



# HANDS-ON STEM CURRICULUM HELPS STUDENTS BECOME CITIZEN-SCIENTISTS

After schools go solar with us on campus, we help them make the most of their clean energy with educational resources to turn solar power into an exciting learning opportunity for their students, including standards-based classroom curricula, student materials, and teacher training for both public and independent schools. And all at no extra cost. One of our most comprehensive educational offerings is our innovative high school program, Throwing Solar Shade® (TSS).

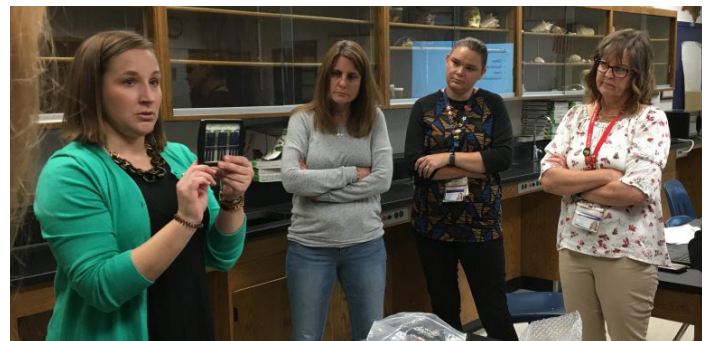
Throwing Solar Shade® is a 12-week program consisting of hands-on STEM curriculum and project-based learning opportunities that allow high school students to become citizen scientists as they evaluate real-world climate issues in their communities and develop potential solutions. Our curriculum was developed in conjunction with the National Energy Education Development Project (NEED) and the research of a PhD climate scientist, Jeremy Hoffman, on the urban heat-island effect.

## WHAT WE PROVIDE

**Teacher training, support, and stipends | Curriculum aligned with state standards and necessary equipment | Scholarship award for winning group | Opportunity and funding for students to travel and present their research at a final, celebratory event**



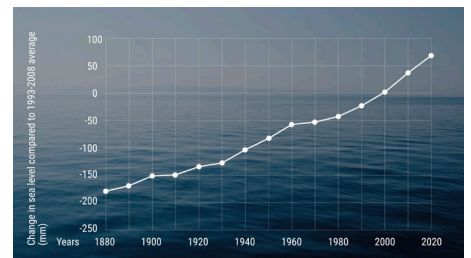
Emily Betts (left), science teacher at Open High School in Richmond, visits Huguenot High School with Secure Solar Futures staff and her class.



Educators learn about using mini solar modules during teacher training, another educational offering of Secure Solar Futures.



Jeremy Hoffman, PhD, narrates a series of engaging videos created for in-classroom use by Throwing Solar Shade® classes.



In 2022, the program united classes from five districts across Virginia and the 2023 cohort is even larger. Students have opportunities to collaborate across district lines, compete for a scholarship award, and present their final research to educators and leaders from across Virginia.

**“ I actually learned a lot myself, just going along with them through the material... I think they came away with a lot better understanding of how electrical currents work, how electricity can be produced, and I think they came out with a much better understanding of conserving energy and engineering.”**

**-TSS TEACHER FROM 2022**



Students present their final projects at the Throwing Solar Shade® Presentation Day event in 2022 at The Science Museum of Virginia in Richmond.

## KEY FINDINGS FROM THROWING SOLAR SHADE® EVALUATION

The following points offer key findings from the evaluation from the second year of the Throwing Solar Shade ®(TSS) program by the Virginia Commonwealth University's Metropolitan Educational Research Consortium.

### FINDING ONE

#### STEM CAREER INTEREST

TSS students showed an increase in interest in STEM as a subject matter and potential career, particularly in relation to their perceptions of having a role model in a STEM field which showed significant growth in their survey.

### FINDING TWO

#### CONTENT KNOWLEDGE

- TSS students showed significant growth in their understanding of STEM through their participation in the program, particularly in their understanding of the mechanics of photovoltaic (PV) cells and solar panels, how environmental factors affect solar energy production, and how shading, coloration, and materials affect surface temperature on buildings.
- TSS students emphasized how they not only gained content knowledge in STEM, but also how to apply it to make a positive impact on their communities.

### FINDING THREE

#### COMMUNICATION, CITIZENSHIP, CRITICAL THINKING, COLLABORATION, AND CREATIVITY (5 C'S)

- TSS students reported growth in skills that aligned with the "Five Cs," an enduring strength of the program across years.
- In particular, TSS students reported significant growth in relation to their sense of citizenship. For example, students described how they learned about their collective responsibility for addressing climate change, indicating that they "share the same problems dealing with energy."