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Second Grade Students Learn about Civil Engineers and Erosion

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SECOND GRADE STUDENTS LEARN ABOUT CIVIL ENGINEERS AND EROSION

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OVERVIEW

Students learned about erosion and the roles of civil engineers through art integration. Students constructed landscapes, built hills upon them, and observed what happened when they dripped water on to their hills.

AIM OF STUDY

- Examine the role of arts integration in education and the learning process for children.
- Analyze the process of students learning what civil highway engineers do regarding erosion.

LITERATURE REVIEW

The Arts Provide Needed Motivation

Students look for personal meaning when tasked with learning something new, when personal meaning is established there is a deeper feeling of motivation to continue learning.

Benefits of Arts Integration



Children are naturally inquisitive and often look for understanding how things work.



Figure 1. Example badge which students personalized, student responses and sketches to observing erosion.

The question many researchers are still trying to answer is *how* the cognitive process occurs through the incorporation of the arts.

METHOD

RESEARCH QUESTION

What is the process of 2nd grade students learning about the work of highway engineers and how do arts play a part in that learning?

PARTICIPANTS

23 second-grade students
11 female and 12 male
Age range 7 to 8 years

QUALITATIVE DATA COLLECTION

Data was gathered from the examination of field notes, pictures, students' verbal statements & facial expression, as well as completed student products.

Students' creative processes were analyzed by facial expressions and verbal statements from the students expressing positive feelings.

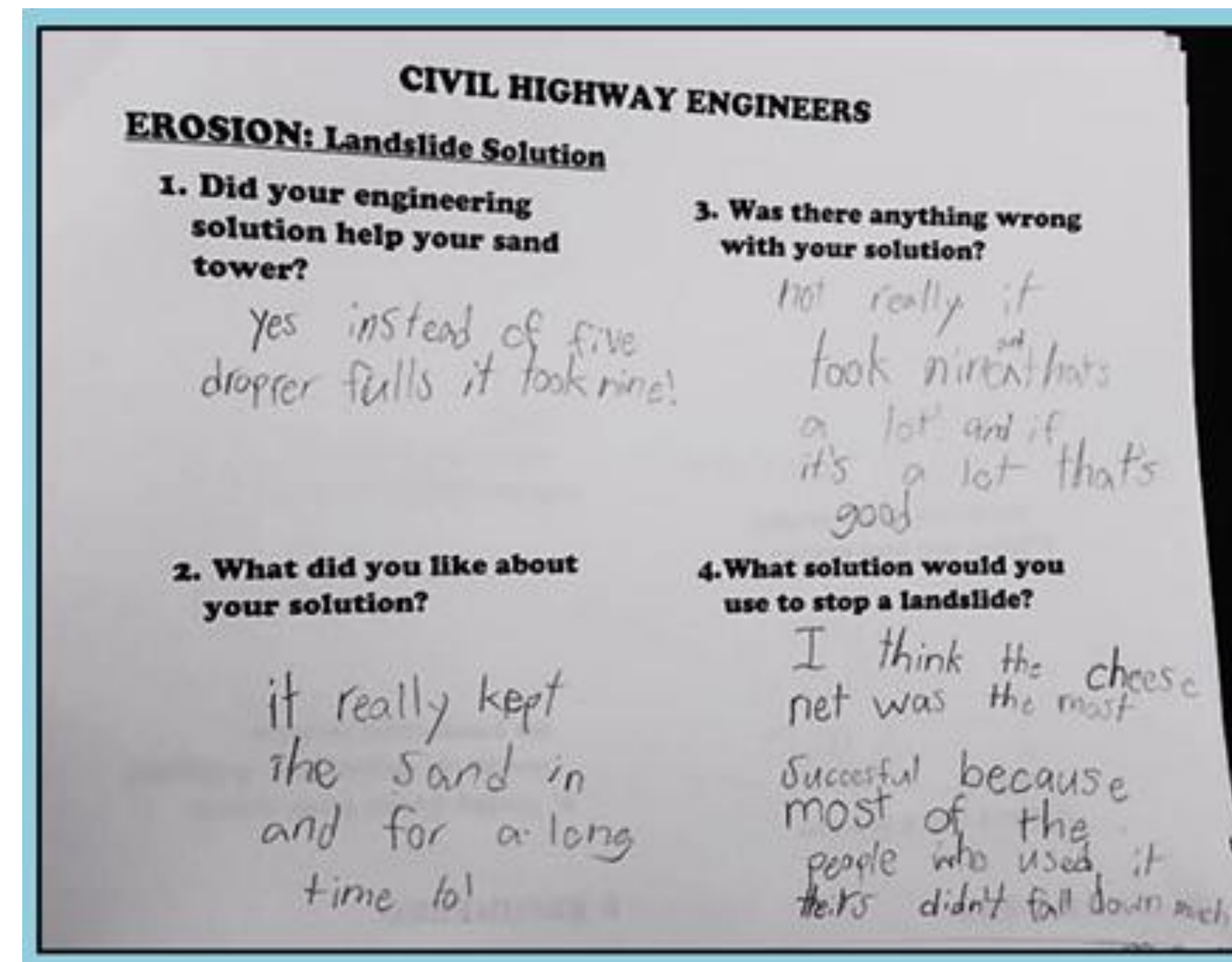


Figure 2. Example student responses to observing erosion.

RESULTS

Through qualitative content analysis twelve general themes emerged regarding the thought processes of the study participants.

Theme	Order
Prior knowledge connection to erosion or erosion solutions	1
Connect erosion to engineers who stop or prevent it.	2
Learning about Civil Engineers and Developing an identity of being a civil engineer by finding symbols that they relate to and that fit with civil engineers	3
Observing the erosion in action	4
Shape of the sand tower discussed	4
What erosion looks like	4
Connecting the activity to art	5
Motivation , enjoyment, fun, fantasy	5
Social Learning and teamwork	5
Problem-solving about the erosion solutions	6
Connecting solution to real world	7
Desire to continue exploring erosion	8

Figure 3. The general themes in order of occurrence, with several of the themes sharing a ranking number as they were so closely intertwined.

SUMMARY OF FINDINGS

Motivation and Enjoyment

Students displayed high levels of enjoyment and motivation through positive body language (smiling, cheering, clapping) and verbal communication.

Problem Solving

As the students observed the changes in their sand hills they began to rely more on their engineering skills to continue their investigation into how erosion occurs and what their role is to stop it.



Figure 4. Examples of students testing different engineering solutions to erosion on the sand hills.

Social Learning and Teamwork

Working in groups allowed students to discuss ideas through social learning. Students were able to rely on one another throughout the learning process by observing the ways in which differing students approached their activities from different perspectives.

FUTURE RESEARCH

The learning process for children engaged in science and art integration highlights the need for teachers to engage children from a multi-perspective approach.

Art cognition emphasizes multiple perspectives, as does engineering, incorporating the two in a classroom lesson recognizes that there are multiple solutions to most problems.

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