CROSSCUTTING CONCEPTS AS LANGUAGE FOR REASONING AND SENSEMAKING IN HIGH SCHOOL EARTH SCIENCE

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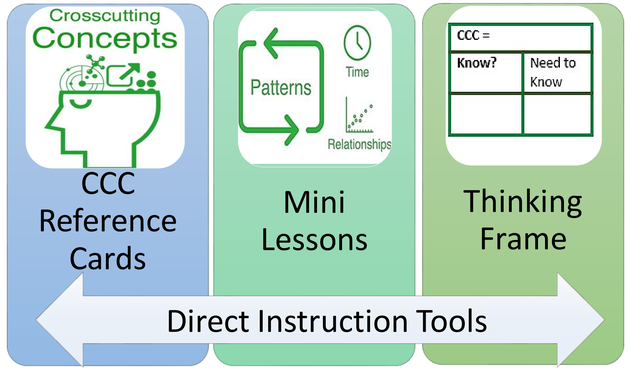
Background- Why Crosscutting Concepts?

- Core Ideas in High School **Earth Science** cover many topics **relevant to challenges** humans are facing across the globe.
- To address these challenges, it is increasingly important that we **support students** in improving **reasoning and communication** as part of **scientific literacy.**
- **Crosscutting Concepts** have potential as common language for student to describe thinking as they communicate.

Action Research Question

To what extent does the direct instruction of crosscutting concepts impact student reasoning and communication in high school Earth Science?

Treatment



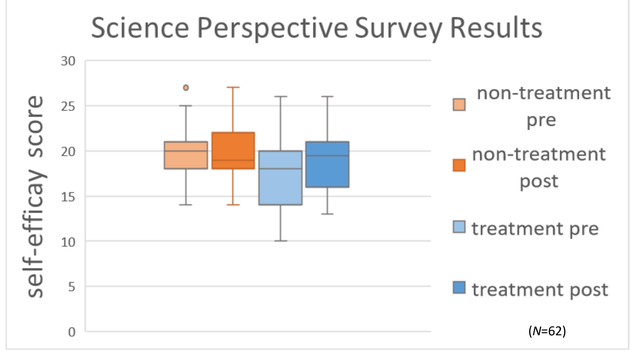
Direct instruction of Crosscutting Concepts **increases recognition of CCCs** across science content and **improves student connections** with content and each other.

Data Collection related to sub questions

Recognition of CCC's	Proficiency - Detail and Specificity of Reasoning	Self efficacy and Science communication
Science Perspectives Survey	Misconception Probes	Science Perspectives Survey
Notebook Reflection	Unit Application ?'s	Notebook Reflection
CCC Practice Tasks	CCC Practice Tasks	Student Interviews

Results

- **87% of students** in treatment group **increased recognition** of CCC's and were able to provide examples across content.
- **Changes in reasoning proficiency** were **not significantly different** between the treatment and non-treatment group.
- Students with **lower self efficacy made larger gains** with direct instruction.



Conclusion and Value

Direct instruction of Crosscutting Concepts

- Contributes to a common language in the science classroom.
- Helps link ideas across science topics
- Provides starting point for student reasoning