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Successful strategies in teaching Earth system science

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There are multiple strategies that have been successfully used singly or in combination, in teaching and learning Earth system science for pre-college teachers and their students as well as undergraduate and graduate students. One technique is partnering scientists with teachers and students in the classrooms, whether through intermittent but regular interactions or long term partnerships such as throughout the school year. Another is engagement of students including young children in ongoing science research investigations and/or conducting their own inquiries including presentations of their studies, as a way of applying what they have been taught and as evidence of what they have learned. A third approach is use of experiential learning through short or long field trips and expeditions. A fourth method is use of different knowledge systems, i.e. western science and Native knowledge in Earth system science pedagogy. This last is especially important for indigenous students and has also been appreciated by non-indigenous students. Examples of how past and ongoing projects/courses, such as the Partners in Science, IPY GLOBE Seasons and Biomes, GK-12 Teaching Alaskans Sharing Knowledge, Observing Locally - Connecting Globally, and the International Arctic Research Center Summer Schools, that have implemented or are using these techniques with success, will be discussed in the paper.