Appendix 8: Area and Watering Cost

The most effective way to measure the amount of water usage is through the use of a water meter. Initially though, in order to get an estimate on the total cost of water for a school garden, one is going to need to know the approximate square foot area the garden will cover.

Calculating square footage

Finding the square footage of a garden is relatively simple if the space is a basic square. Simply calculate the area of the space using this formula:

**Length x Width = Area**

What if I have an odd-shaped space?

Here’s an idea that is simple and fun for students to experiment with when working with an uneven edge or a swirl:

Take a length of twine or rope and use it to outline the odd-shaped bed. Mark the point on the rope at which it meets the starting point of the twine or rope. Then, remove the rope from the garden bed, and replace it on a lawn or cement area in a more traditional square or rectangular shape. Have your students measure the shape using a formula for area that they are learning in class.

For a rectangle, use Length x Width

For a circle, use \( \pi r^2 \)

Where \( r = \) radius and \( \pi = 3.14 \)

the area of the rectangle or circle you calculate is equal to the area of the odd-shaped garden bed.

Example: Your string measures 5 feet long and 6 feet wide in a rectangular shape.

5 feet x 6 feet = 30 square feet

Your total area is 30 square feet.

Tip: As long as no length is added to the rope, the area will remain the same no matter what shape the rope is in. Have students experiment with this concept by re-shaping the rope in several different sizes of squares, rectangles, triangles, or circles (whichever shapes for which they have learned area formulas) and then calculating the area—they should all be the same. This is a great way for students to review and master the basic concept that a defined area can take many different forms without increasing or decreasing in area.

Calculating Water Use

Providing one inch of water takes a little over half a gallon per square foot (0.623 gallon to be exact). That means that every 10’x10’ area will require over 62 gallons of water for each inch of

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water. That doesn’t sound like much until you consider that a 100’ x 100’ lawn uses 6,230 gallons of water every time you turn on the sprinklers and deliver one inch of water!

To calculate the amount of water you use, multiply the width times the length of your garden in feet to get the number of square feet of area. Then multiply that figure by 0.623 to come up with the number of gallons used. This would tell you how many gallons needed to equal 1” of water, but not how many gallons you would need to use. This can only be done with a measuring devise. The easiest is to measure the number of inches of water delivered and calculate the gallons or have an in-line water meter that can measure the actual gallons used and then calculate the inches delivered.

For overhead watering (sprinkler of hose) set a couple of cat food cans in the bed where they get watered and measure the depth of water in the can when finished watering. Use the depth of water in the can as the inches or fraction of inches delivered to calculate gallons and costs.

For a drip system without a flow meter the calculation can get very complicated.

In-line water meters are available as reasonable cost on the world wide web.

On average – water use for edible crops per season (April-Oct) will be about 35 inches of water
Calculations – 35 inches = 21 gals/ sq ft (1in/sq ft = .623 gal)
Garden size – 500 sq ft – total water use 10,500 gals/season
1,000 sq ft – total water use 21,000 gal/season

Considerations –
if using drip irrigation on timers (properly set) these numbers are pretty close for an average
if using sprinklers or flood irrigation – double or triple the numbers to accommodate for the inefficiency of those watering methods.

For final cost figure - calculate water cost/gal (figure from city utilities)

**Calculating Water Costs**

In the City of Las Cruces, schools are considered small commercial or large commercial depending on the size of the school. Currently a “small commercial” schools pays $16.82 (access charge) and an additional $1.18 for every 1,000 gallons of water used. “Large commercial” schools are charged $25.23(access charge) and an additional $1.96 for every 1,000 gallons of water used. To calculate the cost of watering the school garden

1) Divide the number of gallons used by 1,000
2) Multiply by the price the school pays per 1,000 gallons. Don’t forget to include the sewer costs unless you have a separate meter.