Devils Tower National Monument
Wyoming

National Park Service
U.S. Department of the Interior

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Devils Tower Math - Volume of a Cylinder

Materials List and Explanation

For each student or group you will need:
- **3 pieces of paper of equal size (different colors preferred)**
- **tape (8 small pieces should be sufficient)**
- **scissors (optional)**
- **filler material for cones (optional, but lots of fun!)**
  - **use beans, rice, popcorn, etc.**
  - **place a tray beneath to keep the mess contained**

Materials for making cones
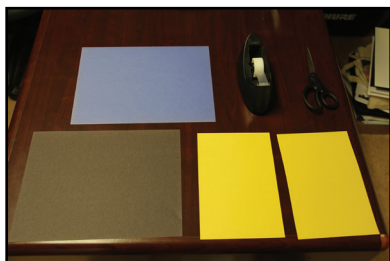
Fold one piece in half (long ways) and cut or tear on fold

Three different cones

Tape one on the short edge, one on the long edge, and the cut paper together on the short edges

Nested cylinders
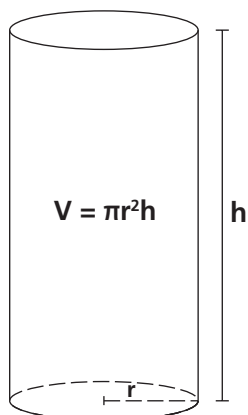

Which has the most volume?

Compare volume

Lift center out to show other cones have more volume

Devils Tower Facts:
- **Height = 867 ft (264 m)**
- **Circumference of Base = 1 mile (1,609 m)**
- **Area of Top = 1 acre (43,560 ft² or 4,047 m²)**

Formula Reference:
1 mile = 5,280 ft (1,609 m)
Circumference = $2\pi r$
Area of a circle = πr^2

Volume of a Cylinder

$V = \pi r^2 h$

Since the Tower is not a true cylinder, your calculation will be an over-estimate. The Tower is wider at the base than at the top; a more accurate way to calculate the volume is to use the formula for a truncated cone.

Volume of a Truncated Cone

$V = 1/3\pi h(R^2 + r^2 + Rr)$