Colorado Science and Engineering Fair

2025 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: Effect of temperature on growth of diatoms Skeletonema costatum and Ditylum brightwellii

Finalist's Name: Emma Bahr

School and City: William J. Palmer High School

Sponsor's Name: Nathaniel Lohmann

Category: Earth & Environmental Sciences

Division: Senior (grades 9 - 12)

Abstract (250 words or less):

Although they account for less than 1% of the Earth's photosynthetic biomass, phytoplankton play an important role in aquatic ecosystems and the global carbon cycle. However, they can also grow exponentially, harming their environment. Phytoplankton, and in particular diatoms, are an important subject in the effect of climate change on aquatic ecology, because they are vital to higher trophic levels and largely at the mercy of their environment. This research investigated the impact of temperatures on diatoms Skeletonema costatum and Ditylum brightwellii in the context of the San Francisco Bay.

The diatoms were grown at temperatures ranging from 20-30℃ to imitate temperatures at and around the warmest observed in the San Francisco Bay (24℃). Phytoplankton were grown for 6 days in each temperature condition and populations were measured by manual cell counting every 2 days. Data was analyzed using an ANCOVA hypothesis test. Temperature groups were found to have distinct effects on growth rates of S. costatum ($p<0.01$), however not D. brightwellii ($p=0.15$). The data suggested that the optimal temperature for population growth in both species is around 22℃.

Based on both this study and review of related research, it appears that human disruption of the ecology of the estuary (both directly, through sewage and fertilizer causing eutrophication and indirectly, through the effects of climate change) create conditions favorable to the formation of harmful phytoplankton blooms.

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.**