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Using Creative Writing to Facilitate Science Learning

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Using Literacy and Culturally Responsive Pedagogy to Enhance Science Content

Dr. Alma Stevenson and Dr. Lacey Huffling
Georgia Southern University Statesboro Campus
Who we are

- Science and Literacy educators
- Passionate about equity in science education
- Work with historically underrepresented populations
- See literacy and culturally responsive teaching as ways to integrate students’ cultural resources into the content
Introduce yourself:
How long teaching
Where from
Grade levels
Our Goals for Today’s Session

● Discuss Culturally Relevant Pedagogy (CRP).
● Discuss multiple literacy strategies.
● Experience one mini lesson adapted from the original lessons and see examples of student work.
● Share experiences and ask questions.
● Brainstorm ways to develop science unit infused with literacy and CRP
What do you want to know about today’s topic?
Our Attempt

Informal learning residential week-long program sponsored by GA Department of Education Migrant Program

5 days of 4-hour class sessions (1st Day was 4 hours in morning and 3 in afternoon)

25 rising 6th-8th graders (18 female, 7 males)

All children of migrant farm workers of Mexican descent
Tenets of Culturally Relevant Pedagogy

- Respect for the legitimacy of different cultures
- Incorporate students’ cultural, linguistic, and social backgrounds into the curriculum
- Provide a challenging curriculum and relate new information to students’ life experiences
- Cultivate a community of learners in your classroom
- Address a spectrum of learning styles
- Maintain high expectations for student success
How We Infused CRP

Chose to focus on soil ecosystems:

- Connections to soil through families’ jobs
- Highlight students’ and families’ funds of knowledge (Gonzalez, Moll, & Amanit, 2005)
<table>
<thead>
<tr>
<th>CRP Tenet</th>
<th>Connection in Soil Ecosystems</th>
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<tbody>
<tr>
<td>Respecting different cultures and incorporating cultural information into the curriculum</td>
<td>Highlighted culture of migrant workers which is often not presented in formal education</td>
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<td>Relating new information to students’ life experiences</td>
<td>Introduced academic language and scientific concepts to students’ life experiences</td>
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<td>Teaching to the “whole child” and treating the classroom like a community</td>
<td>Used cooperative learning throughout week-long experience</td>
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<tr>
<td>Addressing a spectrum of learning styles</td>
<td>Provided multiple ways for students to learn (e.g. hands-on data collection; multiple texts and multiple literacy strategies)</td>
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How well do you understand how our topic of Soil Ecosystems addressed aspects of CRP?
Integrating Literacy: Strategies to Enhance

- Language skills
- Academic content learning
- Academic vocabulary
- Scientific writing ability

Diagram:
- Framed Paragraphs
- Culturally Relevant Literature
- R.A.F.T.
- Reflection
- Research Skills
- Conferencing
- Content Relevant Literature
- Digital Storytelling
- Storyboarding
Circle the literacy strategy you have used before:

Conferencing  Storyboarding  R.A.F.T  Reflection

Culturally Relevant Literature  Content Relevant Literature

Framed Paragraphs  Digital Storytelling  Research Skills
## Connections to Common Core (NGAC and CCSSO 2010)

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
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<tbody>
<tr>
<td>WHST.6-8.2</td>
<td>Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. <em>(MS-LS1-5), (MS-LS1-6)</em></td>
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<tr>
<td>WHST.6-8.7</td>
<td>Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. <em>(MS-LS1-1)</em></td>
</tr>
<tr>
<td>WHST.6-8.8</td>
<td>Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. <em>(MS-LS1-8)</em></td>
</tr>
<tr>
<td>WHST.6-8.9</td>
<td>Draw evidence from informational texts to support analysis, reflection, and research. <em>(MS-LS1-5), (MS-LS1-6)</em></td>
</tr>
<tr>
<td>SL.8.5</td>
<td>Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. <em>(MS-LS1-2), (MS-LS1-7)</em></td>
</tr>
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Culturally Relevant Literature

Depicts a migrant boy (Diego) who travels the US with family to harvest crops.

Engaged students in read aloud of text.

Asked how the story compared and contrasted to their life experiences.

In end of week surveys and interviews, students shared how much they liked (Dorros, 1997)
Google Map Activity based on *Radio Man*

https://www.google.com/maps/d/u/1/edit?mid=1xtUEUob9uP5_63LbaW5V3ZVqY_k&ll=35.704549221453654%2C-110.03145&z=5
Share what you observed:
R.A.F.T. (Role, Audience, Format, Topic)

Partners worked together to write a children’s book on seed finding perfect place to grow.

Gave students choice:

- Freedom to choose a favorite vegetable or fruit
- Provided two options for role (child seed or parent plant)
- Provided two options for audience (furry friend or children
Determination of Science Investigations and Instruction

Based content presented on R.A.F.T. topic: Finding perfect place to grow

Example: Day 1 afternoon - Explore and examine local soil samples
Students curious about wet vs. dry soil
Led to student investigation of wetting soil samples
Started finding organisms in soil samples
Led to setting up soil samples in beakers to examine next day
I learned that there are 3 types of soil. Sand is smooth and it looks like clay. When it gets wet it gets muddy. Its particles are bigger than clay's particles. Clay is rocky and it looks like mud. When it gets wet it gets muddy. Its particles are smaller than sand and silt. Silt is soft and it feels smooth when you touch it.

Our sample looked like soil. When it got wet, it got like clay, which showed it was like soil texture through our qualitative data. Our quantitative data showed our sample to be 88%, which means it had 0% clay, 33.3% silt, and 66.7% sand.

What did I learn?

I learned that there is 3 types of soil. Sand, Clay, and Silt. Sand had the percentage of 66.7%. Clay had the percentage of 0. And Silt had the percentage of 33.3%. 
Reflection

- What did I learn today?
- How can I connect my learning with today’s readings lesson, and lab, with my own experiences?
- What did I observe today?
- How can I connect my observations with today’s readings, lesson, and lab, with my own experiences?

We do not learn from experience... we learn from reflecting on experience.

- John Dewey
Content Relevant Literature

- On 3rd day, read aloud non-fiction book
- Asked guiding questions
  - What similarities did you notice from text and your soil observations?
  - What information from the text will help you
Research Skills

- Needed information for Digital Story
- Pre-selected websites to explore
- Discussed information that was needed
- Recorded in lab book
Storyboarding

Sketch of page #1:

Sketch of page #2:

Introduction:

Plot: Challenge

Attempts

Climax

Solution

Result:

Words on page #1:

Words on page #2:

"My name is Strawberry Shortcake... it's getting into being early fall and I need to find a good friend like you to help me."

"Mr. Muffin--better hurry up if you want to plant your seeds because it's almost fall. I overheard the farmers talking about Somebody wanting to buy the farm."

You're such a worrywart.
Conferencing

- Provided written feedback on drafts each day
- Ran peer review workshops
- Had face-to-face conferences with each pair on Days 3 and 4
Circle the literacy strategy you want to try now:

- Conferencing
- Storyboarding
- R.A.F.T
- Reflection

- Culturally Relevant Literature
- Content Relevant Literature

- Framed Paragraphs
- Digital Storytelling
- Research Skills
Digital Storytelling

https://docs.google.com/presentation/d/1ksiPN8ijnt0A_8gQvIO7eCiWcejQmltyEToaROn5mA/edit#slide=id.g134da90042_0_6

https://docs.google.com/presentation/d/1HqOrUhfBywyqRIItL-rqoKK-HBHqLi0bVwAuuvtjs/edit#slide=id.g1455cbcb9a_0_0

https://docs.google.com/presentation/d/1CbirvmftrLEHjvx-OWCS8eV-WAVQMLiKASkOQ18ErM/edit#slide=id.g134da90042_0_16

https://docs.google.com/presentation/d/1sOEvTsRgmvoG_pe-GN9Te9WEc6SPZbbEq1nYS3pA2qo/edit#slide=id.g145887e958_4_32
Classroom Resources

Google Map for *The Radio Man*

Math problems based on *The Radio Man*

Soil Observation Data Table

Soil Texture Labs

Porosity, Permeability, and Infiltration Rate Labs

Student Google Maps

Soil Chemical Testing Lab

Soil Collection Datasheet

Soil Research Sites

Whole Class Data Table on Google Sheets
Start a Mind Map by drawing or typing anywhere:

Ideas for Integrating Literacy and CRP
Circle how you are feeling about infusing literature and CRP into your science curriculum:
Thank you!

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Alma Stevenson- astevenson@georgiasouthern.edu
Links for Resources

Google Map for *The Radio Man* - https://goo.gl/LR1pNX

Math problems based on *The Radio Man* – https://goo.gl/VNDFNP

Soil Observation Data Table - https://goo.gl/aIYFFE

Soil Texture Labs - https://goo.gl/qyajbx

Porosity, Permeability, and Infiltration Rate Labs - https://goo.gl/ZFK1Zx

Soil Chemical Testing Lab - https://goo.gl/tjDKqq

Soil Collection Datasheet - https://goo.gl/KJOhHQ

Whole Class Data Table on Google Sheets - https://goo.gl/wTyFTp