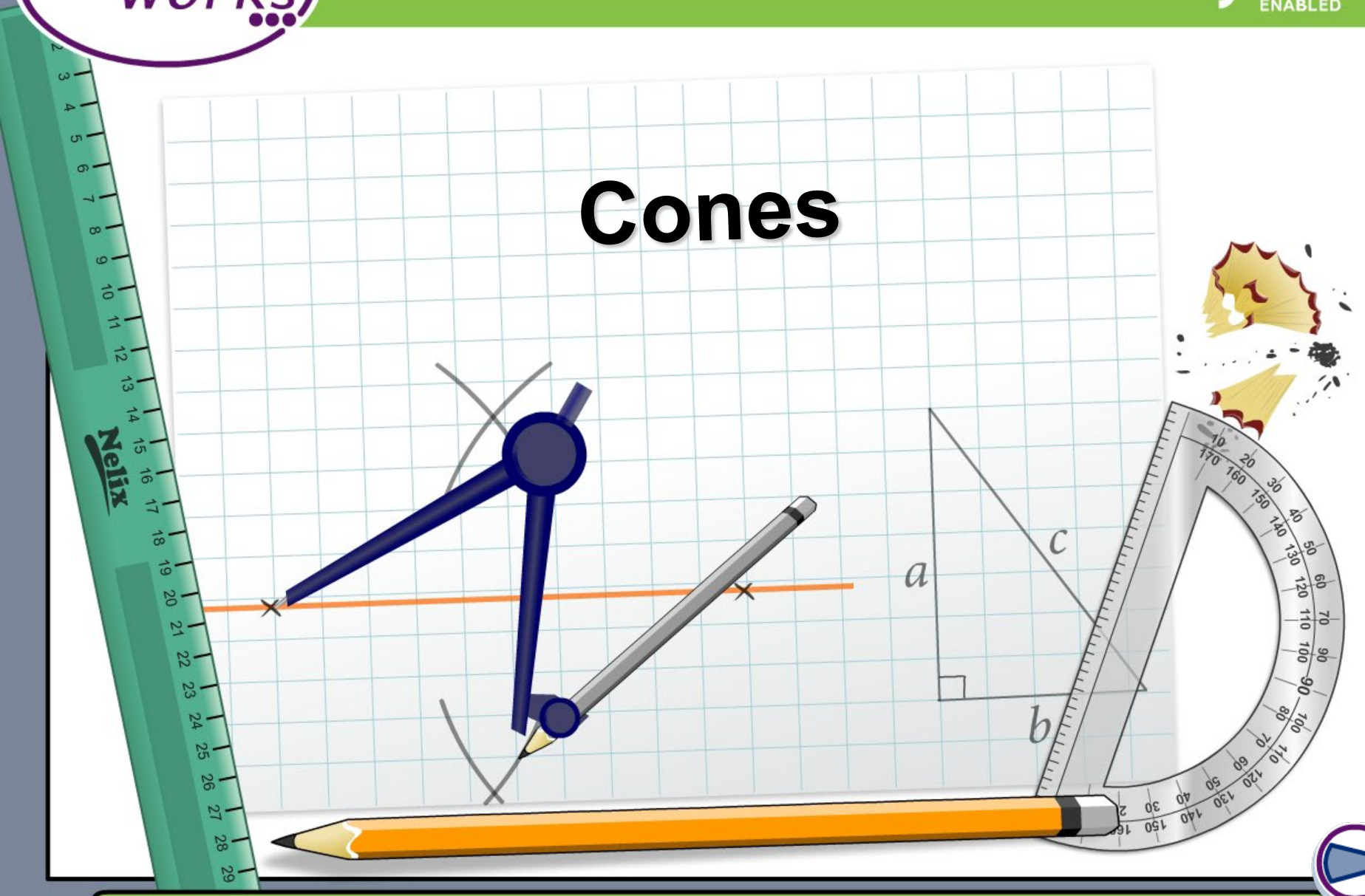
Cones



Information

Common core icons

This icon indicates a slide where the Standards for Mathematical Practice are being developed. Details of these are given in the Notes field.

Slides containing examples of mathematical modeling are marked with this stamp.

This icon indicates an opportunity for discussion or group work.

The **Standards for Mathematical Practice** outlined in the Common Core State Standards for Mathematics describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

These are:

1) Make sense of problems and persevere in solving them.

2) Reason abstractly and quantitatively.

3) Construct viable arguments and critique the reasoning of others.

4) Model with mathematics.

5) Use appropriate tools strategically.

6) Attend to precision.

7) Look for and make use of structure.

8) Look for and express regularity in repeated reasoning.

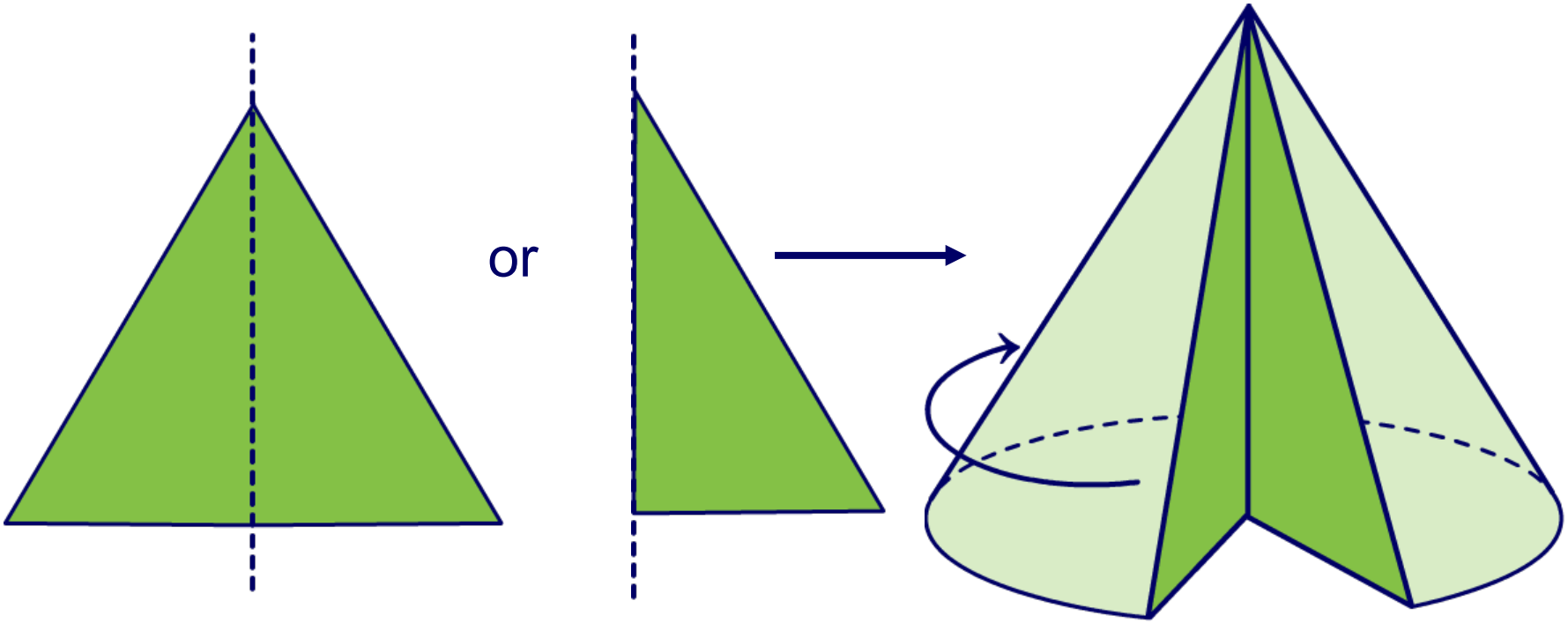
This icon indicates that the slide contains activities created in Flash. These activities are not editable.

This icon indicates teacher's notes in the Notes field.

Cones

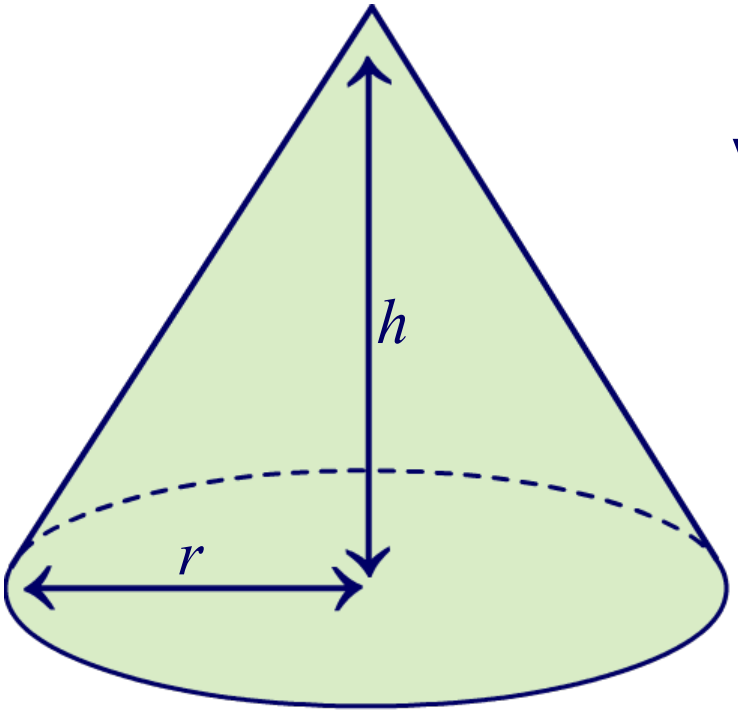
A **cone** is a pyramid with a circular base.

A cone can be created by rotating a triangle around an axis.



Volume

A cone is a type of pyramid. The volume of a pyramid can be found by multiplying the area of the base by the height and dividing by 3.



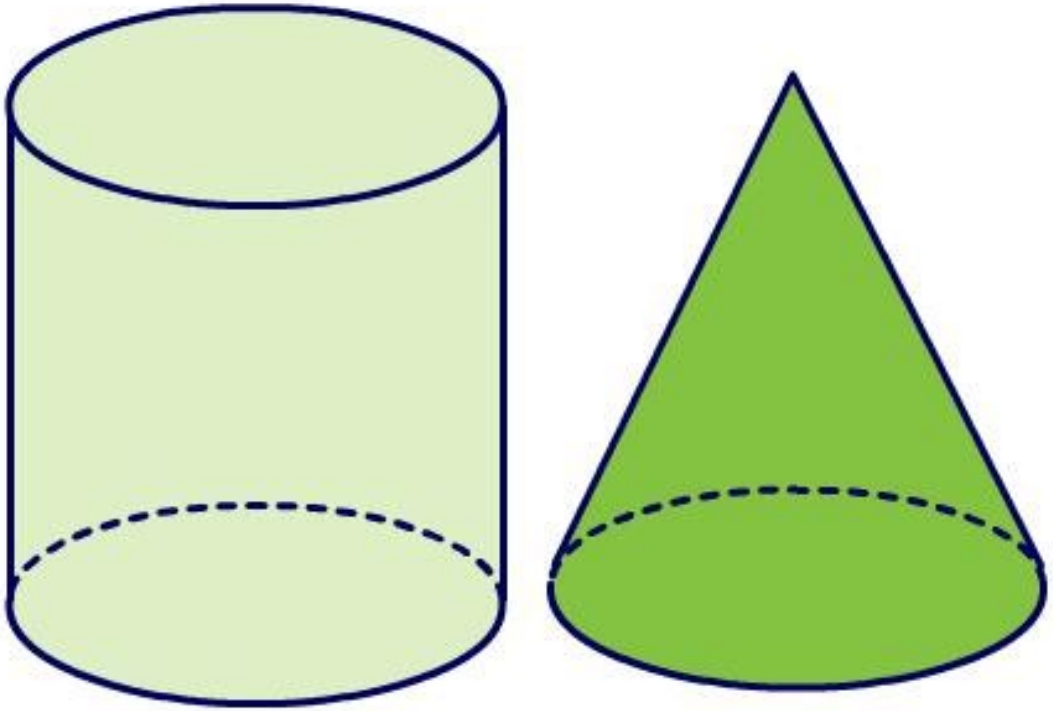
volume = $\frac{1}{3}$ × area of base × height

volume = $\frac{1}{3} \times \pi r^2 \times h$

Finding the volume of a cone

How are the formulas for the volume of a cone and the volume of a cylinder related?

Press "**play**" to find out.



Volume of ice cream cones

Two sizes of ice cream cones are 20 cm tall, but their volumes are 188.5 cm^3 and 335.1 cm^3.

Marcus is designing a dispenser for the cones and needs to find the radii of the two sizes of cone.

Marcus thinks their radii are 6 cm and 8 cm.

Why is he wrong?

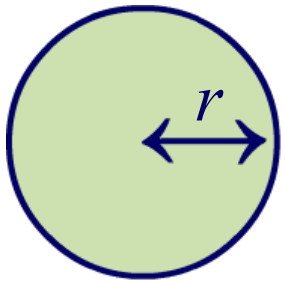
You may need the formula:

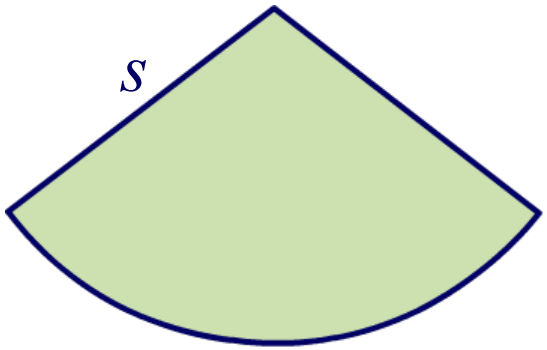
$$V = \frac{1}{3}\pi r^2 h$$

Surface area of a cone

The surface area of a cone equals the surface area of the base plus the surface area of the curved face.

Below is the base and curved face of a cone.





The area of the circle:

$= \pi r^2$

The area of the sector:

$= \pi rs$

surface area $= \pi r^2 + \pi rs$

Conical hats

A party company makes children's party hats. The hats have a circumference of 16 inches and height of 7 inches.

How much paper will it take to fill an order for 250 hats?

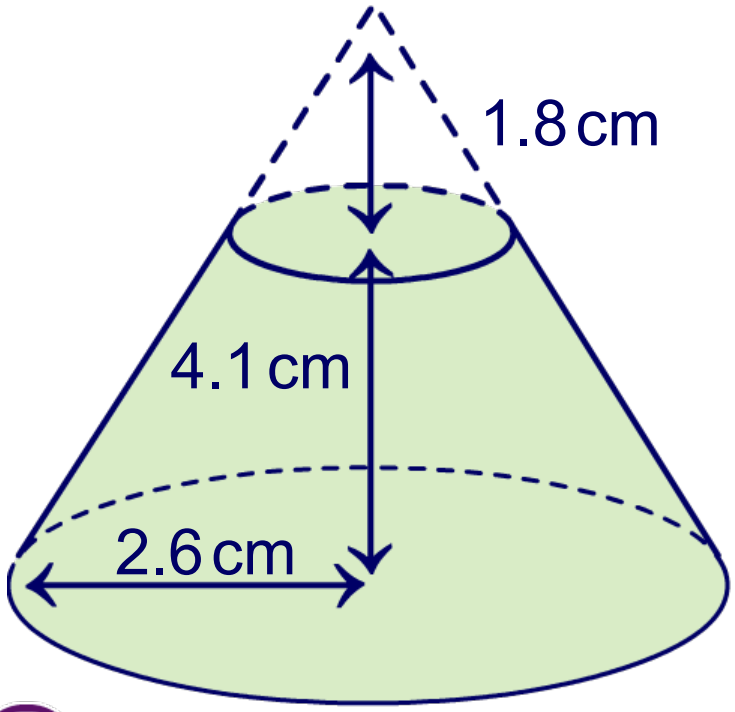
Press "**start**" to begin.

start

Volume of a frustum

A **frustum** is a portion of a cone with the top sliced off parallel to the base.

Here is a frustum of a cone. Its top is 2 cm in diameter. Calculate its volume to the nearest hundredth.



find volume A (large cone):

$$V_A = \frac{1}{3} \times \pi (2.6)^2 \times 5.9$$

$$V_A = 41.77$$

find volume B (small cone):

$$V_B = \frac{1}{3} \times \pi 1^2 \times 1.8$$

$$V_B = 1.88$$

find volume of frustum:

$$V = V_A - V_B$$

$$V = \mathbf{39.89\ cm^3}$$

Finding the volume of a frustum

Calculating the volume and surface area of a frustum

An hourglass can be thought of as two congruent frustums connected by their tops.

Press "**play**" to see how to calculate the surface area and volume of the hourglass shown.