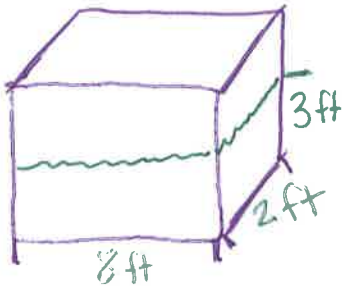Name _____ Date _____

Geoffrey builds rectangular planters.

1. Geoffrey's first planter is 8 feet long and 2 feet wide. The container is filled with soil to a height of 3 feet in the planter. What is the volume of soil in the planter? Explain your work using a diagram.

$$V = l \times w \times h$$
$$V = (8\,ft \times 2\,ft) \times 3\,ft$$
$$\boxed{V = 48\,ft^3}$$

3 ft
2 ft
8 ft

2. Geoffrey wants to grow some tomatoes in four large planters. He wants each planter to have a volume of 320 cubic feet, but he wants them all to be different. Show four different ways Geoffrey can make these planters, and draw diagrams with the planters' measurements on them.

Planter A

4 ft
10 ft
8 ft

Planter B

2 ft
16 ft
10 ft

Planter C

2 ft
20 ft
8 ft

Planter D

5 ft
8 ft
8 ft

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Lesson 7: Solve word problems involving the volume of rectangular prisms with whole number edge lengths.

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3. Geoffrey wants to make one planter that extends from the ground to just below his back window. The window starts 3 feet off the ground. If he wants the planter to hold 36 cubic feet of soil, name one way he could build the planter so it is not taller than 3 feet. Explain how you know.

$V = l \times w \times h$

$36 \text{ ft}^3 = (\underline{\quad} \times \underline{\quad}) \times 3 \text{ ft}$

$\underbrace{\qquad\qquad}_{12 \text{ ft}^2}$

6 × 2
3 × 4
12 × 1

Since Geoffrey wants to build a planter with the height of 3 feet and volume of 36 ft³, the base of the planter would need to be 12 feet squared. I choose (4 ft × 3 ft) × 3 ft.

4. After all of this gardening work, Geoffrey decides he needs a new shed to replace the old one. His current shed is a rectangular prism that measures 6 feet long by 5 feet wide by 8 feet high. He realizes he needs a shed with 480 cubic feet of storage.

   a. Will he achieve his goal if he doubles each dimension? Why or why not?

$V = 5 \text{ ft} \times 6 \text{ ft} \times 8 \text{ ft}$
240 ft^3

$V = 12 \text{ ft} \times 10 \text{ ft} \times 16 \text{ ft}.$
$V = 1920 \text{ ft}^3$

No, because the shed is huge, not 480 ft³

   b. If he wants to keep the height the same, what could the other dimensions be for him to get the volume he wants?

$480 \text{ ft}^3 = (\underline{\quad} \times \underline{\quad}) \times 8 \text{ ft}$
$\underbrace{\qquad}_{60}$

6 × 10   3 × 20
5 × 12
2 × 30
1 · 60
4 × 15

   c. If he uses the dimensions in part (b), what could be the area of the new shed's floor?

$\boxed{60 \text{ ft}^2}$

$\dfrac{480}{8} = 60$

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                                     whole number edge lengths.

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M5·L7

2. Volume = length × width × height
    320 = 10 × 8 × 4 ✓
    320 = 0.8 × 100 × 4
    320 = 16 × 2 × 10 ✓
    320 = 160 × 2 × 1
    320 = 1 × 1 × 320
    320 = 32 × 10 × 1
    320 = 400 × 0.4 × 2
    320 = 8 × 2 × 20 ✓
    320 = 5 × 2 × 32
    320 = 8 × 8 × 5 ✓