



**CALIFORNIA STATE SCIENCE FAIR  
2005 PROJECT SUMMARY**

<b>Name(s)</b> <b>Darren W. Coates</b>	<b>Project Number</b> <b>J1611</b>
<b>Project Title</b> <b>Death in a Water Bath</b>	
<b>Abstract</b> <b>Objectives/Goals</b> My objective was to learn at what temperature three different types of vegetable seeds die. This is important when seeds are treated for disease control and for seed storage. My hypothesis was that corn, bean and spinach seeds would die at different temperatures because of differences in seed size and cool season versus warm season types. <b>Methods/Materials</b> Ten corn, bean and spinach seeds were placed in a water bath for ten minutes at each of five temperatures (43.3 deg C, 48.9 deg C, 54.4 deg C, 60.0 deg C and 65.6 deg C). My control was 43.3 deg C which should have caused no damaging effects. My research on this subject showed that all seeds would be killed at 65.6 deg C. Seed treatment for disease control is usually done at 48.9 deg C. The water bath treated seeds were placed between two moist paper towels and germination was checked daily. <b>Results</b> The best treatment temperature for seed germination was 48.9 deg C. All of the seeds germinated by day 4. At my highest temperature (65.6 deg C), all of the spinach seeds died but 90% of the corn seeds and 70% of the bean seeds germinated but at a slower rate than at cooler temperatures. <b>Conclusions/Discussion</b> My hypothesis was correct in that the three types of vegetable seeds died at different temperatures. All of the spinach seeds died at 65.6 deg C, as expected. The results for beans and corn were surprising - a majority of the seeds survived 65.6 deg C which did not agree with my references. Better germination at 48.9 deg C than at 43.3 deg C was also unexpected and could possibly be used as a standard seed treatment. I was able to increase my knowledge of seed germination and the effects of temperature on seed growth with this research project.	
<b>Summary Statement</b> My project tests the germination of three types of vegetable seeds at five different temperatures.	
<b>Help Received</b> Father photographed experiment, purchased seed and provided electronic thermometer.	