



# CULTURALLY RESPONSIVE ENGAGEMENT & TEACHING

**Making teaching and learning “relevant” and “responsive”** to students’ cultural practices, languages, and other differences has inspired pedagogies in multi-cultural education that includes Culturally Responsive Teaching (Gay, 2018).

When we represent NASA, we adopt culturally responsive approaches to student engagement and teacher training in a spirit of inclusivity and to address issues of educational equity in Science, Technology, Engineering and Mathematics (STEM). This document is designed to serve as a quick guide for both educators and personnel who are involved in student STEM Engagement. It includes definitions of Culturally Responsive Engagement (CRE) and Culturally Responsive Teaching (CRT), their foundational components, and implementation strategies.

**Culturally Responsive Teaching (CRT)** is defined as: “using the cultural characteristics, experiences, and perspectives of ethnically diverse students as conduits for teaching them more effectively” (Gay, 2018).

It is based on the assumption that when academic knowledge and skills are situated within the lived experiences and frames of reference of students, they are more personally meaningful, have higher interest appeal, and are learned more easily and thoroughly (Gay, 2018).

Therefore, knowledge of cultural diversity is vital to teaching culturally diverse students and is at the essence of CRT. Knowledge about students’ culture essential to teaching and learning include values, traditions, communication, learning styles, contributions, and relational patterns (Gay, 2002).

Gay, G. (2018). *Culturally responsive teaching: Theory, research, and practice*. Teachers College Press.  
Gay, G. (2002). Preparing for culturally responsive teaching. *Journal of Teacher Education*, 53(2), 106–116.

**Culturally Responsive Engagement (CRE)** is the act of being responsive to the audience’s cultural make-up by utilizing it to engage the audience and to make the content relevant to them. Typically, STEM engagement events may be programmed as one-off events involving organization volunteers and informal educators. Yet these interactions can be meaningful, achieve desired outcomes, and have long-lasting impact if elements of CRE are included. By learning about the audience’s background as a whole, such engagement events can make connections by drawing on the presenter’s story and common characteristics to the community, or by eliciting stories from the audience members through establishing trust and then seeking participation through purposeful activities. It is worth the effort to first make connections, and value the contexts relevant to that community. Knowing how to implement CRE can be useful for all STEM Engagement and STEM Education stakeholders.

## FOUNDATIONS OF CRT & CRE

Students come into classroom with **Funds of Knowledge** (Gonzalez, et. Al., 2006). A student’s funds of knowledge can be described as:

- academic and personal background knowledge
- accumulated life experiences
- skills and knowledge used to navigate everyday social contexts
- world views structured by broader historically and politically influenced social forces

González, N., Moll, L. C., & Amanti, C. (Eds.). (2006). *Funds of knowledge: Theorizing practices in households, communities, and classrooms*. Routledge.

**Multicultural Education** is a form of education or teaching that focuses on creating equal educational opportunities for students from all cultures, social-class, racial, and ethnic groups by reforming the whole school environment. The critical dimensions of multicultural education (Banks, 1993) are:

- Content Integration
- Knowledge Construction
- An Equity Pedagogy
- Prejudice Reduction
- Empowering School Culture and Social Structure

Banks, J. A. (1993). Multicultural education: Development, dimensions, and challenges. *The Phi Delta Kappan*, 75(1), 22–28.

# IMPLEMENTING CULTURALLY RESPONSIVE ENGAGEMENT AND CULTURALLY RESPONSIVE TEACHING

Implementing CRT and CRE requires one to consider multiple aspects including instructional/presentation techniques, instructional/support materials, the establishment of a general relationship tone with the participating students, parents, and community, and self-awareness. The STEM Curriculum Review Framework (SCRF) (Martinez-Ortiz, et. Al., 2019), based on Morrison, et. al. (2008), provides specific guidelines to implementing CRT and CRE. These include:

## 1. Making Connections

Share your story, elicit the audience's story, and make connections. Making the content relevant to the audience is a step towards engaging them.

## 2. Language and Communication

Encourage multiple modes of communication, attend to multiple meanings, and honor the use of native language. For example, use tools like flashcards and a multi-lingual glossary.

## 3. Cognitive Demand

Be aware of the cognitive demand on students and other participants — balance procedures and concepts, provide opportunities for complex thinking, and use multiple representations.

## 4. Power and Participation

Elicit, value, and respect student and participant contributions, and explicitly support a sense of equity among all — not just those who actively put forth their ideas.

## 5. Student Identity and Funds of Knowledge

Create and maintain collective understanding by making connections to personal/community/cultural knowledge and role models from the community.

## 6. Critical Knowledge and Social Justice

Connect learning to current issues/contexts in the community and empower them to consider and change/transform the issue to positively impact the community.

## FOR MORE INFORMATION ON CRE AND CRT



Download Geneva Gay's 2002 paper "[Preparing for Culturally Responsive Teaching](#)."



Check out our short, self-directed, digital course on the topic: "[Preparing to be Culturally Responsive](#)" EPDC digital badge.



Review an example of [how an existing hands-on NASA activity can be modified](#) to include elements of CRT.



For more learning opportunities on STEM instructional practices and on how to use NASA resources in your classroom or STEM engagement presentations, please [visit our website](#).



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## REFERENCES

- Martinez Ortiz, A., Vomvoridi-Ivanovic, E., Sorto, M.A., Close, E., Dickinson, G., Bos, B., Bowman, A., Rodriguez Amaya, L., (2019). STEM Curriculum Review Rubric. LBJ Institute for STEM Education and Research, Texas State University.
- Morrison, K. A., Robbins, H. & Rose, D. G., (2008) Operationalizing Culturally Relevant Pedagogy: A Synthesis of Classroom-Based Research, *Equity & Excellence in Education*, 41:4, 433–452, DOI: 10.1080/10665680802400006