# VOLUME OF SPHERE CONE CYLINDER

## FORMULAS AND WORD PROBLEMS - GRADE 8

131 ITEMS

56 PAGES

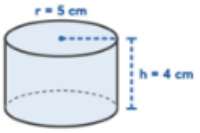
My name _____ Date _____

**Mixed Review 1**

**Cylinder, cone or sphere? Find the volume two ways.**

Each solid is different. Pick the formula, then find the volume two ways. The solids are made up and not drawn to scale.

1




Work

In terms of pi _____ pi $cm^3$

With 3.14 _____ $cm^3$

2

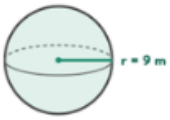



Work

In terms of pi _____ pi $in^3$

With 3.14 _____ $in^3$

3




Work

In terms of pi _____ pi $m^3$

With 3.14 _____ $m^3$

Volume of Sphere Cone Cylinder - Mixed Review 1



Bright Path Sped

# Terms of Use

Please read before you print your first page.

## One classroom license

- This file is for one classroom: one teacher, one group of students.
- Please do not share it, post it online, or sell it.
- Extra licenses for a team or a school are available on the product page.

## This is a fillable PDF

- Open it in a PDF reader (Adobe Acrobat Reader, Preview, or your browser), click into a line or a box, type, and Save As.
- Every name line, answer box, check box and ruled box on the student pages is a type-in field, and so are the tracker and the other record pages. You can also print any page and write by hand.
- It works offline, with no account needed.

## Print at 100 percent

Turn off fit to page and shrink to fit so the ruled lines stay 0.34 inch apart and the cut pieces stay the size the pages say. The cylinder is blue, the cone orange-red and the sphere green, and the numbers are on every picture, so a black and white copy reads too.

## Student work

A filled-in tracker, class grid or team note carries a real student's name. Keep it in the data folder.

## Need help?

If a field will not behave or a page will not print the way you expect, use Ask a Question on the product page before leaving a review. A fix to the file ships as a free update from My Purchases.

© Bright Path Sped. For single-classroom use by the original purchaser.



PREVIEW

Preview - Bright Path Sped

My name _____ Date _____

# Three Solids, Three Formulas

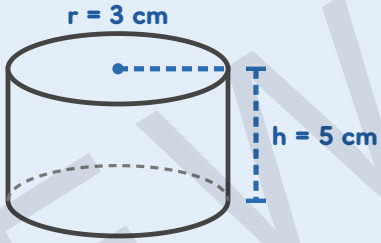


**Read about the three solids. Keep this page next to you.**

Memory help: **r** is the radius, half of the diameter. **h** is the height. Volume is in **cubic** units, like $cm^3$. Find the radius first, every time.

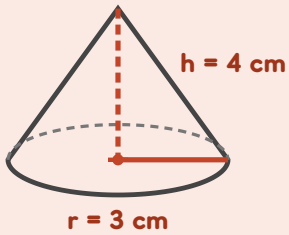
## Cylinder

Shape two flat circles and a curved side.
Formula $V = \pi r^2 h$
Say it base area times height.
Example r = 3 and h = 5 gives 45 pi.



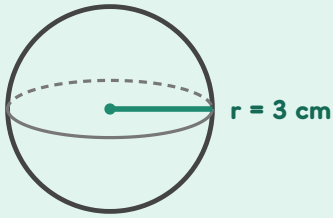

## Cone

Shape one flat circle and a point.
Formula $V = 1/3 \pi r^2 h$
Say it one third of a cylinder with the same base and height.
Example r = 3 and h = 4 gives 12 pi.




## Sphere

Shape a perfectly round ball, no flat faces.
Formula $V = 4/3 \pi r^3$
Say it uses r three times. No height.
Example r = 3 gives 36 pi.




PREVIEW

Preview - Bright Path Sped

My name _____ Date _____

# Volume Words

**Match each word to what it means.**

Write the letter of the meaning in the box.

| | | | |
|---|---|---|---|
| **Volume** | ☐ | **A** | all the way across a circle through the center |
| **Cubic units** | ☐ | **B** | how much space a solid fills |
| **Radius** | ☐ | **C** | the number about 3.14 used with circles |
| **Diameter** | ☐ | **D** | how tall a solid is, straight up from the base |
| **Height** | ☐ | **E** | the units for volume, like $cm^3$ |
| **Pi** | ☐ | **F** | from the center of a circle to its edge |

**Use two of the words in one sentence.**

PREVIEW

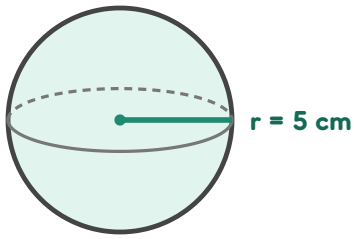
Preview - Bright Path Shed

My name _____ Date _____

# Read: Spheres

**Read. Then answer the questions.**

A sphere is perfectly round, like a ball. Every point on its surface is the same distance from the center. That distance is the radius. A sphere has no flat faces. Its volume uses the radius three times: $V = 4/3 \pi r^3$. If a problem gives the diameter, cut it in half first to get the radius.




1. Does a sphere have a flat base?

☐ **yes** ☐ **no**

2. Which formula gives the volume of a sphere?

☐ **$V = 4/3 \pi r^3$** ☐ **$V = 4 \pi r^2$** ☐ **$V = 1/3 \pi r^2 h$**

3. A sphere has a diameter of 10 cm. What is its radius?

☐ **5 cm** ☐ **10 cm** ☐ **20 cm**

4. What do you do first when a problem gives the diameter?

_____

5. A sphere has r = 3 cm. Find its volume in terms of pi.

_____

PREVIEW

Preview - Bright Path Shed

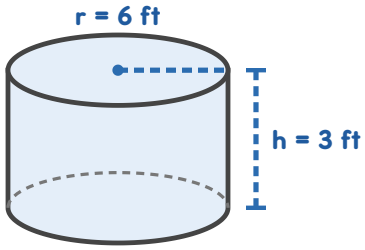
My name _____ Date _____

# Volume of Cylinders 2

**Find the volume of each cylinder. Leave pi in your answer.**

Leave pi in your answer, like 20 pi. Every measure is the radius. The solids are made up and not drawn to scale.

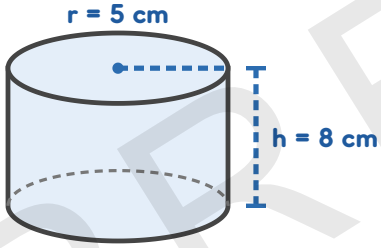
**4**




**Work**

**Volume** _____ pi $ft^3$

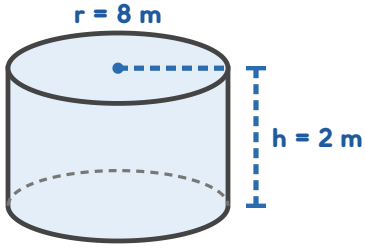
**5**




**Work**

**Volume** _____ pi $cm^3$

**6**




**Work**

**Volume** _____ pi $m^3$

PREVIEW

Preview - Bright Path Sped

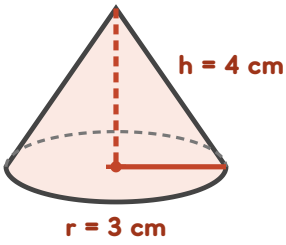
My name _____ Date _____

# Volume of Cones 1

**Find the volume of each cone. Leave pi in your answer.**

Leave pi in your answer, like 20 pi. Every measure is the radius. The solids are made up and not drawn to scale.

**1**

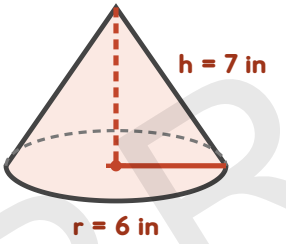



**Work**

**Volume**

_____ pi $cm^3$

**2**

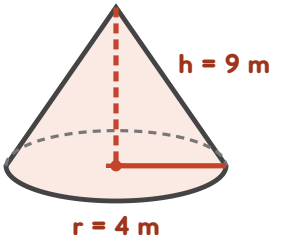



**Work**

**Volume**

_____ pi $in^3$

**3**




**Work**

**Volume**

_____ pi $m^3$

PREVIEW

Preview - Bright Path Sped

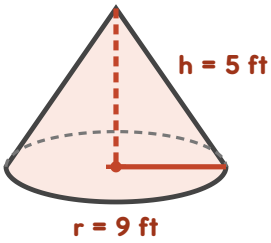
My name _____ Date _____

# Volume of Cones 4

**Find the volume of each cone. Use 3.14 for pi.**

Use 3.14 for pi and round to the nearest tenth. Some give the diameter, so find the radius first. The solids are made up and not drawn to scale.

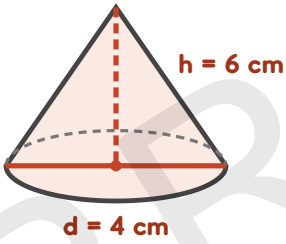
**4**




**Work**

**Volume** _____ $ft^3$

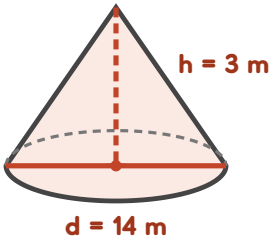
**5**




**Work**

**Volume** _____ $cm^3$

**6**




**Work**

**Volume** _____ $m^3$

PREVIEW

Preview - Bright Path Sped

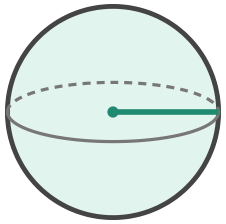
My name _____ Date _____

# Volume of Spheres 3

**Find the volume of each sphere. Use 3.14 for pi.**

Use 3.14 for pi and round to the nearest tenth. Some give the diameter, so find the radius first. The solids are made up and not drawn to scale.

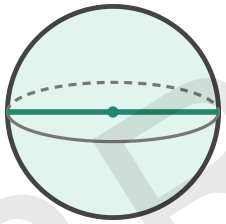
**1**




**Work**

**Volume** _____ $in^3$

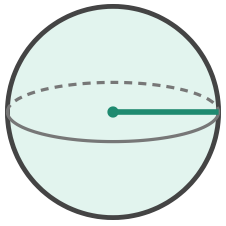
**2**




**Work**

**Volume** _____ $cm^3$

**3**




**Work**

**Volume** _____ $m^3$

PREVIEW

Preview - Bright Path Sped

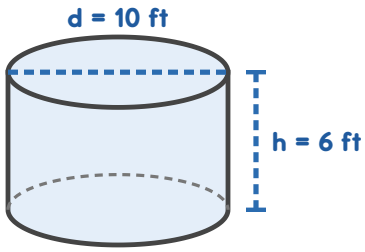
My name _____ Date _____

# Mixed Review 2

**Cylinder, cone or sphere? Find the volume two ways.**

Each solid is different. Pick the formula, then find the volume two ways. The solids are made up and not drawn to scale.

**4**




**Work**

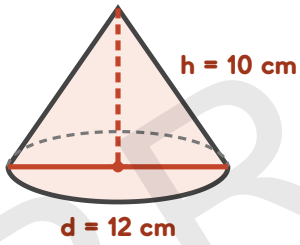
**In terms of pi**

_____ pi $ft^3$

**With 3.14**

_____ $ft^3$

**5**




**Work**

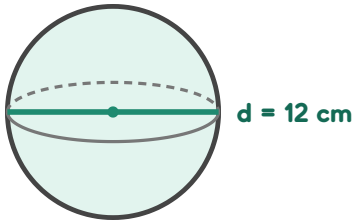
**In terms of pi**

_____ pi $cm^3$

**With 3.14**

_____ $cm^3$

**6**




**Work**

**In terms of pi**

_____ pi $cm^3$

**With 3.14**

_____ $cm^3$

PREVIEW

Preview - Bright Path Sped

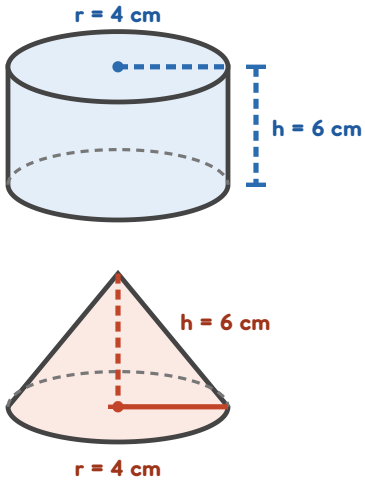
My name _____ Date _____

# Which Holds More? 1

**Find both volumes. Check which solid holds more.**

Find the volume of both solids, in terms of pi. Then decide which one holds more.

**1**




**Work**

**First solid**

_____ pi $cm^3$

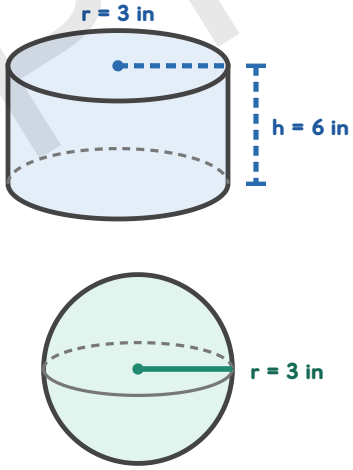
**Second solid**

_____ pi $cm^3$

**Holds more**

☐ first ☐ second ☐ same

**2**




**Work**

**First solid**

_____ pi $in^3$

**Second solid**

_____ pi $in^3$

**Holds more**

☐ first ☐ second ☐ same

PREVIEW

My name _____ Date _____

# Word Problems 2

**Read each problem. Show your work. Find the volume.**

The objects are made up. Pick the formula, then find the volume.

3 A round water tank is a cylinder. Its diameter is 6 m and its height is 5 m. Find its volume in terms of pi.

**Show your work**

**Answer** ☐

**Units** ☐

4 A pile of sand is shaped like a cone. Its radius is 6 ft and its height is 4 ft. How much sand is in the pile? Use 3.14 for pi. Round to the nearest tenth.

**Show your work**

**Answer** ☐

**Units** ☐

PREVIEW

My name _____ Date _____

# Find the Mistake 1

**These students are made up. Check each one's work. Fix each mistake.**

Some work is right. Some has a mistake. Fix each mistake so the answer is right.

1. Mia found the volume of a cylinder, r = 5 cm, h = 4 cm. **V = pi x 5 x 5 x 4 = 100 pi**

☐ **correct** ☐ **has a mistake**

**If it has a mistake, fix it:** _____

2. Omar found the volume of a cone, r = 6 cm, h = 5 cm. **V = pi x 6 x 6 x 5 = 180 pi**

☐ **correct** ☐ **has a mistake**

**If it has a mistake, fix it:** _____

3. Lena found the volume of a sphere, r = 3 cm. **V = 4/3 x pi x 3 x 3 = 12 pi**

☐ **correct** ☐ **has a mistake**

**If it has a mistake, fix it:** _____

4. Jack found the volume of a cylinder, d = 10 cm, h = 3 cm. **V = pi x 10 x 10 x 3 = 300 pi**

☐ **correct** ☐ **has a mistake**

**If it has a mistake, fix it:** _____

5. Ana found the volume of a cone, r = 3 cm, h = 7 cm. **V = 1/3 x pi x 3 x 3 x 7 = 21 pi**

☐ **correct** ☐ **has a mistake**

**If it has a mistake, fix it:** _____

PREVIEW

Preview - Bright Ezee Shop

My name _____ Date _____

## Short Answer

Answer each question in your own words.

Useful words **radius** **diameter** **height** **volume** **formula** **cubic units** **pi**

1. Explain how to get the radius when a problem gives the diameter.

2. Why does the cone formula have 1/3 in it? Compare a cone with a cylinder.

3. A cylinder has r = 4 cm and h = 5 cm. Show how to find its volume in terms of pi.

4. What does in terms of pi mean? Write a volume that way.

5. Why is volume measured in cubic units?

PREVIEW

Preview - Bright Path Shed

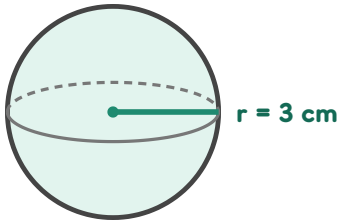
My name _____ Date _____

## Cut and Sort 2 Work Page 2

**Find the volume of each solid. Leave pi in your answer. You will sort these next.**

Each solid is a piece on Cut and Sort 2. Find its volume here. Then look for the letter on the piece.

**D**

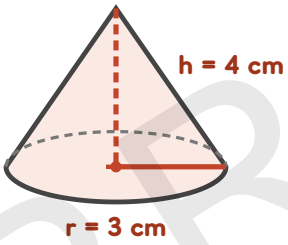



**Work**

**Volume**

_____ pi $cm^3$

**E**

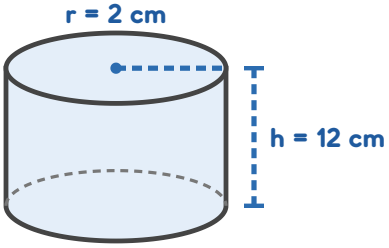



**Work**

**Volume**

_____ pi $cm^3$

**F**




**Work**

**Volume**

_____ pi $cm^3$

PREVIEW

# Answer Key: Cylinders and Cones

Volume of a cylinder: pi $r^2$ h. Volume of a cone: 1/3 pi $r^2$ h. With 3.14, round half up to the nearest tenth. Diameters are halved first.

## Volume of Cylinders 1 and 2 pages 11 and 12

| # | Solid | Volume |
|---|---|---|
| 1 | r = 3, h = 5 cm | 45 pi $cm^3$ |
| 2 | r = 4, h = 10 in | 160 pi $in^3$ |
| 3 | r = 2, h = 9 m | 36 pi $m^3$ |
| 4 | r = 6, h = 3 ft | 108 pi $ft^3$ |
| 5 | r = 5, h = 8 cm | 200 pi $cm^3$ |
| 6 | r = 8, h = 2 m | 128 pi $m^3$ |

## Volume of Cones 1 and 2 pages 15 and 16

| # | Solid | Volume |
|---|---|---|
| 1 | r = 3, h = 4 cm | 12 pi $cm^3$ |
| 2 | r = 6, h = 7 in | 84 pi $in^3$ |
| 3 | r = 4, h = 9 m | 48 pi $m^3$ |
| 4 | r = 5, h = 6 ft | 50 pi $ft^3$ |
| 5 | r = 9, h = 2 cm | 54 pi $cm^3$ |
| 6 | r = 9, h = 3 in | 81 pi $in^3$ |

## Volume of Cylinders 3 and 4 pages 13 and 14

| # | Solid | In terms of pi | With 3.14 |
|---|---|---|---|
| 1 | d = 8, r = 4, h = 5 in | 80 pi | 251.2 $in^3$ |
| 2 | r = 2, h = 7 cm | 28 pi | 87.9 $cm^3$ |
| 3 | d = 6, r = 3, h = 10 m | 90 pi | 282.6 $m^3$ |
| 4 | r = 10, h = 3 ft | 300 pi | 942.0 $ft^3$ |
| 5 | d = 12, r = 6, h = 4 cm | 144 pi | 452.2 $cm^3$ |
| 6 | d = 14, r = 7, h = 2 in | 98 pi | 307.7 $in^3$ |

## Volume of Cones 3 and 4 pages 17 and 18

| # | Solid | In terms of pi | With 3.14 |
|---|---|---|---|
| 1 | d = 6, r = 3, h = 7 in | 21 pi | 65.9 $in^3$ |
| 2 | r = 6, h = 4 cm | 48 pi | 150.7 $cm^3$ |
| 3 | d = 10, r = 5, h = 9 m | 75 pi | 235.5 $m^3$ |
| 4 | r = 9, h = 5 ft | 135 pi | 423.9 $ft^3$ |
| 5 | d = 4, r = 2, h = 6 cm | 8 pi | 25.1 $cm^3$ |
| 6 | d = 14, r = 7, h = 3 m | 49 pi | 153.9 $m^3$ |

### The three formulas

- Cylinder: V = pi $r^2$ h.
- Cone: V = 1/3 pi $r^2$ h.
- Sphere: V = 4/3 pi $r^3$.
- Volume is in cubic units, like $cm^3$.

### Rounding with 3.14

- Multiply the whole number in front of pi by 3.14.
- Round half up to the nearest tenth: 87.92 is 87.9 and 282.6 stays 282.6.
- A whole number such as 942 is written 942.0 to show the tenth.

PREVIEW

# Answer Key: Find the Mistake and Quiz

Accept a fix that says the same thing in a student's own words, with the right volume.

## Find the Mistake 1 page 33

| # | Student | Is it | Fix |
|---|---|---|---|
| 1 | Mia | correct | V = 100 pi $cm^3$ |
| 2 | Omar | mistake | Left out the one third. 1/3 x 180 = 60, so V = 60 pi $cm^3$. |
| 3 | Lena | mistake | Used r squared. A sphere uses r three times: 4/3 x 27 = 36, so V = 36 pi $cm^3$. |
| 4 | Jack | mistake | Used the diameter as the radius. r = 5, so V = pi x 5 x 5 x 3 = 75 pi $cm^3$. |
| 5 | Ana | correct | V = 21 pi $cm^3$ |

## Find the Mistake 2 page 34

| # | Student | Is it | Fix |
|---|---|---|---|
| 1 | Theo | mistake | Used the diameter as the radius. r = 6, so V = 4/3 x 216 pi = 288 pi $cm^3$. |
| 2 | Ruby | correct | V = 36 pi $cm^3$ |
| 3 | Sam | correct | V = 32 pi $cm^3$ |
| 4 | Zoe | mistake | Forgot to square the radius. V = pi x 3 x 3 x 8 = 72 pi $cm^3$. |
| 5 | Eli | mistake | Used one third instead of four thirds. V = 4/3 x 216 pi = 288 pi $cm^3$. |

## Quiz page 35

| # | Answer |
|---|---|
| 1 | V = 1/3 pi $r^2$ h |
| 2 | 36 pi $cm^3$ |
| 3 | 36 pi $cm^3$ |
| 4 | one third |
| 5 | 5 in |
| 6 | 30 pi $cm^3$ |
| 7 | $cm^3$ |
| 8 | 36 pi $cm^3$ |
| 9 | 157.0 $cm^3$ |
| 10 | 5 cm |

### Where to go after the quiz

- Missed the formula items: reread pages 7 to 9 and sort page 37.
- Missed the radius and diameter items: practice pages 13 and 14, 17 and 18 and 21 and 22.
- Missed the cone items: reread page 8 and sort page 41.

PREVIEW

# Volume Tracker

One student, every scored page. Filled example: page 52.

Student _____ Teacher _____ Month _____

| Page | Page type and set | Items | Right | Date | Notes |
|---|---|---|---|---|---|
| 6 | Volume Words | 6 | | | |
| 7 | Read: Cylinders | 5 | | | |
| 8 | Read: Cones | 5 | | | |
| 9 | Read: Spheres | 5 | | | |
| 10 | Worked Example | 3 | | | |
| 11-12 | Volume of Cylinders 1 and 2 | 6 | | | |
| 13-14 | Volume of Cylinders 3 and 4 | 6 | | | |
| 15-16 | Volume of Cones 1 and 2 | 6 | | | |
| 17-18 | Volume of Cones 3 and 4 | 6 | | | |
| 19-20 | Volume of Spheres 1 and 2 | 6 | | | |
| 21-22 | Volume of Spheres 3 and 4 | 6 | | | |
| 23-24 | Mixed Review | 6 | | | |
| 25-26 | Find the Missing Measure | 6 | | | |
| 27-28 | Which Holds More? | 4 | | | |
| 29-32 | Word Problems | 8 | | | |
| 33 | Find the Mistake 1 | 5 | | | |
| 34 | Find the Mistake 2 | 5 | | | |
| 35 | Quiz | 10 | | | |
| 36 | Short Answer | 5 | | | |
| 37 | Cut and Sort 1 | 6 | | | |
| 40 | Cut and Sort 2 | 6 | | | |
| 41 | Cut and Sort 3 | 10 | | | |

## How to fill this in

Write how many items the student got right with no prompt, and the date. A blank means not tried yet, never wrong. There are 131 items on the 34 scored pages, in 22 rows (a set that runs over several pages is one row). Answer keys: pages 42 to 47. Filled example: page 52.

This month we are working on (your own standard or wording)

PREVIEW

# Volume at Home

Dear family, this week we are learning how much space a cylinder, a cone and a sphere hold. These questions are for talking, not for a grade. Short answers are fine.

Student _____ Week of _____

## Three things to talk about

- Ask your student to say the three formulas out loud. A hint: the cone is one third of a cylinder with the same base and height.
- Ask: "If a problem gives the diameter, what do you do first?" The answer: cut it in half to get the radius.
- Ask where they have seen a can, a funnel or a ball, and which solid it is like.

## My words from home

Something shaped like a cylinder _____

Something shaped like a cone _____

Something shaped like a sphere _____

## Words that may come up

**Volume:** how much space a solid fills. **Radius:** center to edge. **Diameter:** all the way across. **Height:** straight up from the base. **Pi:** about 3.14. **Cubic units:** like $cm^3$.

Note from the teacher

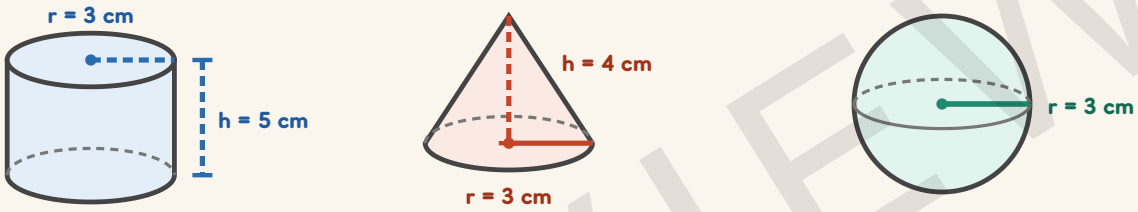
Note from home

PREVIEW

# Binder Cover

Slide this into the front of a binder. The divider tabs and a spine label to cut out are on the next page (page 55).

Math - Geometry - Grade 8




# VOLUME OF SPHERE CONE CYLINDER

## Formulas and Word Problems

**Learn** | **Practice** | **Check**

Teacher _____ Class or student _____

PREVIEW