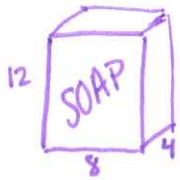
Unit 7: Filling and Wrapping
Hwk #3– Compost Containers/ Review(Inv. 1.4)

Name Key

1. Suppose that a company sells laundry soap in boxes that measure 4 *inches* × 8 *inches* × 12 *inches*.

A. What is the volume of the laundry soap box?



$V = 4 \times 8 \times 12 = \boxed{384 \text{ in}^3}$

The company wants to offer larger economy size boxes.

B. What changes in dimensions would give a box with double the volume?

doubling the volume would make it 768 in^3.
You can get this volume by doubling any <u>one</u> side.
Ex: $12 \times 8 \times 8 = 768$ or $24 \times 8 \times 4 = 768$

C. What changes in dimensions would give a box with triple the volume?

You can triple the volume by tripling any <u>one</u> side.
Ex: $12 \times 8 \times 4$
$\downarrow$
$12 \times 8 \times 12 = 1{,}152$

D. What changes in dimensions would give a box with half the volume?

You can half the volume by halving any one dimension. $12 \times 8 \times 4$
$\downarrow$
$6 \times 8 \times 4 = 192$

E. Given the **scale factor of 2**, find the volume of a box similar to the basic box. Show how you can find the volume without calculating the separate dimensions of each new box design.

S.F. = 2
4 in × 8 in × 12 in
↓ ↓ ↓
8 in × 16 in × 24 in

$V = 8 \times 16 \times 24$
$\boxed{V = 3{,}072 \text{ in}^3}$

You can find the volume by multiplying the original box volume by the factor f^3.
$(\text{Scale Factor})^3 = 2^3 = 8$ $8 \times 384 = 3{,}072$

2. You want to make a compost box bigger than the basic $1-2-3$ *foot* size. Your friend says, "If you double each dimension, you'll be able to double the capacity at only double the cost of the materials to build it."

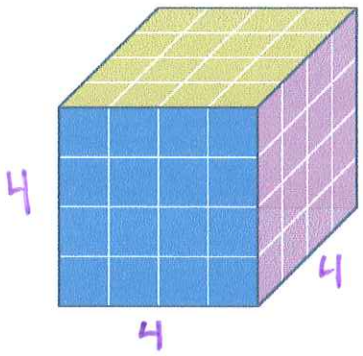
A. Is your friend correct about doubling the capacity? Why or why not?

No, your friend is incorrect. Doubling each dimension increases the volume by a factor of 8. ← 2^3

B. Is your friend correct about doubling the cost? Why or why not?

No, your friend is incorrect. Doubling each dimension increases the surface area by 4 so the cost of materials would be 4 times as much.

3. Mrs. Brown wants to paint her jewelry box blue. The jewelry box is in the shape of a cube and has an edge length of 4 *inches*. How much blue paint will Mrs. Brown need?



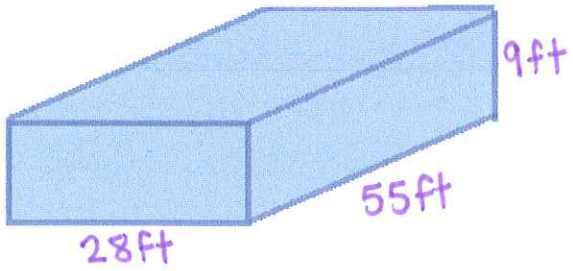
one side has an area of 16

16 × 6 sides = 96

She would need 96 in^2 of paint.

4. Mrs. Arnold is building a pool in her backyard. The pool will be 55 *feet* long, 28 *feet wide*, and 9 *feet* deep. How much water will fit in the pool?

↘ This is asking for volume.



$55 \times 28 \times 9 =$ 13,860 ft^3 of water