



# **Classroom Implications of NGSS for ELLs**

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# *Who am I?*



- Classroom ESL and BR teacher
- NGSS writer
- Semester in Chile

## Overview



- Context: Issues with science achievement for ELLs
- Pre-NGSS: The way we've been supporting science for ELLs so far
- Opportunities through NGSS
- NGSS in the classroom: Real world trial

## ***Context***



### **Urgent national call for improved access to science**

1. Changing demographics
2. Achievement gaps in NAEP
3. Policy: AYP points to inclusion of language learning in academic content
4. National need for equal opportunity



# Pre-NGSS

# Pre-NGSS



**Today's classroom for each lesson with ELL focus – every ELL student has a**

1) Language objective

2) Content objective

# *Pre-NGSS*



## Content Objective

- E. Compare the structures of the
- Earth's land features using models, pictures, diagrams, and maps.

## Pre-NGSS



### Example Progression WIDA

- Level 3: **Follow multi-step directions** to complete a model of landforms **with a partner using realia.**
- Level 3: **Write a brief description** of each landform presented in the model **using an illustrated word bank.**

## *Pre-NGSS*



## The "experience of learning science" through the eyes of Muhammed

- 1) scores a DPI 2.4 (composite)
- 2) has lived in U.S. almost 1 year
- 3) is from rural Gambia
- 4) speaks Wolof

## Pre-NGSS



### Table Discussion

*T:* Tell me about this landform in our model. (She points to an illustrated word bank). Is it a lake or a river?

*M:*It is a lake.

*T:* Now show me the big, round lake in the model, Can you find a big, round lake?

*M:*Here is the big, round lake.

*T:* What can you write about this lake? Can you write about the lakes in the model for me?

*M:* (Writes, using the word bank) *The big round lake.*

## *Pre-NGSS*



**DISCUSS: What was Muhammed's experience learning science?**

What English is he developing?

What is he learning about science?

What is he learning about the language of science?



# Opportunities through NGSS

# *Opportunities through NGSS*



## **NGSS: Major Shifts in Science Education Highlights process**

1. Disciplinary core ideas
2. Crosscutting concepts
- 3. Scientific and engineering practices**

# Opportunities through NGSS



## Performance Expectation

### 2. Earth's Surface Systems: Processes that Shape the Earth

- **2-ESS2-b** Develop an explanation about the kinds and shapes of land and water in the area.
- **2-ESS2-a** *Use drawings and physical models to test, compare strengths and weaknesses, of design solutions that slow or prevent wind and/or water from changing the shape of the land.*

# *Opportunities through NGSS*



## **Scientific and Engineering Practice**

### **Constructing Explanations and Designing Solutions**

- *Use information from direct or indirect observations to construct an evidence based account for observable events.*

# Opportunities through NGSS



## Core Ideas

### ESS2.A Earth Materials and Systems

- *Wind and water can change the shape of the land.*

### ETS1.B Developing Possible Solutions

- *Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solution to other people.*

## *Opportunities through NGSS*



**How can I teach English to Muhammed so that he uses it in a way that more closely resembles scientist's language?**

Constructing Explanations (for science) and Designing Solutions (for engineering)

- **Use evidence** (e.g., measurements, observations, patterns) **to construct or support an explanation or design a solution to a problem.**

# *Opportunities through NGSS*



## Language Goals (WIDA)

- Level 3: **Write a brief description** of each landform presented in the model **using a word bank and picture cards.**
- Level 3: **Follow multi-step directions** to complete a model of landforms **with a partner using realia.**

# *Opportunities through NGSS*



## Language Goals **with NGSS**

- Level 3: **Write a brief description** of each earth material presented in the model **using a word bank and picture cards** to provide evidence to support the claim that earth materials have distinct properties.
- Level 3: **Follow multi-step directions** to complete a model of earth material **with a partner using realia** to find patterns in the effects wind and water have on the land.



# NGSS in the Classroom



Npe Leo Xiong

Niamtxiv: Wacha



Lus Nug txog Av:

Nug Koj li Niamtxiv

Tag nrho av puas zoo ib yam (Is all soil the same)?

They are different.

Some are rocky, some are dry  
some are sandy.

Koj yuav paub tau li cas (How do you know)?

We went to dig and  
saw different types.

Peb yuav nrhiav tau li cas (How can we find out)?

you can go look at the different lands.

you can even go and dig and feel them.

**Scientific Question: Do three places near our school have the SAME soil?**


- map work

- field work

## ***NGSS in the Classroom***



- **Video clip: Gathering evidence in the urban marsh 1414**

- Models of soil profiles

- Soil Samples

## ***NGSS in the Classroom***



- **Video clip discussion: Using evidence to support claims 1468**

- Claims/ Evidence/ Reasoning

## ***NGSS in the Classroom***



- **Video clip: Gathering evidence about color of soils  
1449, 1468, 1474**

Do you think the soil came from the



urban marsh,



the coniferous hill,



or the school yard field,?

Use **evidence** to support your **claim**:

**Claim:**

I think the soil is from the Coniferous Hill

Why do you think that?

**Evidence:**

I think it is because it has pine needles. And it has a black color and light brown color and a dark brown color too. And I look at the model of the Coniferous Hill that's how I know.

## ***NGSS in the Classroom***



- **Video clip: discussion, using evidence to support claims 1470 and 1453 (and 1451)**

# *NGSS in the Classroom*



- Class discussion supporting claims

How can wind



and rain



change the soil?

When the wind come

it ~~reach~~ the ~~trach~~

to the urban marsh and

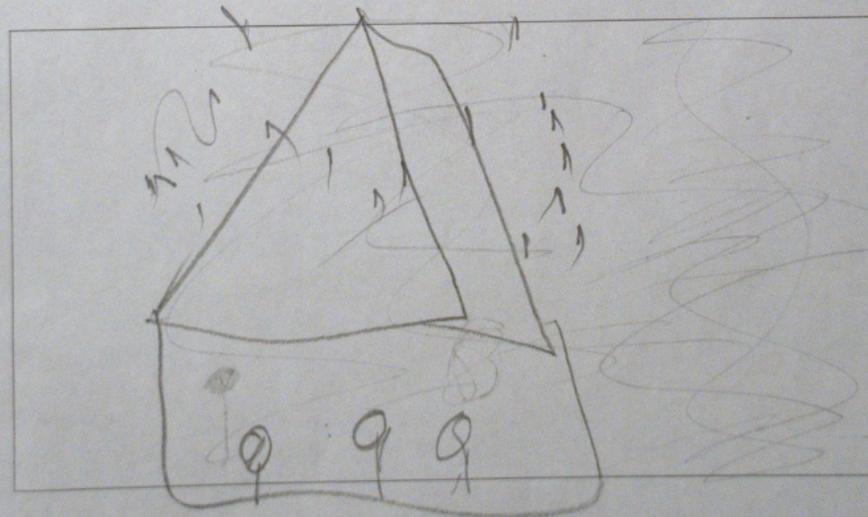
When the rain come it

What can we do to STOP wind and rain from changing the soil?

We can make a

new house

change  
The  
soil



How can wind



and rain



change the soil?

the wind can blow the top

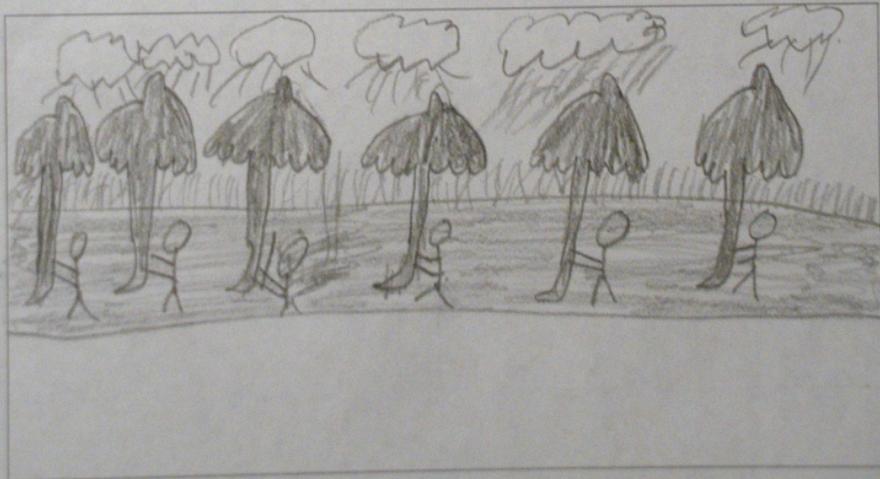
of the water and the force of the water

can go and then when it rains it can change the  
color

What can we do to STOP wind and rain from changing the soil?

we could put an umbrella on top

of the water and hold the umbrella



# *NGSS in the Classroom*



- Implications for older grades
- How will this shift to practices help with the achievement gap?

## *Conclusions*



### **NGSS promotes both science and language learning for ELLs**

- Focus on science practices as part of the content
- *All students* (ELL & non-ELL, alike) are involved with learning the "language of science"
- *All students* (ELL & non-ELL, alike) are actively involved with debating the ideas