

Motivation

In many education systems, meteorology is given little attention in comparison to other subjects. In Arizona, the standards of learning have meteorological concepts outlined in the following grade levels: kindergarten, second grade, fourth grade, seventh grade, eighth grade, and one year of optional high school credit ("Standards: Science Standards"). When comparing the standards of learning for the life science (biology) subject, life science is taught in every year of school up to high school, where there is a required year of life science in order to graduate. For students who may have an interest in meteorology, this leaves a lacking education and potentially prevents students from pursuing a career in the field of meteorology and atmospheric science.

Introducing Meteorology to Students

In an effort to introduce students to the concept of meteorology/ atmospheric science, I entered the classroom of Dr. Constantinos Manoli at the St. Cyril of Alexandria School in Tucson, Arizona. Dr. Manoli provided me with the opportunity to teach his eighth grade students numerous concepts including the North American Monsoon and Climate Change. The goal was for students to answer questions like: What is a monsoon and when is the Arizona monsoon

- season?
- How do monsoons form and what impacts the variability of the monsoon?
- What is an urban heat island and how has the climate changed over the last century?

In addition, the goal was for students to gain research skills and experience to bridge the gap between K-12 and higher education.

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Outreach in Meteorology as an Underrepresented Science Lauren Porter^{1,2}

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Teaching, Experiments, and Projects

Students were taught the basic mechanics of the North American Monsoon and overall climate change. Experiments were conducted to teach basic concepts in airmass transport and clouds (Fig. 1). Students then completed a joint research project that was presented at the Univ. of Arizona El Dia conference convened by the Department of Hydrology and Atmos. Science (Fig. 2).



Figure 1: The experiments conducted by the students to better understand the atmosphere. (a) represents the airmass experiment, conducted using red, hot water and blue, ice to show how warm air rises and cold air sinks. (b) represents the cloud in a jar experiment, conducted using a match (smoke for aerosols), hot water, and ice.



Figure 2: The poster presented at El Dia by ten eighth grade students.

Citation

"Standards: Science Standards." Arizona Department of Education, 19 July 2022, https://www.azed.gov/standards-practices/k-12standards/standards-science.



Figure 3: In a survey completed by students at the conclusion of the outreach fellowship, students rated their overall experience on a scale of 1-10. The students were asked to consider the learning material, homework assignments, experiments, and research projects.

Post-Fe
Yes 48.8%

Figure 4: In a survey completed by students at the conclusion of the outreach fellowship, students identified whether or not they had an increased interest in the field of atmospheric science.

- grade levels.



Results Student Experience from a Scale of 1-10 **Overall Student Experience**



Conclusions/ Future Work

Students were found to be lacking a subjectively basic understanding of the atmosphere.

• Many students found interest in the subject and actively pursued an understanding of the topics discussed.

In future work, students need to be provided with a more basic understanding of the atmosphere prior to learning about specific topics. This should be implemented in lower