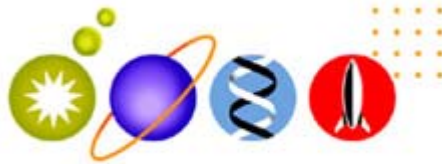


SCIENCE BUDDIES in Action



Student

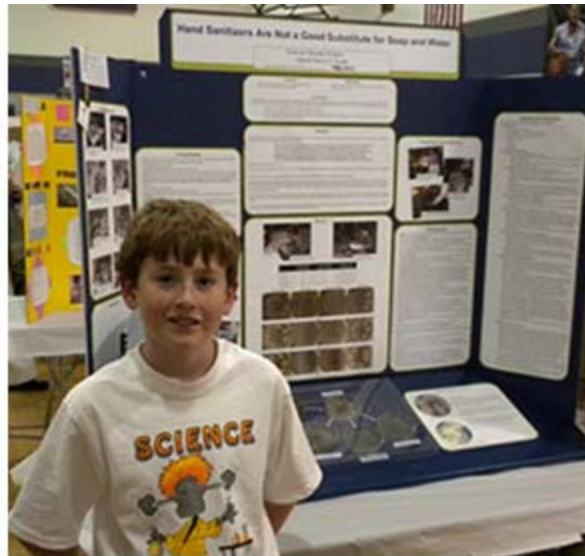
Gabriel Akins
Livermore, California

Summary

Gabriel Akins is back in action, putting hand sanitizers to the test against good ol' fashioned soap and water.

Overview

Third-grader Gabriel Akins was formerly featured on Science Buddies in Action for building a lemon battery that was strong enough to power a small motor. His interest in science has continued to grow, and with help from his grandfather and Science Buddies resources, Gabriel recently placed 1st at his science fair with a project comparing the effectiveness of hand sanitizers and soap and water.



Gabriel has placed at science fairs three years in a row, and each time, has used Science Buddies resources. This year, Gabriel was inspired by the Science Buddies Project Idea [Germs in Action](#). Using the Science Buddies [Steps of the Scientific Method](#) guide, he formulated a hypothesis, developed an experimental procedure, and created an organized and clear display board on which to present his findings.

To begin, he prepared a soil-manure mixture to spread on his hands. He then melted agar and poured it into petri dishes. After placing his hands in the manure, he placed three fingers into the agar of one of the petri dishes. He repeated this step three more times—once washing his hands with just water, again then with soap *and* water, and again after using the hand sanitizer. Gabriel then incubated the bacteria-filled petri dishes for 24 hours, after which he photographed the petri dishes and noted the number of bacterial colonies, their sizes, and their colors in his lab notebook.

Gabriel's findings might surprise you. Despite the popular use of hand sanitizers, he found soap and water—and even just water—to be more effective at cleaning the bacteria off of his hands. Gabriel's findings led him to conclude that we should “1) Always use soap and water to remove bacteria and viruses. 2) If soap is not available, use plain water to wash your hands. 3) Only use hand sanitizers when soap and water or just plain water are not available.”



Dirty hands



I am pressing my fingers on the agar.