

THE IMPACT OF EXPLICITLY TEACHING SYSTEMS THINKING SKILLS FOR THE NGSS

BACKGROUND

- I teach **sixth grade science** students at a N-12 private international school in the United Arab Emirates
- Saw **student success** with Science Practices and Disciplinary Core Ideas
- Students **struggled to make connections** between concepts and units
- Would explicit instruction of the Crosscutting Concepts improve students' ability to understand content and make connections?

METHODS

PRE

- Survey and interviews
- Initial models and concept maps

DURING

- Systems minilessons
- Lab investigations

POST

- Final models and concept maps
- Survey and interviews



KEY FINDINGS



Figure 1. Comparison of cumulative pre- and post-treatment assessment scores (N=88).

- Students improved in all four systems thinking skills, with variation between students reducing from pre-treatment to post-treatment.
- Students reported that learning about the systems analysis helped them understand the water cycle and vice versa.

“ If you learn what a system is, it's easier to learn about a specific system. ”

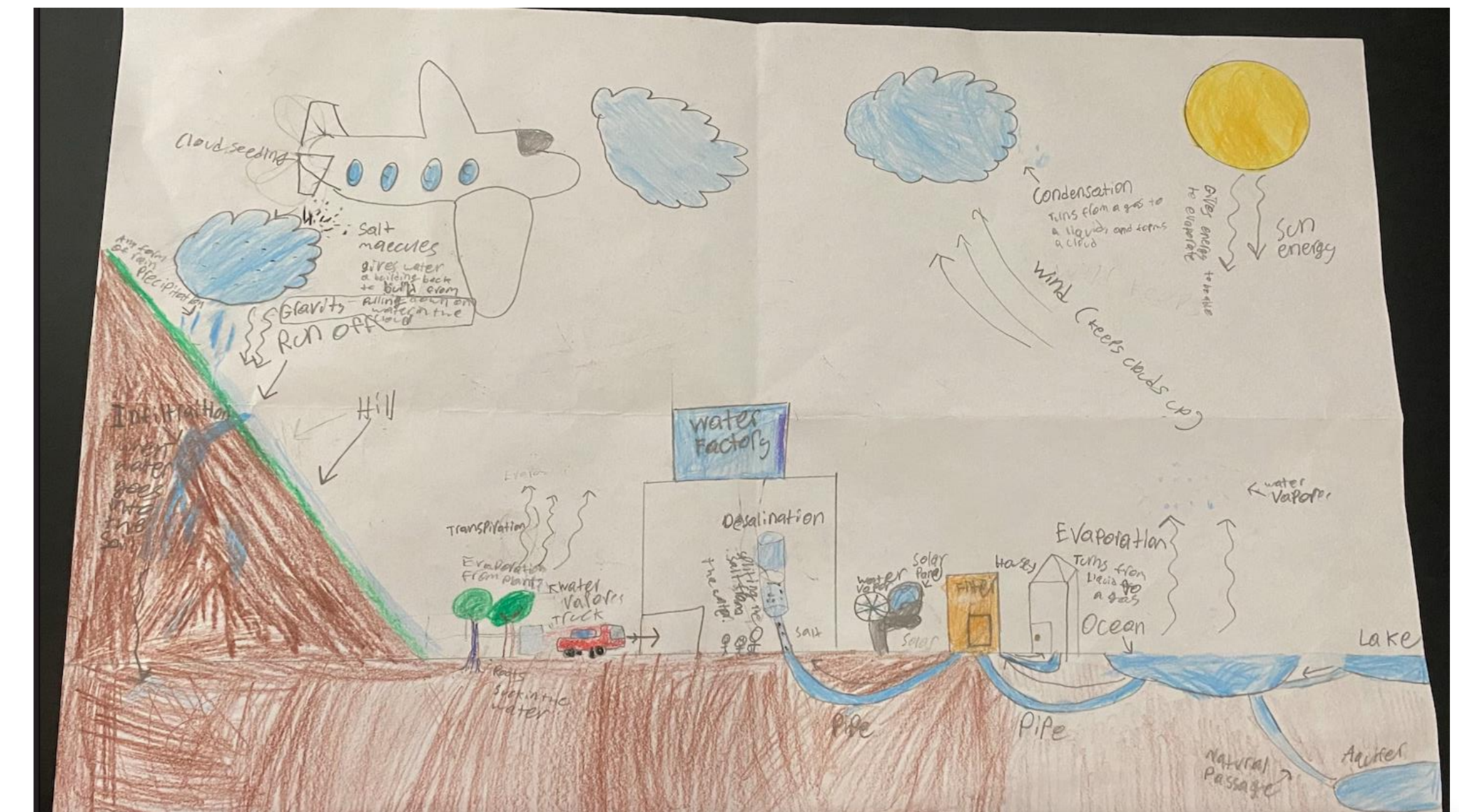


Figure 2. Sample student post-treatment model.

TAKE-AWAYS

- Students with **higher MAP scores and better spatial thinking skills show higher success** with systems thinking in both pre- and post-assessments.
- Teaching systems thinking **improves three-dimensional instruction**, as students noted learning about systems helped them understand concepts and how to ask better questions, interpret results of investigations, and make models.



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