

Chapter Review

Learning Goals

Inquire and Explore: How can you determine the volume of an object?
 How can you use patterning and cubes to describe volume?
 What is the relationship between the surface area and volume of regular solids?

After this section, I can

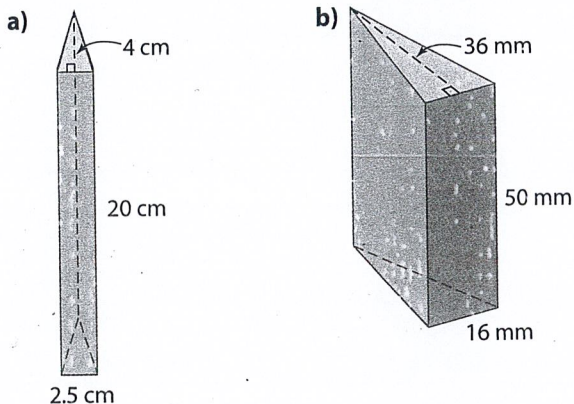
3.1	<ul style="list-style-type: none"> use multiple strategies to determine the cube of a whole number use reason and logic to determine the cube root of a perfect cube
3.2	<ul style="list-style-type: none"> use a variety of strategies to calculate the volume of prisms apply the concept of volume to solve problems involving prisms, cylinders, and composite 3-D objects
3.3	<ul style="list-style-type: none"> explain the relationship between surface area and volume apply the relationship between surface area and volume to solve problems and make conclusions

3.1 Cubes and Cube Roots, pages 72–77

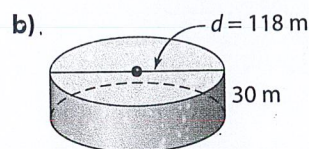
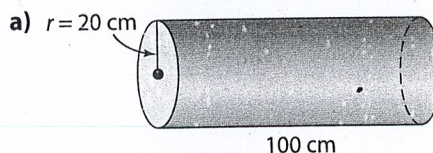
- Determine the value of 8^3 .
- How many centimetre cubes does it take to model 4^3 ? Write a sentence that describes the relationship between the length of the side of a cube and the volume of that cube.
- Use linking cubes to model finding the cube root of 27.
 - Find $\sqrt[3]{216}$ using prime factorization.
 - Use guess and check to find the cube root of the perfect cube 3375.

3.2 Volume of Prisms, pages 78–87

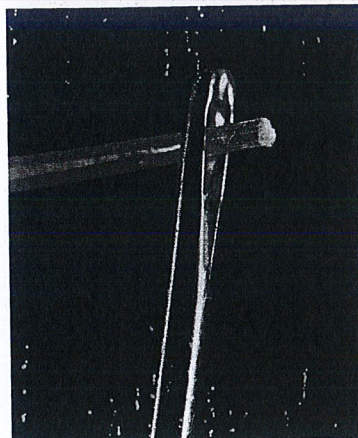
- What is the volume of each right triangular prism?



- What is the volume of each cylinder?

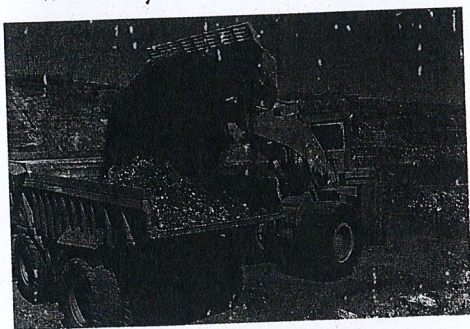


- Fibre optic filaments are very small. For example, an R sensor probe is 152.4 mm long with a diameter of 1.587 mm. What is its volume? Give your answer to the nearest tenth of a cubic millimetre.

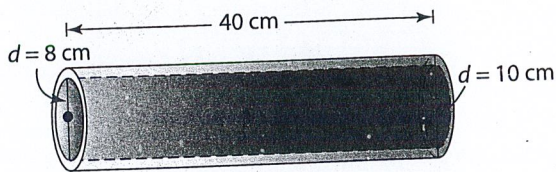


7. On a construction site, the earth is excavated to a depth of 12 m from a rectangular pit measuring 85 m by 54 m. The earth is removed by dump trucks that have a capacity of 42 m^3 of earth, and can transport 5 loads each hour.

- Calculate the total volume of earth being excavated.
- How many truckloads are needed to remove the earth?
- If 4 trucks work non-stop for a 6-h day, how many days will it take to remove all the earth? Express your answer to the nearest whole day.

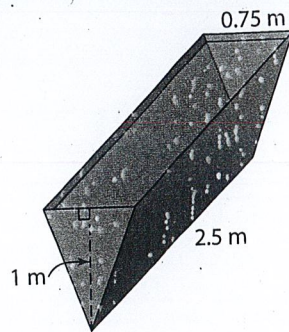


8. A pipe has an outside diameter of 10 cm, an inside diameter of 8 cm, and a height of 40 cm. How much water can fit in the pipe? Round your answer to the nearest tenth of a cubic centimetre.



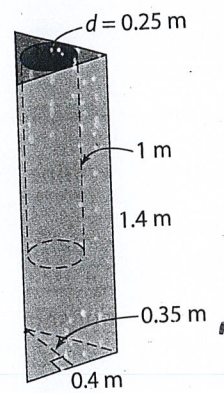
- A cylinder with a radius of 0.28 m and a length of 7 m is being replaced with a cylinder of radius 0.25 m. The volume must remain the same. How long must the new cylinder be? Give your answer to the nearest hundredth of a metre.
- A sheet of paper that is 22 cm by 28 cm can be rolled in two different ways to make a cylinder. Estimate the volume of each cylinder. Use formulas to prove which way produces the larger volume. Show your work.

11. At Wacky Water Park, a large trough fills with water at a rate of 0.6 m^3 per minute. When it is full, it tips over and dumps its contents.



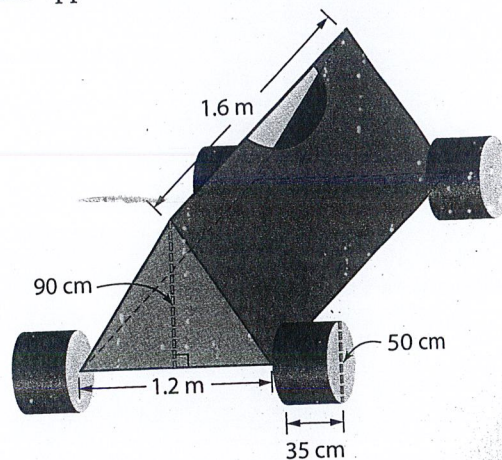
- What is the volume of water when the trough is full?
- How long does it take for the trough to fill with water? Give your answer in minutes and seconds.

12. A clay planter has the shape of a right triangular prism, as shown. There is a cylindrical hole inside the planter.



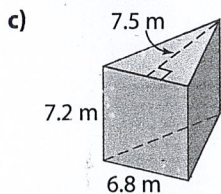
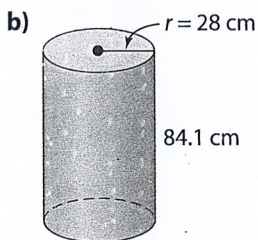
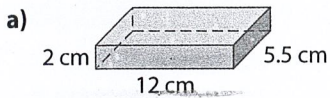
- Calculate the volume of clay needed to make the planter, to the nearest thousandth of a cubic metre.
- The planter is sprayed with a 2-mm thick layer of glaze. How much glaze is needed for the outside of the planter? How much is needed for the inside?

13. Candice competes in go-kart races. Calculate the approximate volume of the go-kart.

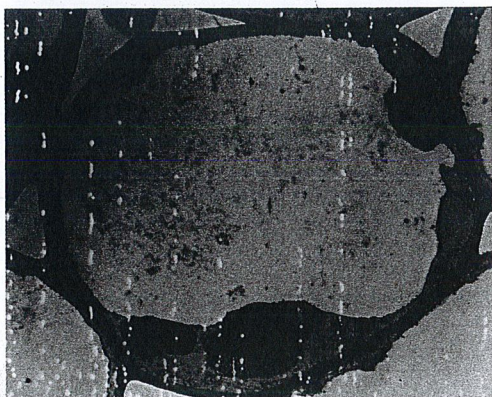


3.3 The Relationship Between Surface Area and Volume, pages 88–93

14. Calculate the surface-area-to-volume ratio of each prism.



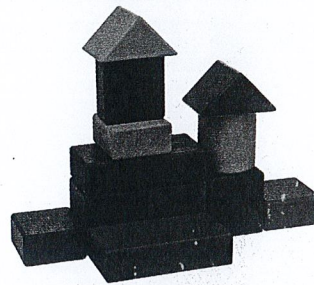
15. Single-celled organisms are very tiny. An amoeba ranges in size from 0.25 mm to 0.75 mm, depending on food supply. Use the relationship between surface area and volume to explain why cells are so small.
16. Plant cells have a large vacuole, or space, that holds waste and water, and that provides structural support for the plant. Use the relationship between surface area and volume to explain why tropical plants often have huge leaves, but cactus plants have thick stems and no leaves.



Connect the Concepts

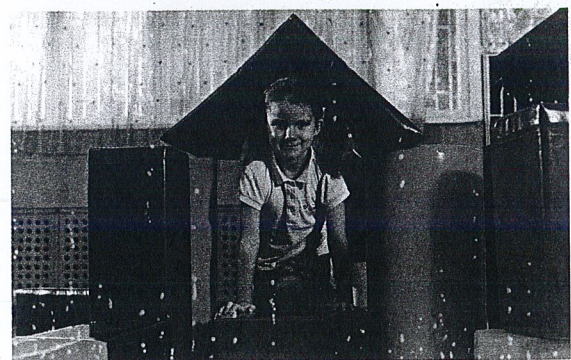
17. Design a set of children's wooden blocks of various shapes and sizes. Include at least four blocks that are different shapes. Make sure the blocks fit together to build structures.

- a) Determine the volume of each solid.
b) If each block is coated with a 1.5-mm thick layer of varnish, what volume of varnish do you need?



18. Design a set of foam cushions for a children's play area. Include at least three different shapes.

- a) Determine the volume of each piece of foam and the surface area to cover each shape in colourful vinyl.
b) If vinyl costs \$26/m², how much will it cost to cover all of the cushions?



19. a) Draw three rectangular prisms with different dimensions but the same volume.
b) Calculate the surface area of each prism you drew in part a).
c) If wrapping paper costs \$0.05 per square centimetre, how much will it cost to cover each of the prisms from part a)?