Surface area to volume ratio

Biology calculations | AQA Combined Science 8464 and AQA GCSE Biology 8461 | 12 questions, 39 marks

GCSE science calculations

Scan for the solutions

Equations for this topic (cover this box to practise recalling them)

- surface area of a cube = 6 × (side length)^2 learn this one
- volume of a cube = (side length)^3 learn this one
- surface area : volume ratio = surface area ÷ volume learn this one
- surface area of a cuboid = 2 × (lw + lh + wh) learn this one
- volume of a cuboid = length × width × height learn this one

Name: _____ **Date:** _____ **Score:** _____ **/ 39**

1 In a diffusion practical, Bethany cuts a cube of agar jelly with sides of 2 cm.

a. Calculate the surface area of the cube.

b. Calculate the volume of the cube.

c. Write the surface area : volume ratio in the form n : 1

(3 marks)

Answer _____

2 A cube of potato has sides of 3 cm.

Calculate the surface area : volume ratio of the cube. Give your answer in the form n : 1

(3 marks)

Answer _____

3 A tiny pond organism has a surface area of 150 mm^2, a volume of 25 mm^3 and a mass of 0.03 g.

Calculate its surface area : volume ratio in the form n : 1

(1 mark)

Answer _____

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4 A block of agar is a cuboid that measures 4 cm by 2 cm by 1 cm.

Calculate the surface area : volume ratio of the block. Give your answer in the form n : 1

(3 marks)

Answer _____

5 A single cell is modelled as a cube with sides of 0.02 mm.

a. Write the side length in μm.

b. Calculate the surface area : volume ratio of the cell, using lengths in μm. Give your answer in the form n : 1

(3 marks)

Answer _____

6 A piece of carrot is a cuboid that is 2 cm long, 5 mm wide and 5 mm high.

Calculate its surface area : volume ratio, working in mm. Give your answer in the form n : 1

(3 marks)

Answer _____

7 A model organism has a volume of 64 cm^3. Its surface area : volume ratio is 1.5 : 1

Calculate the surface area of the model.

(2 marks)

Answer _____

8 **Higher tier**

A cube of beetroot has a volume of 125 mm^3.

Calculate the surface area : volume ratio of the cube. Give your answer in the form n : 1

(3 marks)

Answer _____

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9 **Higher tier**

A cube of agar has a total surface area of 216 cm^2.

Calculate the surface area : volume ratio of the cube. Give your answer in the form n : 1

(3 marks)

Answer _____

10 Femi places agar cubes with sides of 1 cm and 4 cm in acid. The acid diffuses into the cubes and changes their colour.

a. Calculate the surface area : volume ratio of the 1 cm cube.

b. Calculate the surface area : volume ratio of the 4 cm cube.

c. How many times bigger is the ratio for the 1 cm cube than for the 4 cm cube?

Give the ratios in the form n : 1. Show your working.

(5 marks)

Answer _____

11 A flatworm is modelled as a cuboid 16 mm long, 8 mm wide and 0.5 mm thick.

a. Calculate the surface area : volume ratio of the flatworm. Give your answer in the form n : 1, with n to 2 significant figures.

b. A different animal with the same volume is modelled as a cube with sides of 4 mm. Calculate its surface area : volume ratio in the form n : 1

Show your working.

(5 marks)

Answer _____

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12 Olivia models a beech leaf as a thin cuboid. The leaf is 6 cm long, 4 cm wide and 0.25 mm thick. Its mass is 0.45 g.

Calculate the surface area : volume ratio of the leaf, working in cm. Give your answer in the form n : 1, with n to 2 significant figures.

Show your working.

(5 marks)

Answer _____

End of questions | Total 39 marks

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