



Teaching *for*
TRANSFORMATION

Calculations with Wells

Math 8

Mr. Bain
NCAI



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Deep Hope:

My Deep Hope is that in this chaotic world we comprehend how balance in math reveals God's established order.

Long Term Learning Targets: Order Discovering

- 🎯 I can model situations with linear functions so that I know where the situation is headed if nothing changes.
- 🎯 I can represent and interpret functions in an equation and on a graph in order to understand how a function remains in balance.
- 🎯 I can discover the order in God's world by exploring the application of functions to real world problems, like digging and utilizing a well.



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Curricular Outcomes:

- Use functions to model relationships between quantities.
- Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.



Habit(s) of Learning:

Before our field work, students engaged in **joy-filled collaboration** as they worked to understand how we were going to apply our knowledge about functions and volume to an actual well drilling site. As we were there, they worked together to follow instructions and help in the limited ways we could. After the visit, they were motivated to make calculations about a real situation happening in Roberto Centeno's community, where their well stopped working and they have been without water for 2+ years.

Our reflection activity afterwards required **curious thinking** as students tried to imagine what it would be like to live without water, as well as how their math skills could help others in the future.



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See God's Story:

Creation	Fall	Redemption	Restoration
God created a world with enough food and water for all people.	Many people today live in communities without access to potable water.	God plants people in community to meet more of their needs; engineers design ways to get people access to water.	One day no one will be without water as everything will be as God desired. We can use our math skills to join Him in restoring balance to creation.

Storyline:

Restore Balance is our Storyline, and this activity gave students a vision of how math is necessary to restore balance to some broken situations.



Throughlines:

Order Discoverers

Students were order discoverers while recognizing how much math was required to find the water underground, dig the hole, pump the water out, store it in a tank, and serve a population was a journey of discovery for the students.

Servant Workers

Students engaged our FLEx with the attitude of going to serve and use their math skills to understand as best they could the work being done, as well as recognize their ability to achieve more with further education.



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Formational Learning Experience:

Real needs: No access to clean water

Real people: Small church and neighbors in Los Cedros

Real work: Participation in creating a well to provide access to clean water

INVITE

Students were introduced to the idea, then asked which Throughlines they thought most applied to what we were planning to do.



NURTURE

Community member Roberto Centeno shared about his community being without water, nurturing students' understanding of the real people and the real need.





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EMPOWER

- Students were empowered by recognizing that their learning can play a role in helping real people with real problems.
- They also connected their future learning with a greater capacity to serve others, as the engineers needed greater math skills than what the 8th graders currently possess.





Student Reflections:

“We can be Order Discoverers through math by helping people solve a problem”

“We can be resourceful and use our math skills to help others”

“We can be truth seekers by solving to get the answer, we could be order discoverers by looking at how equations must always be balanced on both sides, and we can be servant workers by applying what we’ve learned to real life.”

Teacher Reflections:

Students met the long-term targets of understanding and applying functions to the real world. They connected the Deep Hope to the FLEx very naturally, much more so than any of our lessons.

Spending extra time talking about Deep Hope, Storyline and Throughlines before we went was essential to get them in the appropriate frame of mind.