

Effects of Biosphere 2 Summer Science Academy on Students' Attitudes about Science



THE UNIVERSITY OF ARIZONA
COLLEGE OF SCIENCE

Biosphere 2

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INTRODUCTION

Biosphere 2 is an Earth systems science research facility owned by the University of Arizona.

- The mission of Biosphere 2 is to serve as a center for research, outreach, teaching and life-long learning about Earth, its living systems, and its place in the universe.
- B2 hosts approximately 100,000 visitors per year and 250,000 K-12 students.

The B2 Summer Science Academy is a week-long residential summer program for middle school and high school students focused on science research and experiential learning.

- Research was conducted by participants in each of the Biosphere 2 biomes including: tropical rainforest, ocean, mangrove wetland, coastal fog desert and savannah.
- Participants collaborated with B2 scientists and Outreach Scholars, undergraduate and graduate students from the University of Arizona.
- Research teams presented their findings at a symposium poster session.

PARTICIPANTS

- 43 middle school students and 45 high school students.
- Participants included students from 22 different states and 1 international student.



Figure 1. Biosphere 2 Summer Science Academy high school participants.



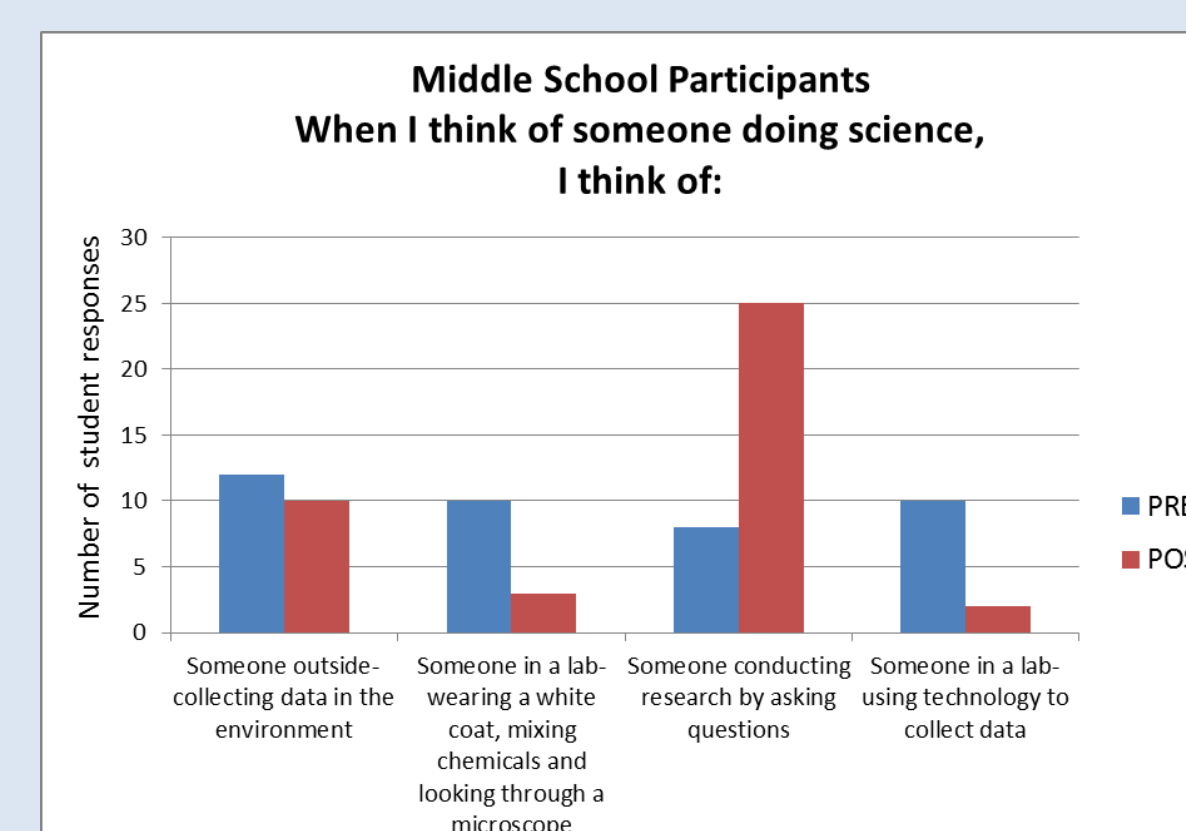
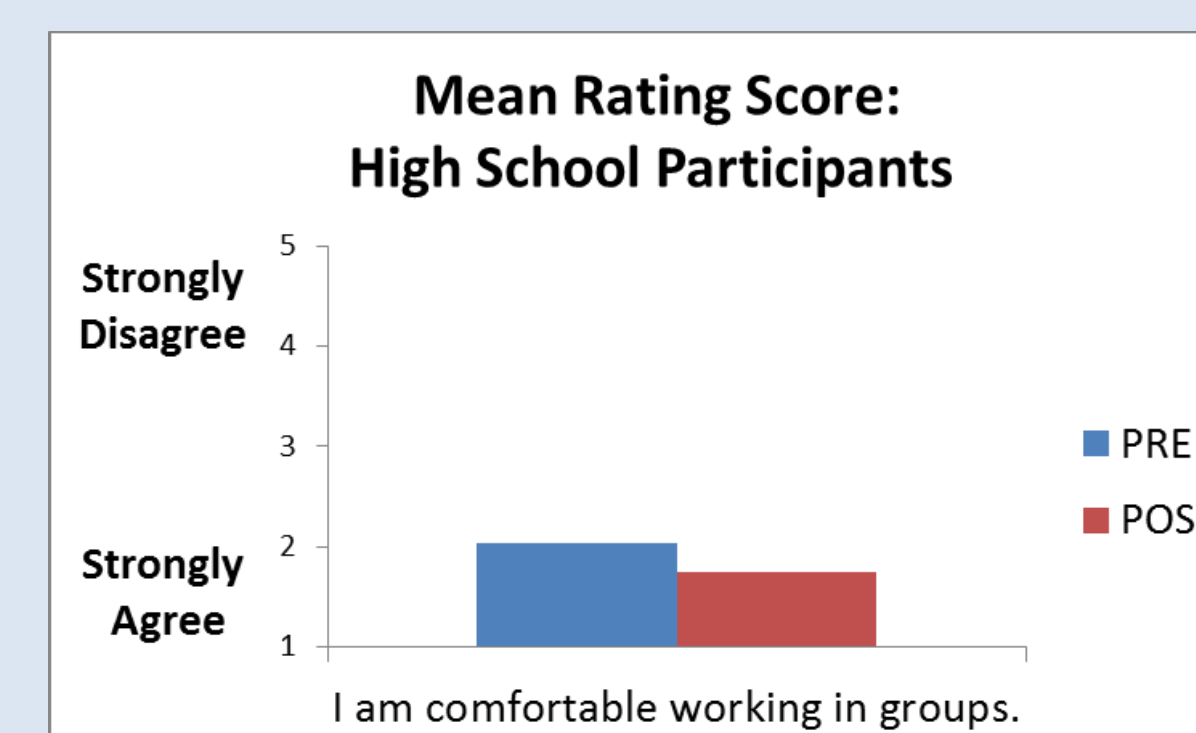
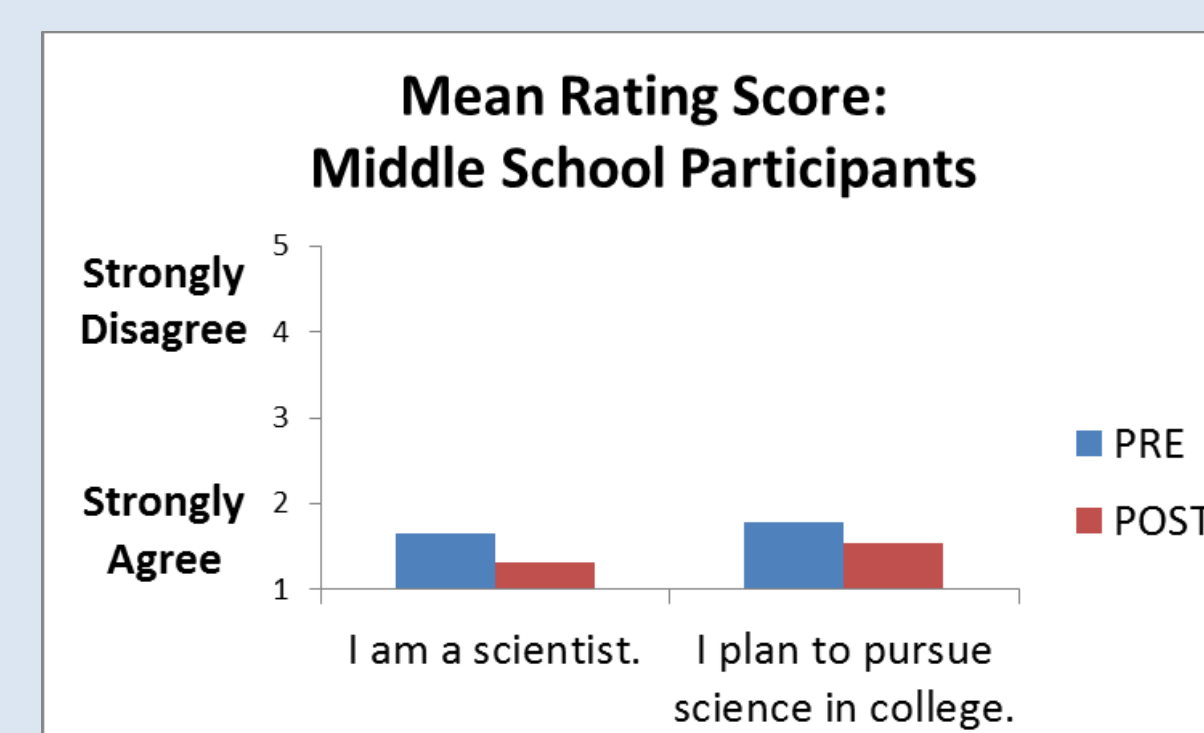
Figure 2. Middle school participants using a porometer to measure stomatal conductance of leaves.



Figure 3. High school participants measuring soil depth in the rainforest biome.

METHODS

- A pre and post survey was used to evaluate the efficacy of the B2 Summer Science Academy.
- Survey data was coded to protect participant privacy.
- The questionnaire included demographic questions, rating questions, structured questions and open-ended questions.
- Student attitudes were self-reported through use of a Likert scale.
- Survey data was used to assess students' attitudes toward science, leadership development and overall educational experience.



RESULTS

- A paired samples t-test was conducted to compare results from pre and post survey questionnaires following participation in the Biosphere 2 Summer Science Academy.
- There was a significant difference in pre ($M=1.65$, $SD=0.53$) and post ($M=1.31$, $SD=0.57$) scores for middle school participants' rating of the following statement: I am a scientist. $t(38)=3.76$, $p=0.0006$.
- There was a significant difference in pre ($M=1.78$, $SD=0.79$) and post ($M=1.54$, $SD=0.74$) scores for middle school participants' rating of the following statement: I plan to pursue science in college. $t(40)=2.36$, $p=0.02$.
- There was a significant difference in pre ($M=2.04$, $SD=0.72$) and post ($M=1.74$, $SD=0.64$) scores for high school participants' rating of the following statement: I am comfortable working in groups. $t(41)=2.87$, $p=0.0006$.

Figure 4. Middle school student testing water pH and salinity in the ocean lab.



DISCUSSION

- Results showed a significant difference in students' reported attitudes toward science and leadership following participation in the Biosphere 2 Summer Science Academy.
- Further research is recommended to assess longitudinal effects of the Biosphere 2 Summer Science Academy on students' pursuit of STEM education and careers.



Figure 5. Biosphere 2 Summer Science Academy Students visiting the Tree Ring Lab at the University of Arizona.

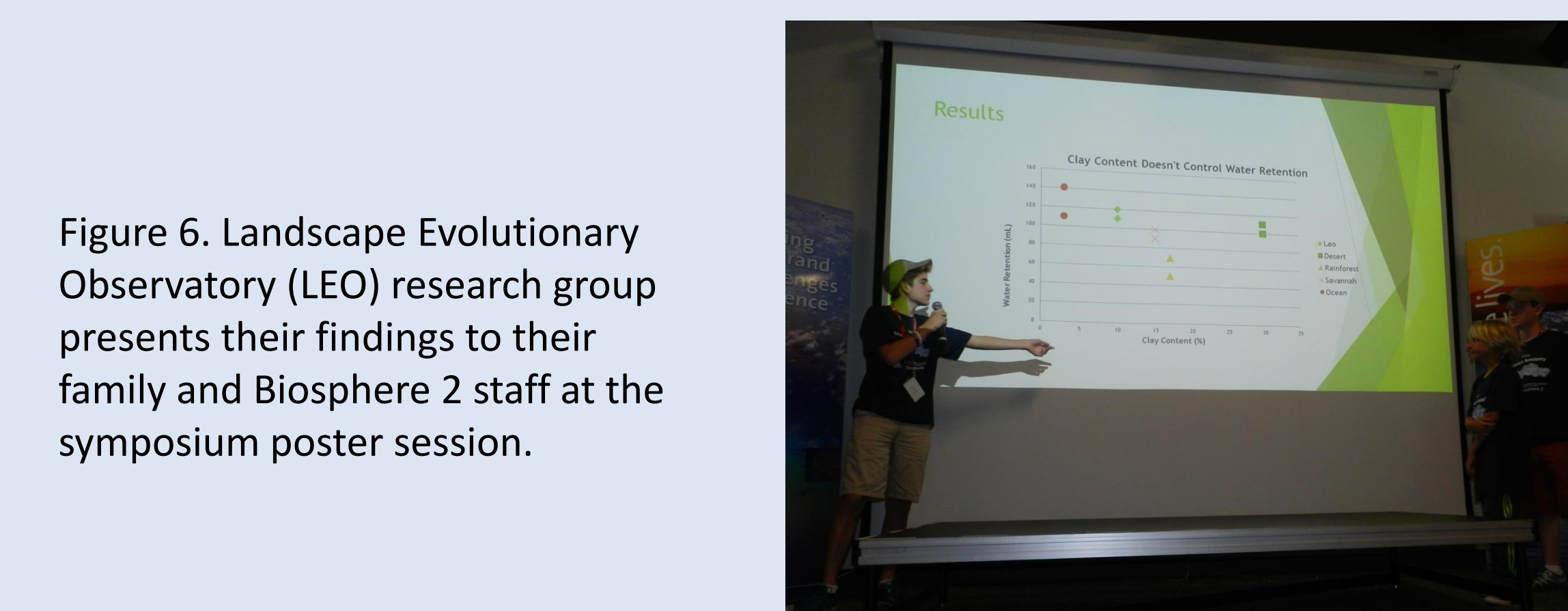


Figure 6. Landscape Evolutionary Observatory (LEO) research group presents their findings to their family and Biosphere 2 staff at the symposium poster session.

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