An Evaluation of Nature Connection and STEM Scores.

Camp Whittier's Elings Science and Math Program: An Evaluation of Nature Connection and STEM Scores.

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Table of Contents

Introduction	3
Problem	4
Stakeholders	4
Structure and Context	5
Literature Review	7
Evaluation Research Questions	7
Sample Population	8
Data Gathering Methods	8
Measurement Scale	9
Resources Needed	9
Evaluation Consequences	10
References	12
Appendix A- NR-21	13

An Evaluation of Nature Connection and STEM Scores.

The Elings Science and Math program (ESMP) was designed to create an enriching and quality outdoor education program aligned with the Next Generation Science Standards (NGSS) for fifth and sixth grade . ESMP was born out of the need for a , unique outdoor education programat for County (UBGC) to compete with the "Outdoor School" that was displaced from a neighboring camp and has been taking place at Camp WhittierThe "Outdoor School" program will return at that pointand UBGC and is scheduled to return in the next calendar year. The evaluation is designed to measure instruction quality the for , and thisand information retention.

The need for the evaluation comes from the responsibility placed on camp Whittier by UBGC and the income source for the larger organization. In 2022 the camp grossed 1.2 million dollars, of which a majority came from the outdoor education program. The current program uses the contacts developed by the Outdoor School and will likely not be in place when the other facility opens. As such, Camp Whittier needs to prove the veracity and quality of the ESMP. theI

The ESMP is advertised as a program that raises STEM scores while youth participate in nature-based activities. The latter statement is fundamentally true as the program takes place at a residential camp in a rural setting. Stating that the program will raise STEM scores and aid youth in related fields has yet to be evaluated and proven. the intervening years; in, the ESMP isStakeholders:

There are two different but linked stakeholders for this evaluation. The first is the UBGC, the organization running and promoting this program at the Camp Whittier location. The continued success of Camp Whittier is contingent on the income generated by the ESMP. The evaluation will allow the successes or failures of the program to be addressed and either improved upon or maintained after the study. The second stakeholders are the schools who serve the andstudents who participate in the ESMP. They will be directly affected by any changes or modifications brought on by the evaluation. The hope is that the program will be shown as effective and high quality. Thus the students will be receiving quality outdoor education instruction.

Structure and context of the ESMP.

The ESMP was developed in recent years for the UBGC and camp Whittier to have an outdoor education curriculum and program. . For the past five years, the Outdoor School has been operating out of the Camp Whittier location, and they will soon return to Rancho Alegre.The Outdoor School program has realized the possibility of an increased revenue stream for the UBGC and Camp Whittier.

An Evaluation of Nature Connection and STEM Scores.

A founding idea of the ESMC was to create a program that was an updated version of the Outdoor School curriculum, which was originally based on the Beetles Project(Lawrence Hall of Sciences, 2023). The updated program has been written to meet NGSS standards to facilitate integration and draw from schools. Included in the appendix is a logic model detailing the program and expected outcomes.

The ESMP (typically) takes place over a 4-day, 3-night sleepaway camp experience during the school year and is attended by school groups during the week, typically Tuesday to Friday.Y with (camp) staff, called naturalists, who are trained in the ESMP curriculumfrom anaturalistnaturalista total of five naturalists/lessons

The Elings Science and Math Camp Logic Model

Literature Review

The American Institutes of Research (AIR) studied the effects of outdoor education programs and the effects of science-based knowledge on participants (2005). Their research showed a sustained increase in science-based knowledge immediately and six to ten weeks after treatment. (American Institutes of Research, 2005, p. vi). Students participating in the outdoor science program maintained a positive outlook on care, concern for the natural environment, and a sustained connection to nature.

The paper published by Bratman et al. (2012) reviews the studies that look at the impacts of nature on individuals in the ways they respond to stress, cognitive well-being, and attention restoration. Relating to the biophilia hypothesis of Edward Wilson (1984), suggesting that humans are wired to love and have an affinity for the natural world, the paper discusses various studies that support human well-being while in natural settings.

Peter Kahn and Thea Weiss (2017) discuss the basic lessons we learn in nature, from falling and recovery to basic problem-solving and social dynamics. They hypothesize that youth can deepen their mental and physical capabilities by facilitating natural connections. With time spent in

nature and away from urbanized areas, individuals can reconnect with the environment and learn new forms of interaction that positively affect their development.Evaluation **R**esearch **Q**uestions. program's primary goalincreaseparticipating *I am not sure about this, I am still working on how or what I will be asking*
Do I need to find evaluation scales already used and tested? My original thought was to use the nature-relatedness scale, but that does not create a measurement that relates to the goal of the evaluation.

sampled populations will come from students participating in on their school-sponsored 5th and 6th-grade science camp trips. There is a cross-section of socioeconomic levels represented in the schools attending, most of the students attending are from public schools, but several private, religious schools attend. The public schools will be the focus of the evaluation as they participate in the state standardized tests that will be reviewed.

The (NR-21)NR-21 a third

Measurement Scale

The NR-21 will be the scale used to evaluate students' connection to nature, developed by Nisbet et al. (2009). The measurement was developed to measure individuals and their feelings and connections after exposure to the natural environment. Two scales have been developed, the NR-6 and the NR-21. The NR-21 can be found in appendix-A; included are instructions for modifying the scale to NR-6. This evaluation will use the NR-21, which has more questions and gives more reliable feedback on the participants' dispositions.

The scare has three aspects to its questions: nature-relatedness and the self, nature-relatedness and perspective, and nature-relatedness and experience, and combined, they give a general score for the level of nature-connectedness and individual. The scale gives a deeper perspective into the individual response and is useful in understanding any connections that may have been strengthened in the ESMP.

An Evaluation of Nature Connection and STEM Scores.

"The California Science Test" is administered to students and has been designed to measure students' aptitude and abilities in the subject matter. The California Department of Education has developed this for grades 5th and 8th and will be used to measure the change in students' knowledge of the subject matter.

Resources Needed

The resources needed for this evaluation are using the Qualtrics software to administer the NR-21 survey to the students. The participants will need the use a tablet or laptop to access the survey, a common device in public schools. In addition to the device need, teacher buy-in to provide the time and space for the students to take the survey. Human resources will be needed to input the survey into Qualtrics, monitor the results, and then collect the data from Qualtrics and compare them against state scores.

Camp Whittier will need to provide quality and trained staff to implement the program, and these naturalists will need to be trained in the material and able to convey the information to the students attending the ESMP. The location and participation of schools in the program will be necessary for this evaluation to succeed, maintaining a roster of schools that plan on attending the program as a core component of the evaluation.

Barriers to Completion

There are more than a few barriers to completion for the success of this evaluation. The primary is the cooperation of the UBGC in the evaluation; there is a possibility that there will not be a desire to invest resources into evaluating a program if it does not guarantee a positive outcome. Time is a second barrier; as previously mentioned, Rancho Alegre is scheduled to reopen, and the "Outdoor School" will return at that location; this would take the roster of schools that currently attend the ESMP at Camp Whittier.

The cooperation of the teachers and schools can also be a potential barrier; the schools will need to cooperate and proctor the survey for the students for pre- and post-attendance data collection. There is existing pushback from the schools concerning requirements for attending the program, which may exacerbate feelings that will lose teacher and administration buy-in.

References

California Department of Education. (2022, February 15). California Science Test (CAST). Retrieved April 25, 2023, from https://cascience.org/download_file/view_inline/459

Effects of outdoor education programs for children in California. (2005). *American Institutes for Research*. https://doi.org/https://www.air.org/sites/default/files/downloads/report/Outdoorschoolreport_0.pdf

Lawrence Hall of Science; University of California at Berkeley. (n.d.). *Home*. Beetles Project. Retrieved April 24, 2023, from http://beetlesproject.org/

Peter H. Kahn, Jr., & Thea Weiss. (2017). The Importance of Children Interacting with Big Nature. *Children, Youth and Environments*, *27*(2), 7–24. https://doi.org/10.7721/chilyoutenvi.27.2.0007

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WILSON, E. O. (1984). *Biophilia*. Harvard University Press. https://doi.org/10.2307/j.ctvk12s6h

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Appendix

A: Nature Relatedness Scale, NR-21(Nisbet et al. 2009).

Nature Relatedness Scale

Instructions: For each of the following, please rate the extent to which y ou agree with each statement, using the scale from 1 to 5 as shown below. Please respond as y ou really feel, rather than how you think "most people" feel.

1 **Disagree strongly**	2 **Disagree a little**	3 **Neither Agree or disagree**	4 **Agree a little**	5 **Agree strongly**

1. I enjoy being outdoors, even in unpleasant weather. ____
2. Some species are just meant to die out or become extinct. ____
3. Humans have the right to use natural resources any way we want. ____
4. My ideal vacation spot would be a remote, wilderness area. ____
5. I always think about how my actions affect the environment. ____
6. I enjoy digging in the earth and getting dirt on my hands. ____
7. My connection to nature and the environment is a part of my spirituality. ____
8. I am very aware of environmental issues. ____
9. I take notice of wildlife wherever I am. ____
10. I don't often go out in nature. ____
11. Nothing I do will change problems in other places on the planet. ____
12. I am not separate from nature, but a part of nature. ____
13. The thought of being deep in the woods, away from civilization, is frightening. ____
14. My feelings about nature do not affect how I live my life. ____
15. Animals, birds and plants should have fewer rights than humans. ____
16. Even in the middle of the city, I notice nature around me. ____
17. My relationship to nature is an important part of who I am. ____
18. Conservation is unnecessary because nature is strong enough to recover from any human impact. ____
19. The state of non-human species is an indicator of the future for humans. ____
20. I think a lot about the suffering of animals. ____
21. I feel very connected to all living things and the earth. ____

Scoring Information Reverse scored items: 2, 3, 10, 11, 13, 14, 15, 18; NR-self items: 5, 7, 8, 12, 14, 16, 17, 21; NR-perspective items: 2, 3, 11, 15, 18, 19, 20; NR-experience items: 1, 4, 6, 9, 10, 13 Overall NR score is calculated by averaging all 21 items (after reverse scoring appropriate items). Scores on the 3 NR dimensions are also calculated by averaging appropriate items after reverse scoring.

A short-form version of the NR scale (NR-6) consists of items: 4, 5, 7, 9, 17, 21. Items are averaged to create a score on the brief measure of NR. No items are reverse-scored.