EDCI 786 Topics: Science Research in the Classroom
Final Report

1.Brief Description of Research Partner's Work (as you would describe it to your students).

Dr. David Steward is a civil engineer that collaborates with other professionals on the water in the Great Plains area. He teaches engineering students about the underground water supply and the factors that allow aquifers to recharge. His lecture that he provided for the classroom shows him modeling the groundwater flow in a large groundwater model.

2. Brief Description of Classroom Adaptation/Fit with Your Curriculum.

Ninth grade English Language Learners completed a unit on groundwater and the water cycle. This unit lasted for 7 instructional days and ended with the students creating a groundwater model, pumping water through it and evaluating the flow and recharge rate. Students compared and contrasted the models created and presented by the difference groups in the class.

3. School Environment (Rural/Suburban/Urban; Local Economy; Other relevant features)

Emporia is considered a rural district in the state, however no students in this classroom had an Kansas agricultural background. All students were Hispanic and could communicate on the basic level. These students are placed in a sheltered science class due to their limited English ability. USD 253 is over 50% minority because of the Tyson Plant which brings in workers.

4. Students Participating in This Unit:

	Gender		
	Female	Male	Total
# Students	2	8	10
% Students	20	80	100

	Ethnicity						
	Asian	Black	Hispanic	Native Am	White	Multi-Ethnic	Total
# Students			10				
% Students			100				

SES

	Free	Paid	Reduced	Total
# Students	7	0	3	10
% Students	70		30	

	Other	
	Free/Reduced Lunch	Special Needs
# Students	0	0
% Students		

5. Description/Reflection of Classroom Implementation

a. Day Taught/Placement in the Curriculum (what students already know)
7 day unit which was taught after going over safety, measuring and converting skills, and the scientific method.

b. General Response of Students/Points of Student Difficulty
The students liked the hands-on nature of the unit. The labs on porosity and creating the groundwater model were their favorite activities. They had difficulty with the vocabulary for the unit and need constant reinforcement to master the words and their meanings.

c. Student Outcomes Data:

Student #	Pre-assessment % Score	Post-assessment % Score	Learning Gain Score
1	30	70	0.57
2	60	100	0.67
3	40	100	1.00
4	10	30	0.22
5	20	100	1.00
6	30	70	0.57
.7	10	90	0.89
.8	30	100	1.00
.9	30	70	0.57
.10	30	80	0.71
Average	40	81	0.72

Formula: $\frac{\text{(Post Assessment \% - Pre Assessment \%)}}{\text{(100\% - Pre Assessment \%)}} = \frac{\text{Actual Gain}}{\text{Potential Gain}}$

Student Response Data:

Student #	Enjoyed the Lesson	Learned a lot	More Excited About Science
1	3	3	2
2	3	3	3
3	3	3	3
4	3	2	1
5	3	3	3
6	2	2	2
.7	3	3	2
.8	3	3	3
.9	2	2	1
.10	3	3	2
Average	2.8	2.7	2.2

1 = Disagree 2 = Neutral 3 = Agree

c. Unanticipated Problems/Successes

d.

It took a great deal of drill and practice to get the students to understand and be able to use the vocabulary. The clay which was used in the groundwater model was a major problem. Getting it in and out of the narrow container and getting it clean afterwards was challenging and took more time than anticipated. The students enjoyed the porosity lab and the groundwater model. They wanted to try different ways of making it and instead of them working in groups some chose to make their own.

e. Adaptations/Changes Made to Final Lesson Draft

The only change made was in the amount of time required for my students to master the vocabulary. This was necessary because my students have a limited knowledge of the English language. I think the vocabulary is appropriate for the average 9^{th} grade student, but extended time will be necessary for SPED and ELL students.

f. Recommendations for Future Users

Wrap the clay barriers used in the groundwater model with saran wrap so that the clean up is easier. This can be discussed with the students so that they realize why it is being done. Another option could be to line the entire container with saran wrap, leaving only the opening unlined. This would allow for easier removal of all materials. I have not tried this and do not know if it would cause any problems with placing materials into the model.

6. Final Version of the Lesson

It is the same as originally submitted. However, it has never been uploaded to the server. I am submitting it again with this so that it can be uploaded.