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## Calculating Volume, frigate measurements

- USS Constitution contained three types of guns (cannons); 24-pounders, 18-pounders and 12-pounders. Each is named for the weight of the cannonball that it fired.

- A 24-pounder had a diameter of 21 inches, the 18–pounder had a diameter of 19.5 inches and the 12-pounder had a diameter of 18 inches.

- Bore is the drilled out part of the gun where the cannonball travels through.

The table below shows the measurements of the guns on USS *Constitution*.

FRIGATE MEASUREMENTS				
	Units	24-Pounder	18-Pounder	12-Pounder
Bore Length	inches	108	108	90
Bore Diameter	inches	5.823	5.292	4.623
Overall Length	inches	122.5	121.2	101.5
Gun Diameter	inches	21	19.5	18
Shot (Cannonball) Diameter	inches	5.547	5.04	4.403

source: http://home.att.net/~ShipModelFAQ/smf-q037.html

Directions: Fill in the table below. Use the information above and formulas for help when needed. Show your work in the space provided below the chart.
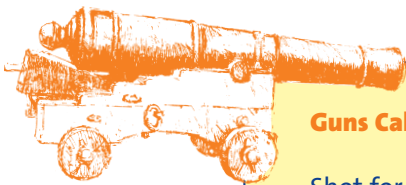
Guns Caliber	Volume (sphere)
Shot for a 24-pounder	_____
Shot for an 18-pounder	_____
Shot for a 12-pounder	_____

1. Take measurements of the classroom and calculate its volume. Convert all measurements to inches?

Class dimensions: length _____ width _____ height _____

2. How many 24-pound shots would fill up the classroom? Explain.

3. Is this calculation an overestimate or an underestimate? Explain.

4. What is the smallest volume container in which you could fit 20 shots of an 18-pounder?

5. Is this calculation and overestimate or an underestimate? Explain.

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6. Name an item in the classroom that could have the same volume as ten 12-pound cannonballs. Explain and remember the units are in inches.

7. The radius of an 18-pounder is approximately 2.52 inches. If the radius were doubled, what would the new volume equal?

8. How many times larger is the volume of the cannonball with the 5.04 inch radius compared to the 2.52 inch radius?

9. How much would you guess the 5.04 inch radius cannonball to weigh?