



## Colorado Science and Engineering Fair

## 2024 Individual Project Abstract Form

**Please print 2 copies of the completed form. Sign both copies, keep 1 for your notebook and submit 1 copy to your Regional Fair Director with your other paperwork.**

Title of Project: Water Purification - A Solution for Fluoride Contamination

Finalist's Name: Varun Velmurugan

School and City: Campus Middle School, Greenwood Village

Sponsor's Name: Velmurugan Balaiya

Category: Chemistry (CHEM)

Division: Junior (6th - 8th grades)

Abstract (250 words or less):

Fluoride contamination in drinking water has become a considerable threat worldwide. Delivering the right amount of fluoride to drinking water helps protect the teeth from decay and reduces the risk of cavities. However, ingestion of fluoride for an extended period and in concentrations over the recommended limits can produce mild to severe health issues called fluorosis, that can cause incorrect dental enamel formation, muscle disorders, reduce the functionality of joints and even affect the bone structure, and brain impairment. To avoid these terrible effects, it is important to control the fluoride levels in drinkable water, particularly in developing countries without access to safe water networks. Although different methods to remove fluoride from water like reverse osmosis, nano filtration, ion-exchange are used, the applicability of the approach with the prospect of country's economic status is difficult due to high cost and maintenance. In this study we investigated the defluoridation method in water using different adsorption materials under various conditions such as static condition, pH and temperature which could pave the defluoridation methods to newer horizons. Previously, we proved the risk of fluoride contamination in drinking water using a brine shrimp model and in this year project, we are interested in identifying the better cost-effective method to purify the water from fluoride contamination.

*I hereby certify that the above statements are correct and the information provided in the Abstract is the result of one year's research. I also attest that the above properly reflects my own work.*

Finalist's Signature:

Date:

In addition, all students must complete the ISEF Student Checklist (1A), Research Plan, Approval Form (1B), and Checklist for Adult Sponsor (1), and any other ISEF forms required for this type of project. See the International Rules and Guidelines for form requirements. Return COPIES of all of these forms to your Regional Fair Director with you Finalist Verification/Permission Form. A signed copy of this form must be included in your notebook.