

REGIONAL FLOOD CONTROL DISTRICT



Measurements of Conversion

Description: This activity teaches students to understand dimensional analysis using a detention basin, this activity will help students understanding how big a detention basin can be and how much water it can hold through the conversion of various measurements. We recommend to use this alongside the “Beat the Flood” activity for more of a hands-on-learning experience.

Background: Detention basins throughout Southern Nevada are built to reduce the flow of water from rainfall through the valley on its way to Lake Mead. The size and capacity of each detention basin depends on the likelihood of flooding in structures located upstream and downstream of the basin in the case of a 100-year or more flood event.

Directions:

1. (Optional) If you are constructing your own detention basin, please refer to “Beat the Flood” activity then come back to **Step 2**.
2. Use the conversions key and solve the question on the capacity of various detention basins through the valley.
3. Check your answers against the Answer Key provided.

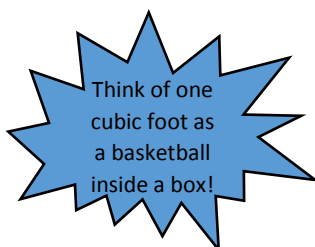
Conversion Key:

1 cubic foot of water = 7.48 gallons of water

1 gallons of water weighs 8.35 pounds

1 acre-foot of water = 43,560 cubic feet of water

1 inch of rain over a square mile = 53.3 acre-feet of water



Abbreviations

Acre-foot → AC-FT

Cubic foot → cu ft.

Gallon → gal.

Pound → lb.

Square mile → mi²

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How much can detention basins hold?

1. If the Red Rock Detention Basin can hold 2,007 AC-FT of water, how much rain over a square mile can it hold?
2. How many acre-feet of water can the Lakes Detention Basin located in the Desert Breeze Park hold if it can hold 6,403,320 cu ft. of water?
3. How many gallons of water can the Lower Flamingo Detention Basin at Charlie Frias Park Detention Basin hold if it can hold 603,988,846.56 lbs. of water?
4. How many gallons of water can the Gowan North Detention Basin in Bunker Park hold if it can hold 921 AC-FT of water?
5. If the Lone Mountain Detention Basin can hold 16.66 in. of rain water over one square mile, if filled to capacity, how much does the water in the detention basin weigh in pounds?
6. If the Lower Las Vegas Detention Basin Sandstone at Ridge Park can hold 700 AC-FT of water, how many cubic feet of water can it hold?
7. If the Upper Las Vegas Wash Detention Basin can hold 1836 AC-FT of water, how many cubic feet of water, gallons of water, pounds of water, and inches of rain can it hold?
8. (Optional) Figure out how many cubic feet of water, gallons of water, pounds of water, and rain can it hold your own detention basin can hold.

Hint: Find the volume of the shoe box then divide it by 1728*.

*1 cu ft. = 1728 cu in.

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Answers Key

1. Red Rock Detention Basin: 2,007 AC-FT of water; 87,424,920 cu ft. of water; 653,938,401.6 gals. of water; 5,460,385,653.36 lbs. of water; 37.51 in. of rain
2. Lakes Detention Basin at Desert Breeze Park - 143 AC-FT of water; 6,403,320 cu ft. of water; 47,896,833.6 gal. of water; 399,938,560.56 lbs. of water; 2.68 in. of rain
3. Charlie Frias Park: 222 AC-FT of water; 2,670,320 cu ft. of water; 72,333,993.6 gal. of water; 603,988,846.56 lbs. of water; 4.17 in. of rain
4. Gowan North Detention Basin at Bunker Park: 921 AC-FT of water; 40,118,760 cu ft. of water; 300,088,324.8 gal. of water; 2,505,737,512.08 lbs. of water; 17.28 in. of rain
5. Lone Mountain Detention Basin at Majestic Park: 888 AC-FT of water; 38,681,280 cu ft. of water; 289,328,806 gal. of water; 415,895,531.49 lbs. of water; 16.66 in. of rain
6. Lower Las Vegas Detention Basin at Sandstone Ridge Park: 700 AC-FT of water; 30,492,000 cu ft. of water; 228,080,160 gals. of water; 1,904,469,336 lbs. of water; 13.13 in. of rain
7. Upper Las Vegas Wash Detention Basin: 1836 AC-FT of water; 79,976,160 cu ft. of water; 598,221,676.8 gals. of water; 4,995,151,001.28 lbs. of water; 34.45 in. of rain over one square mile