surface area of the two ice cubes.
- In each minute, the ice cube melts, and each cubic cm turns to water. How long will the two cubes completely turn into water separately?

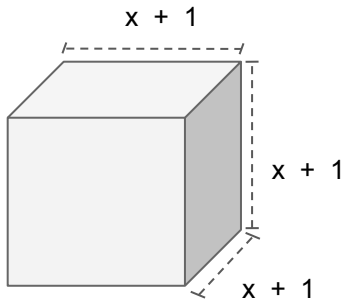


# ALGEBRA AND GEOMETRY

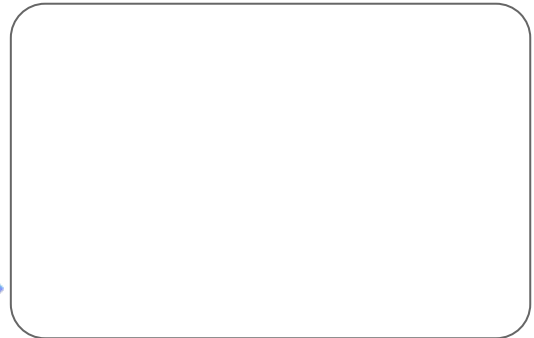
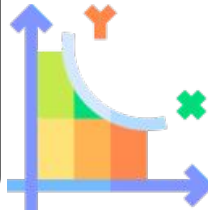
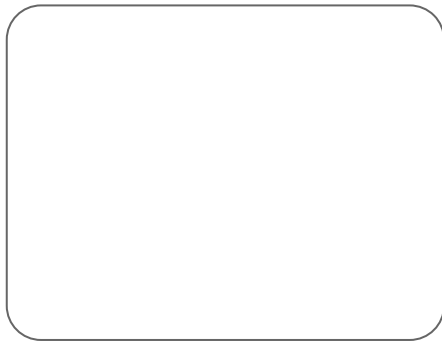
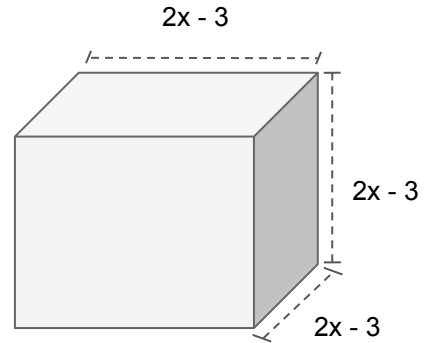
G7  
Advanced

This International Day of Education, show your math ability in Algebra and Geometry by solving these series of questions.

1.



2.



3. The volume of a certain cube is 13824 cubic inches. What is its surface area?

4. The distance of two vertices in a cube is 14.5 in. What is its surface area?

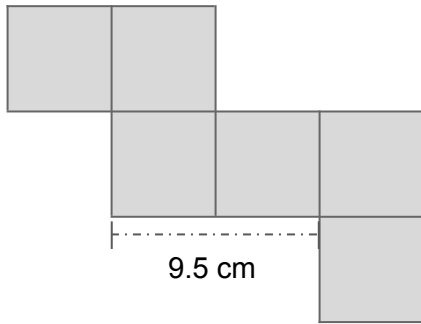


# GEOMETRIC NETS

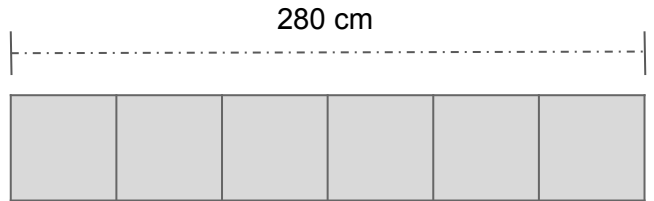
G7  
Advanced

Let's expand our learning about surface area by answering geometric net-related problems. Can each given net form a cube? If it is, solve for its surface area.

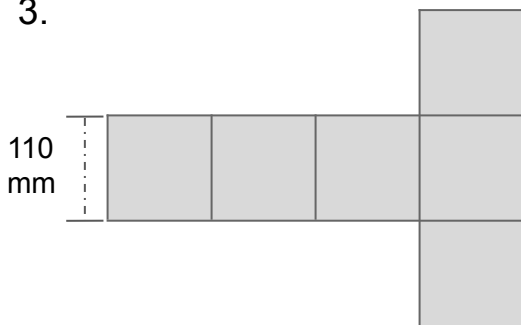
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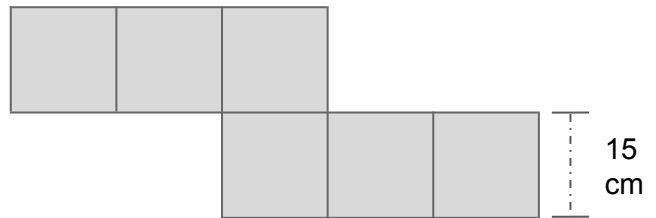
2.



3.



4.



1.

2.

3.

4.



# GETTING AN A

G7  
Advanced

Apply your understanding of the surface area of a cube to answer the following questions. Do everything you can to get an A!

1. The edge of a cube is 5 more than twice a certain value. Find its surface area.

2. A cube has a side length of 250 mm. What is its surface area in  $\text{cm}^2$  ?



3. If the computed surface area of a cube is 1014 in<sup>2</sup>, how long is its edge?

4. How large the surface area will become if the edge of a cube is doubled?

**Bonus question:** How will you differentiate surface area, lateral area, and volume?



# INTERNATIONAL DAY OF EDUCATION GIFTS

G7  
Advanced

The following boxes are giveaways in celebration of International Day of Education. How much gift wrapper is needed to enclose it?

The gift box has a side length of  $(3x + 10)$  cm. The larger one is  $(3x+20)$  cm.

- Sketch the given cube.
- Sketch its equivalent geometric net
- Solve for its surface area



# GOT A CUBE!

G7  
Advanced

**This task requires you to find objects that are education-related. Measure its sides. Sketch it with the given dimensions (scale drawing) , and compute for its surface area.**



# ANSWER GUIDE

## Activity 1

1. 96 sq. in
2. 9.375 or 9.38 sq m
3.  $24x^2$  units
4.  $486a^2b^2$  units

## Activity 2

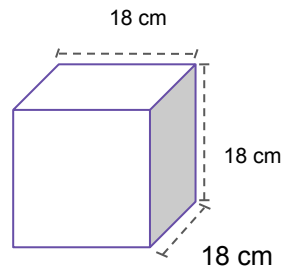
1. 384 sq. cm
2. 600 sq cm
3. 76.89 or 76.9 sq in
4. 123.67 sq. in

## Activity 3

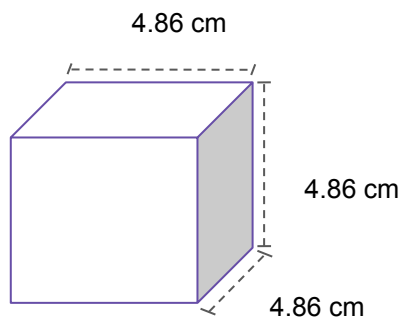
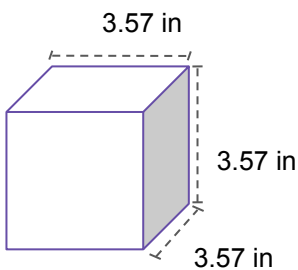
1. 96 sq cm
2. 1014 sq in
3. 33750 sq mm
4. 6144 sq in
5.  $12a^2$  sq units
6.  $14259.38c^2$  sq units
7. 607.83 sq cm
8. 0.34 sq m

## Activity 4

1. Length of the edge = 12 cm, perimeter is 48 cm
2. Length of the edge = 18 cm, perimeter is 72 cm



## Activity 5



- a. 76.47 sq in and 141.72 sq in
- b. 76.47 sq in and 141.72 sq in
- c. 45.5 mins and 114.79 mins





# ANSWER GUIDE

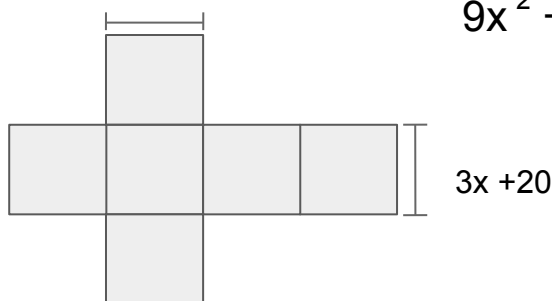
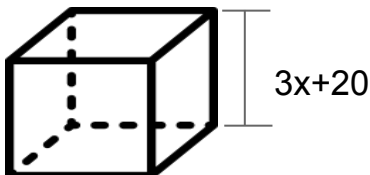
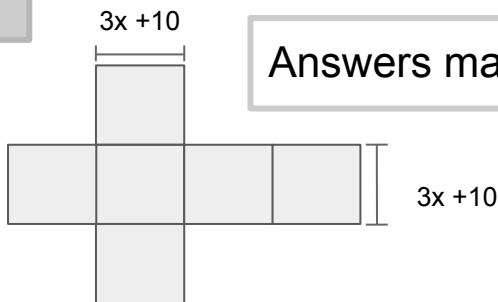
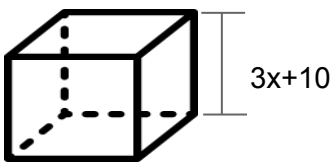
## Activity 6

1.  $6x^2 + 12x + 6$  sq. units
2.  $24x^2 - 72x + 54$  sq. units
3. 3456 sq. in
4. 1251.5 sq in

## Activity 7

1. Yes, it can form a cube. Its surface area is 541.5 sq cm
2. No, it cannot form a cube.
3. Yes, it can form a cube. Its surface area is 72600 sq mm
4. Yes, it can form a cube. Its surface area is 1350 sq cm

## Activity 9



## Activity 8

1.  $6x^2 + 60x + 150$  sq. units
2. 3750 sq cm
3. 13 in
4. The surface area is 4 times larger.

Bonus: The total surface area of a solid is the sum of the areas of all of the faces or surfaces that enclose the solid. The lateral surface area of a solid is the surface area of the solid without the bases. Volume is the number of cubic units that a solid shape can handle.

## Activity 10

Answers may vary.

$$\begin{aligned} \text{c. } & 9x^2 + 60x + 100 \\ & 9x^2 + 120x + 400 \end{aligned}$$



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