



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Melissa S. Izbicki	Project Number J0612
Project Title Water Retention Is a Function of Soil Type	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My project was to determine which soil retains the most water. My independent variable was the water retained by the soil under the pull of gravity (field capacity) My dependent variable was soil type. I believe sand and gravel will retain the least water because they have large pore spaces. When I researched water retention in soil physics I found that the larger the air spaces the more rapidly the water will drain.</p> <p>Methods/Materials I collected seven soil samples from various locations. Bulk density and porosity were calculated from the volume of the container and the soil weight according to the following equations: Bulk density = weight of soil/volume of container Porosity = 1 - (bulk density / mineral grain density) Volumetric water content was calculated by dividing the water retained by the soil by the volume of soil. Gravimetric water content was calculated by dividing the weight of the water retained by the dry weight of the soil.</p> <p>Results For the seven soils measured the average bulk density of three replicates ranged from 0.26 to 1.50 g/cm³. The soils with the highest values were coarse and medium gravel. The soils with smaller particles had lower bulk density. The average porosity ranged from 0.43 to 0.73. The highest values were soils of smaller particles (garden soil, topsoil, and subsoil). The lowest porosity were gravel and sand. The average volumetric water content at field capacity ranged from 0.07 to 0.56. The highest values were potting soil, sand, and subsoil. The lowest were topsoil, coarse and medium gravel. The average gravimetric water content ranged from 0.07 to 0.62. The highest values were garden soil, subsoil, and potting soil. The lowest were gravel and topsoil.</p> <p>Conclusions/Discussion I learned that different soil types retain water differently. My hypothesis was correct that gravel and sand would retain the least water. I was surprised to learn that the finer grain soils (garden soil, topsoil, subsoil and potting soil) had more air space than the coarser grain soils. Water was retained in these small air spaces that I could not see. Water retention is an important property of soils that affects plant growth and suitability for building sites.</p>	
Summary Statement Water retention is a function of soil type and an important property of soils that affects plant growth and suitability for building sites.	
Help Received father helped collect soil and conduct experiment. US Geological Survey provided balance, graduated cylinders, mother took pictures	