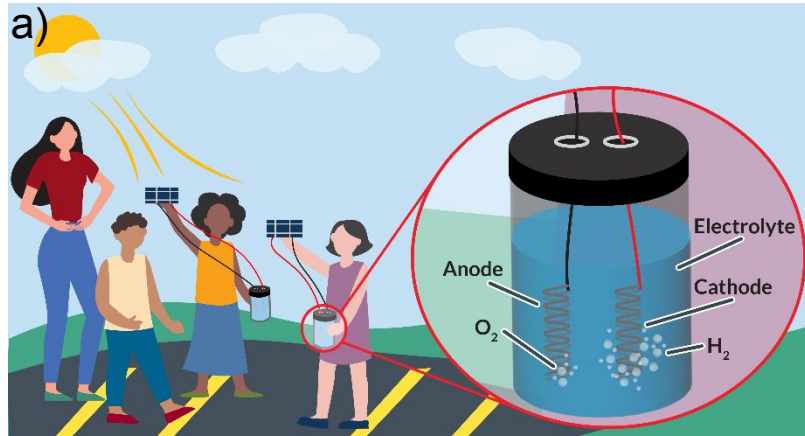


An Active Learning Lesson Plan on Artificial Photosynthesis and Electrochemistry in Elementary Schools



Scientific Achievement:

An active-learning based lesson plan on artificial photosynthesis and electrochemistry for primary school students was developed, using safe, inexpensive, and highly accessible materials. Pre- and post-surveys show a statistically significant improvement in understanding and a narrowed performance gap between minority students and overly represented groups.

Significance and Impact:

Active-learning based lesson plans on artificial photosynthesis and electrochemistry can aid in the development of the next-generation energy workforce by minimizing learning and teaching barriers. The lesson plan is readily adaptable for other scenarios and age groups.

Research Details:

- Developed a lesson plan that employs a hands-on, collaborative activity to teach artificial photosynthesis to 5th grade students in Oakland, CA.
- The materials costs < \$10 per unit and are accessible at supermarkets and on Amazon.
- Lesson plan is aligned with the educational outcomes for 5th grade classrooms in CA.
- A survey was used to ascertain learning in four areas: 1) Motivations of Artificial Photosynthesis, 2) Applications of Artificial Photosynthesis, 3) Inputs and Outputs of Artificial Photosynthesis, and 4) Engineering Design for Artificial Photosynthesis.
- Survey contained questions on student demographics (race and gender).

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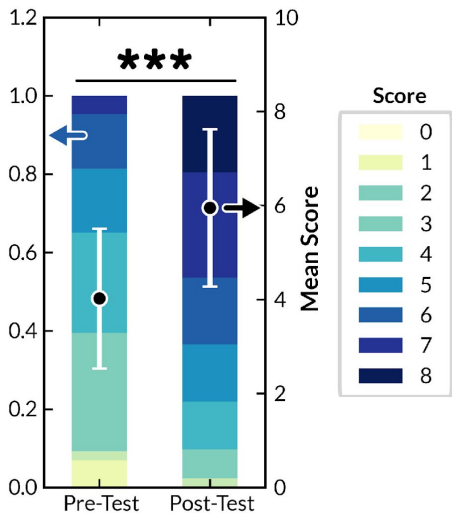


Figure 1: (a) Elementary school students learning about solar-powered water splitting through a hands-on activity. (b) Distribution and mean score of tests before and after lesson plan and demonstration.

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