# Title: Culturally Relevant Pedagogies in Science Education: Theoretical Perspectives and Curriculum Implications Authors: Theila Smith, Lucy Avraamidou, and Jennifer D. Adams DOI: DOI: https://doi.org/10.1007/s11422-021-10082-4

In the article "Culturally Relevant Pedagogies in Science Education: Theoretical Perspectives and Curriculum Implications," authors Theila Smith, Lucy Avraamidou, and Jennifer D. Adams present a compelling argument for the adoption of culturally relevant, responsive, and sustaining pedagogies (CR-SP) in science education, particularly within former colonial contexts. The focus is on addressing the hegemony of Eurocentric science education and its impact on marginalized communities, with a specific emphasis on the Dutch Caribbean community in the Netherlands.  
  
The article highlights the systemic inequities in science education, where the voices of non-dominant groups are often silenced. The authors call for a critical analysis and reconceptualization of science education that centers diverse worldviews and promotes equity. They emphasize the importance of recognizing and valuing the cultural and linguistic practices of students from marginalized communities, arguing that these practices should be integrated into the science curriculum.  
  
A key example provided in the article is a community-based STEAM program in the north of the Netherlands, designed for young children and their parents from the Dutch Caribbean community. This program exemplifies the principles of CR-SP by incorporating culturally relevant content and practices, fostering a sense of belonging, and promoting students' agency in science learning. Here are the key components of designing such a program:

1. Involve members of different racial, cultural and professional backgrounds in the curriculum design process.
2. Conduct assessment interviews with parents and children before and during the program to gauge interests and gather feedback on what they would like to see included in the program. This helps tailor the program to the specific needs and preferences of the community.
3. Incorporate culturally relevant and sustaining activities into the curriculum. Such lessons should not only connect to students' lived experiences but also engage them in broader socio-political issues. For example, exploring the socio-environmental impact of local gas extraction and discussing the social implications and potential actions to address these issues.
4. Ensure the program is multilingual and draws from various disciplines, including science, technology, arts, environment, engineering, and mathematics. This approach recognizes and values the diverse linguistic and cultural backgrounds of the participants.
5. Each week launch a session with a circle to reflect on the week and build a sense of community. This practice, borrowed from restorative justice frameworks, fosters trust and a collective sense of belonging among participants.
6. Recognize the crucial role of the family unit in supporting children's science identity development and encourage active participation from both children and their families in the learning process. This includes engaging in hands-on activities, building, designing, problem-solving, and creating public service announcements or videos to raise awareness about local issues.

The authors trace the history and theoretical underpinnings of culturally adaptive pedagogies, including culturally relevant pedagogy (Ladson-Billings, 1995), culturally responsive teaching (Gay, 2002), culturally sustaining pedagogy (Paris, 2012), and culturally sustaining/revitalizing pedagogy (McCarty and Lee, 2014). They argue that these frameworks are essential for promoting social justice and equity in science education.  
  
**Key Terms and Definitions:**

1. **Assimilationist Teaching:** An educational approach that aims to assimilate students from marginalized communities into the dominant culture. This approach often devalues the cultural and linguistic practices of non-dominant groups, positioning them as deficiencies that need to be corrected. Assimilationist teaching seeks to impose dominant cultural norms and knowledge, often marginalizing and silencing the voices and experiences of students from diverse backgrounds​​.
2. **Asset-Based Pedagogies:** Educational practices that view the cultural and linguistic practices of marginalized communities as valuable resources for learning. These pedagogies emerged in response to deficit perspectives that viewed non-dominant cultural practices as deficiencies. Asset-based approaches, such as the funds of knowledge and community cultural wealth, emphasize the importance of recognizing and leveraging the diverse experiential perspectives and cultural assets that students bring to the classroom​​.
3. **Critical Pedagogy:** A theoretical framework that seeks to analyze and critique the power structures and systemic oppression within educational institutions. Critical pedagogy aims to empower students to challenge and transform oppressive social conditions. It emphasizes the importance of education in promoting social justice and equity by encouraging students to critically examine their own positionality and the sociopolitical contexts that shape their lives​​.
4. **Restorative Justice Framework:** An approach that focuses on building a sense of community and belonging through restorative practices. In the context of education, restorative justice involves creating environments that encourage care, trust, and collective responsibility. Practices such as the circle process are used to reflect on experiences and promote engagement, belonging, and mutual support among students, teachers, and community members​​.
5. **Decolonizing Science Education:** The process of challenging and dismantling the Eurocentric and colonial frameworks that have historically dominated science education. Decolonizing science education involves incorporating diverse worldviews and cultural perspectives into the curriculum, promoting equity, and addressing the systemic inequalities that affect marginalized communities. This approach seeks to create a more inclusive and just science education that recognizes and values the contributions of all cultural groups