



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Jonathan R. Allison	Project Number J0902										
Project Title It's Raining, It's Pouring, the Radishes Are Growing: Chemical Analysis of Rainwater for the Nation's Food Production											
<table border="1"><thead><tr><th>Objectives/Goals</th><th>Abstract</th></tr></thead><tbody><tr><td>Objectives/Goals My objective was to see if rainwater from different parts of the nation affected the growth of radish seeds. I tested the rainwater's hardness and pH levels, obtained information about the air quality of the area the rainwater was collected from and then planted radish seeds.</td><td></td></tr><tr><td>Methods/Materials I contacted friends and family from 11 different cities in the United States and asked them if they could help me by collecting rainwater from their city. After they collected it, they shipped it back to me. Then I tested the rainwater for hardness, using the chemical process of titration. Next I tested the rainwater for pH levels. Then I planted radish seeds in potting soil and watered each plant with rainwater from a different city. I observed, measured and recorded any growth or changes daily for seven days.</td><td></td></tr><tr><td>Results The results of my testing were that Chicago and Virginia had the highest hardness level at 7.0 and most acidic level at 5.0 and they had the least growth. Next Boston, Florida, Long Beach, Los Angeles and New York had average hardness level at 3.0 and pH at 5.5 and their plant growth was average. Hawaii, Memphis, South Carolina and Spokane had the best hardness level at 2.0 and pH level at 6.0 to 6.5 and their plant growth was excellent.</td><td></td></tr><tr><td>Conclusions/Discussion My conclusion is that since deionized water, the purest form of water, has a hardness level of 1.0, the lower the hardness level the better. Also a pH level of 7.0 is neutral, so the closer a pH level is to 7.0 the better. This supports the results of my testing, that the lower the hardness level and the closer the pH level is to 7.0 the better. According to my experiment, the hardness and pH level of rainwater does affect plant growth.</td><td></td></tr></tbody></table>		Objectives/Goals	Abstract	Objectives/Goals My objective was to see if rainwater from different parts of the nation affected the growth of radish seeds. I tested the rainwater's hardness and pH levels, obtained information about the air quality of the area the rainwater was collected from and then planted radish seeds.		Methods/Materials I contacted friends and family from 11 different cities in the United States and asked them if they could help me by collecting rainwater from their city. After they collected it, they shipped it back to me. Then I tested the rainwater for hardness, using the chemical process of titration. Next I tested the rainwater for pH levels. Then I planted radish seeds in potting soil and watered each plant with rainwater from a different city. I observed, measured and recorded any growth or changes daily for seven days.		Results The results of my testing were that Chicago and Virginia had the highest hardness level at 7.0 and most acidic level at 5.0 and they had the least growth. Next Boston, Florida, Long Beach, Los Angeles and New York had average hardness level at 3.0 and pH at 5.5 and their plant growth was average. Hawaii, Memphis, South Carolina and Spokane had the best hardness level at 2.0 and pH level at 6.0 to 6.5 and their plant growth was excellent.		Conclusions/Discussion My conclusion is that since deionized water, the purest form of water, has a hardness level of 1.0, the lower the hardness level the better. Also a pH level of 7.0 is neutral, so the closer a pH level is to 7.0 the better. This supports the results of my testing, that the lower the hardness level and the closer the pH level is to 7.0 the better. According to my experiment, the hardness and pH level of rainwater does affect plant growth.	
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Summary Statement The effects that rainwater hardness and pH levels have on the growth of vegetation.											
Help Received My mom helped me complete and type this application.											