

Area and Perimeter Prior Assessment Questions 11 and 12

Objective: I understand the squared and cubed signs and can calculate the answers.

Teacher Input Ideas:

Children need to understand why there is a need for the squared and cubed signs and the meaning of these. Children should not just be taught how to work sums when these symbols are used, but discover independently.

Place squared paper or 1cm cubes on the table for the children to explore. Ask the children to make a square using the squared paper any size they would like (you may want to limit to 12 squares in length). Ask the children what they know about squares and what makes them special. Discuss what size squares the children have made. Ask the children for suggestions of how they can work out how many squares altogether they have inside the shape. Discuss that this is finding the area. So, if I had a 4 by 4 square there would be 16 squares inside as there are 4 rows of 4 squares to make a square. You may want to model this with squared paper. All squares must have the same length and sides. So, if you see 3 squared, show symbol, it means to make a square. So, times 3 by itself. You could work through children's examples and together record different squared numbers, the calculation and then the answer in a table.

Now ask the children to make a cube with the cm cubes. Ask the children what they notice? How have they made a cube? How is a cube different to a cuboid? Children to share the models they have made and discuss how the children can find the volume of this using knowledge from the volume lesson. Show the children the cubed sign. What do you think this means? How will we be able to find 4 cubed? Repeat again exploring the calculation that is required and ensuring that the children can explain why.

Practice Activities

Purple Practice: Most suited for children who made errors in question 11 and 12 of the prior learning assessment and require further support with using the formula.

The blocks in this activity can be cut up so that the children can match the sum with the answer. Encourage the children to work out the answer rather than just guessing. If the children are finding this difficult, they may want to use squared paper and cubes initially, however promote the use of the formulas or drawing images so that the children have strategies to work this out without practical equipment.

The children will need to apply their knowledge of \times tables, mental strategies of doubling and written multiplication strategies to find out some trickier cubed answers.

Green Practice: Most suited for children who made errors in Question 11 or 12 and need to further secure methods to work out squared and cubed equations.

The children to select a block and work out the answer for this. The children should be able to use the formula and their knowledge of \times table facts to work out the answers. The children should also be encouraged to apply written multiplication strategies to find out some trickier cubed answers. You may want the children to make a model or draw an image for 5 examples. The children can use these images/model to help to explain to others the calculation they are using and why.

Yellow Practice Most suited for children who demonstrate confidence in using the squared and cubed symbols and would benefit from applying other skills.

This activity also appears in the division unit for order of operations. This activity could be provided to the children to see if they understand and can apply the order of operation rule as well as using the cubed and squared symbol.

Alternatively, the children should be given the green activity and then asked to find the highest number that can be cubed under 10,000. Hopefully the children will use their knowledge of other cubed facts to help. Encourage the children to think about sensible starting points.

Mastery the children are given the opportunity to apply their knowledge of the symbols, problem solve and reason in this activity.

The children should suggest sensible starting points for answering the first question. Some children may use their knowledge of squared/cubed numbers and use a trial and improvement strategy. Some children may work systematically, by listing the facts in order and trying different combinations.

For the second task the children are to explore if the statements are true or false by testing their own ideas of squared and cubed numbers. Encourage the children to use their calculations or any images/jottings to prove to others that the statement is true or false.

Answers:

Purple:

3 squared = 9

6 squared= 36

8 squared =64

9 squared=81

1 cubed = 1

2 cubed = 8

4 cubed = 64

5 cubed= 125

9 cubed= 729

Green:

3 squared = 9

5 squared= 25

6 squared = 36

7 squared = 49

8 squared= 64

9 squared= 81

12 squared = 144

1 cubed = 1

2 cubed= 8

4 cubed = 64

5 cubed= 125

7 cubed= 343

9 cubed= 729

12 cubed= 1728

13 cubed= 2197

Yellow:

1) 0

2)82

3) 21

4) 28

5) 18

6) 82

7) 99

8) 78

9) 70

10) 26

11) 18

12) 81

Mastery:

1) 9_2 and 2_3

or 5_2 and 4_3

2) a) true

b) true

c) false

d) false

Purple Practice

Lo: I recognise the squared and cubed symbols and can suggest how I can find the answer.

Pick a purple brick and work out the answer to this. Find the corresponding green brick.

$$1^3$$

$$9^2$$

$$2^3$$

$$6^2$$

$$8^2$$

$$5^3$$

$$3^2$$

$$9^3$$

$$4^3$$

$$729$$

$$9$$

$$64$$

$$36$$

$$81$$

$$1$$

$$125$$

$$8$$

$$64$$

Lo: I can calculate the answer to the sum when I see the cubed or squared sign.

Choose a block to pick. Work out the answer. Pick 5 questions to prove the answer with an image or a model to a friend.

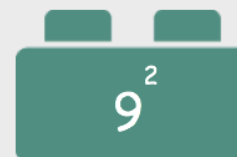
A dark teal rectangular block with two smaller teal tabs on top. It contains the mathematical expression 3^2 in white text.

A dark teal rectangular block with two smaller teal tabs on top. It contains the mathematical expression 5^2 in white text.

A dark teal rectangular block with two smaller teal tabs on top. It contains the mathematical expression 6^2 in white text.

A dark teal rectangular block with two smaller teal tabs on top. It contains the mathematical expression 7^2 in white text.

A dark teal rectangular block with two smaller teal tabs on top. It contains the mathematical expression 8^2 in white text.

A dark teal rectangular block with two smaller teal tabs on top. It contains the mathematical expression 9^2 in white text.

A dark teal rectangular block with two smaller teal tabs on top. It contains the mathematical expression 12^2 in white text.

A dark teal rectangular block with two smaller teal tabs on top. It contains the mathematical expression 1^3 in white text.

A dark teal rectangular block with two smaller teal tabs on top. It contains the mathematical expression 2^3 in white text.

A dark teal rectangular block with two smaller teal tabs on top. It contains the mathematical expression 4^3 in white text.

A dark teal rectangular block with two smaller teal tabs on top. It contains the mathematical expression 5^3 in white text.

A dark teal rectangular block with two smaller teal tabs on top. It contains the mathematical expression 7^3 in white text.

A dark teal rectangular block with two smaller teal tabs on top. It contains the mathematical expression 9^3 in white text.

A dark teal rectangular block with two smaller teal tabs on top. It contains the mathematical expression 12^3 in white text.

A dark teal rectangular block with two smaller teal tabs on top. It contains the mathematical expression 13^3 in white text.

Yellow Practice

LO: I use the order of operations rule to help me to calculate the answer to sums.

Look at the sums on each block. Use your knowledge of the order of operations to help you calculate the answers.

1)

$$3 - 9 \div 3 =$$

2)

$$67 + 3 \times 5 =$$

3)

$$7 \times 4 - (5+2) =$$

4)

$$6^2 - 2^3 =$$

5)

$$27 - 3 \times 3 =$$

6)

$$9^2 + 1^2 =$$

7)

$$180 - 9^2 =$$

8)

$$80 - 10 \div 5 =$$

9)

$$6 + 4^3 =$$

10)

$$10 + 4 \times 2^2 =$$

11)

$$7 + (2 + 3^2) =$$

12)

$$(7 + 2) \times 3^2 =$$

Challenge:

How are you going to remember the order of operations rule?

Can you create your own song, poem or poster to help you?

1) Fill in the missing boxes to solve the equation:

The equation is presented with three boxes. The first box is purple and contains the number 2. The second box is purple and contains the number 3. The third box is teal and contains the number 89. The boxes are arranged in a row, separated by a plus sign and an equals sign.
$$\boxed{2} + \boxed{3} = \boxed{89}$$

2) Prove if each statement is true or false:

- a) When an odd number is cubed, the answer is always odd.
- b) When an even number is cubed, the answer is always even.
- c) When an even number is squared, the answer can be odd or even.
- d) When an odd number is squared, the answer is always even.