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# D-STEM EQUITY MODEL ... Diversifying the STEM Education to Career Pathway!!!

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# **Welcome to the 2019 NADOHE Annual Conference!**

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# **D-STEM EQUITY MODEL...**

**DIVERSIFYING THE STEM EDUCATION TO CAREER PATHWAY!!!**

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# STEM

(SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS)

An interdisciplinary approach to learning where rigorous academic concepts are coupled with real-world lessons as students apply science, technology, engineering, and mathematics in contexts that make connections between school, community, work, and the global enterprise enabling the development of STEM literacy and with it the ability to compete in the new economy (National Center on Gifted and Talented, 2013).



# STEM EDUCATION



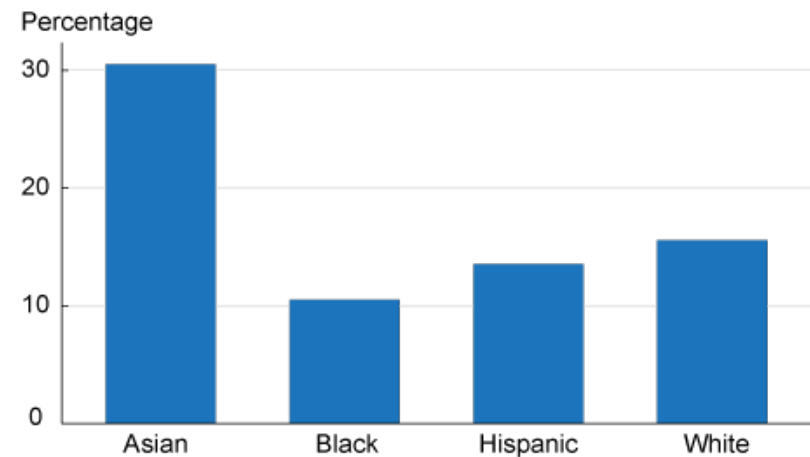
## CAREER PATHWAY

Fewer than 10% of Black and Latino students complete the high school mathematics sequence, which includes algebra, geometry, trigonometry, and pre-calculus.

Latino and Black students are academically four years behind their White counterparts and score below approximately 75% of White America in mathematics.

<https://nces.ed.gov/pubs2010/2010015.pdf>

### Percentage of Bachelor's Degree Recipients Majoring in STEM Subjects

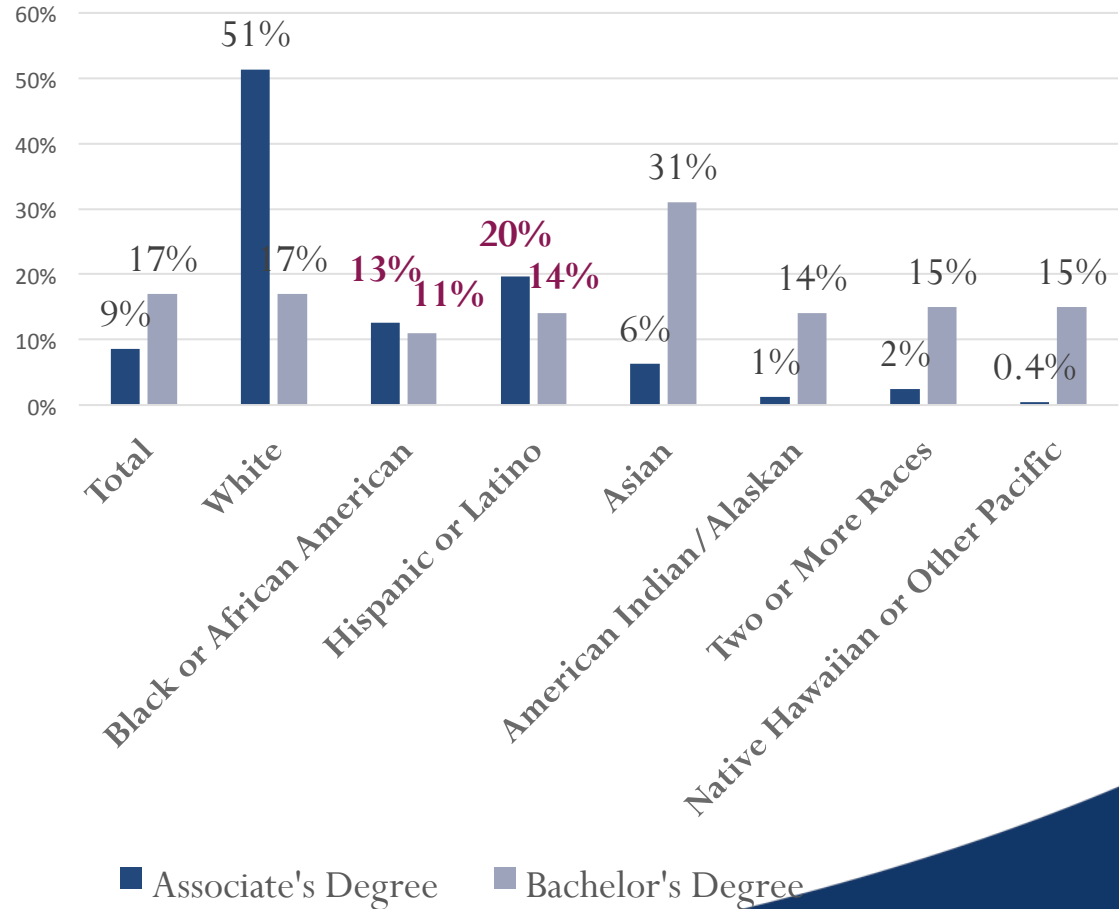


Source: Author's calculations from Integrated Postsecondary Education Data System (IPEDS) data for July 1, 2012 – June 30, 2013. The majors included are those with a two-digit Classification of Instructional Programs (CIP) code in the following categories: computer and information sciences and support services, engineering, biological and biomedical sciences, mathematics and statistics, and physical sciences.

# STEM DEGREES AND RETENTION IN HIGHER EDUCATION

[https://www.insidehighered.com/news/2019/02/26/latinx-black-college-students-leave-stem-majors-more-white-students?utm\\_source=Inside+Higher+Ed&utm\\_campaign=6056411834-DNU\\_2019\\_COPY\\_01&utm\\_medium=email&utm\\_term=0\\_1fcbc04421-6056411834-197492137&MC\\_CID=6056411834&MC\\_EID=80B31AF554](https://www.insidehighered.com/news/2019/02/26/latinx-black-college-students-leave-stem-majors-more-white-students?utm_source=Inside+Higher+Ed&utm_campaign=6056411834-DNU_2019_COPY_01&utm_medium=email&utm_term=0_1fcbc04421-6056411834-197492137&MC_CID=6056411834&MC_EID=80B31AF554)

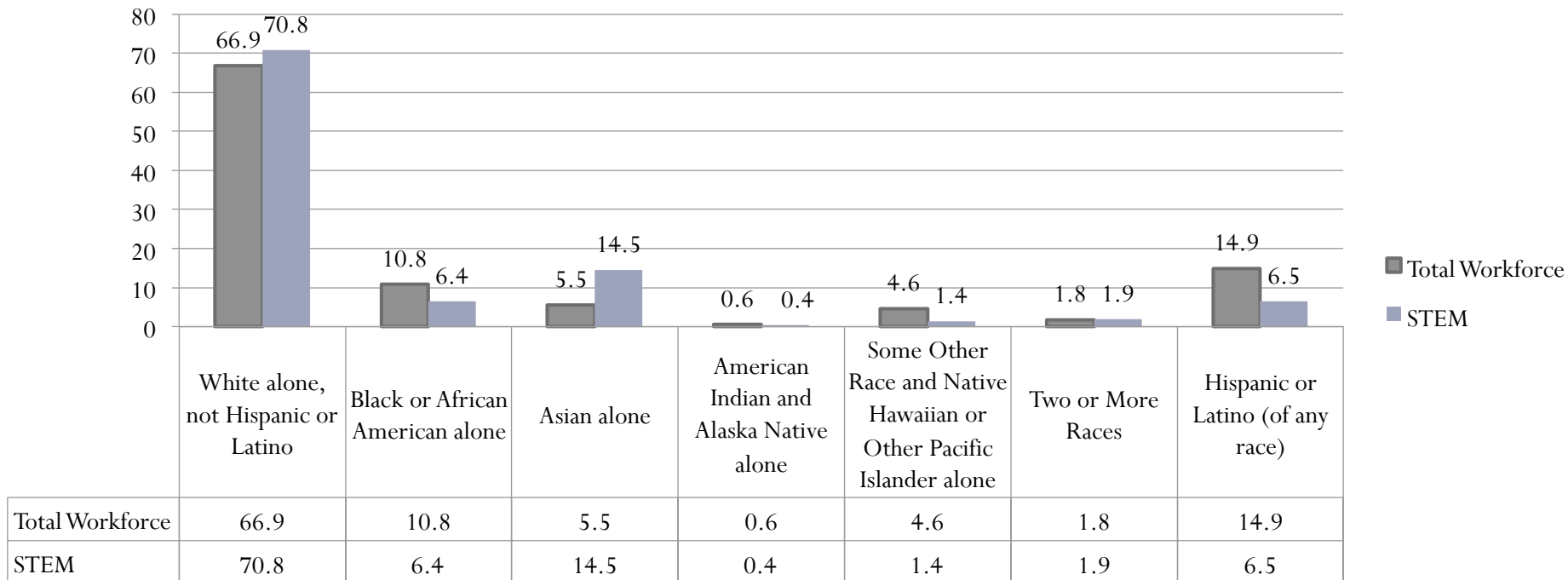
	STEM Majors	STEM Retention
<b>Black</b>	18%	60%
<b>Latinx</b>	20%	63%
<b>White</b>	19%	71%



National Center for Educational Statistics, <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2018412>

# STEM SIGNIFICANCE

## CAREER STABILITY AND ECONOMIC DEVELOPMENT



□ According to the Washington-based Center for Political and Economic think tank, **the U.S. workforce could employ as many as 140,000 additional Black and Latino college graduates in STEM fields** annually if the gap in college completion by Blacks and Latinos closed to roughly match that of the White and Asian student graduation rates (Roach, 2014).

□ According to the U.S. Census Bureau, the median income for Blacks is \$32,229 and \$38,624 for Latinos, almost \$20,000 less than Whites; but **for Latinos and Blacks in STEM careers, the median income is \$75,000** which is only about \$10,000 less than Whites (Landivar, 2013).

# METHODOLOGY

## Diversifying STEM to Education Pathway, N = 415

*Through qualitative research methodologies, students engaged in STEM, their parents, STEM educators, STEM professionals, and Community Organizations that implement STEM programming were asked to provide their perspectives and share their stories related to the intersection between race and STEM.*

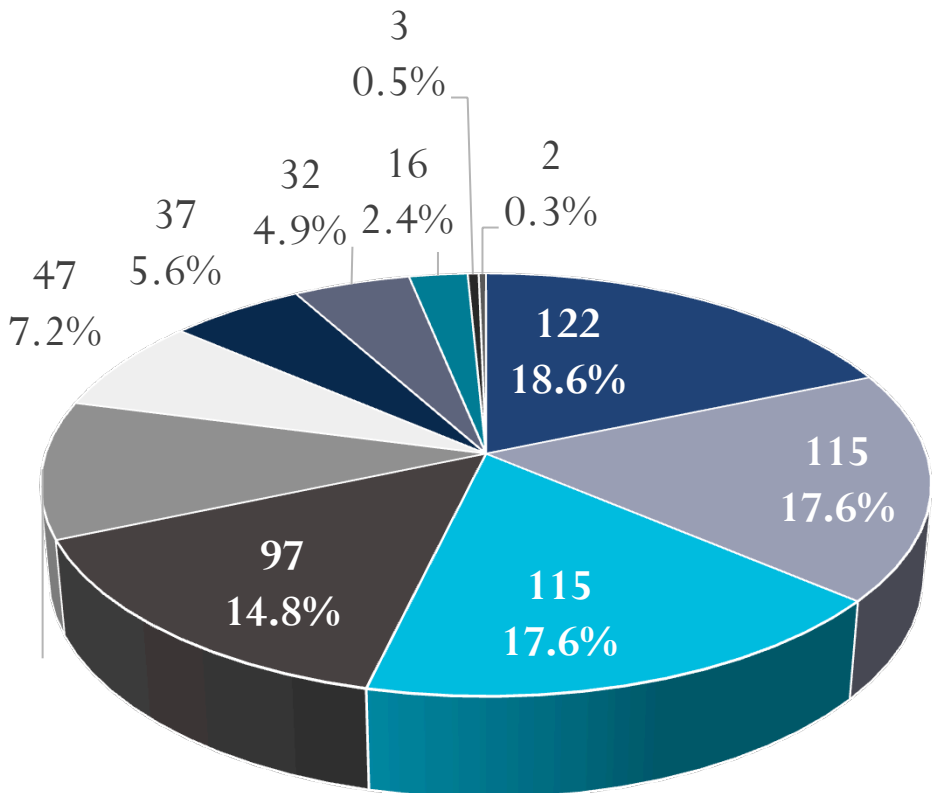
- The Motivation of Black and Latino Students to Engage in STEM, n = 281
  - 106 high school students, 86 middle school students, 27 STEM educators, 51 parents and 11 college students.
- Diversifying STEM Think Tank, n = 134 from 64 organizations
  - To understand from the perspectives of STEM professionals, Educators, and Diversity/Inclusion Officers strategies to diversify and strengthen the STEM education to career pipeline.

## Critical Race Theory

*Attempts to understand American education and reform, acknowledging the unique perspective and voice of people of color as victims of oppression in racial matters and valuing their story telling as a legitimate way to convey knowledge (Khalifa, Dunbar, & Douglas, 2013).*



# FACTORS THAT MOTIVATE BLACK AND LATINO STUDENTS TO ENGAGE IN STEM EDUCATION (N<sub>T</sub> = 281, N<sub>R</sub> = 655)



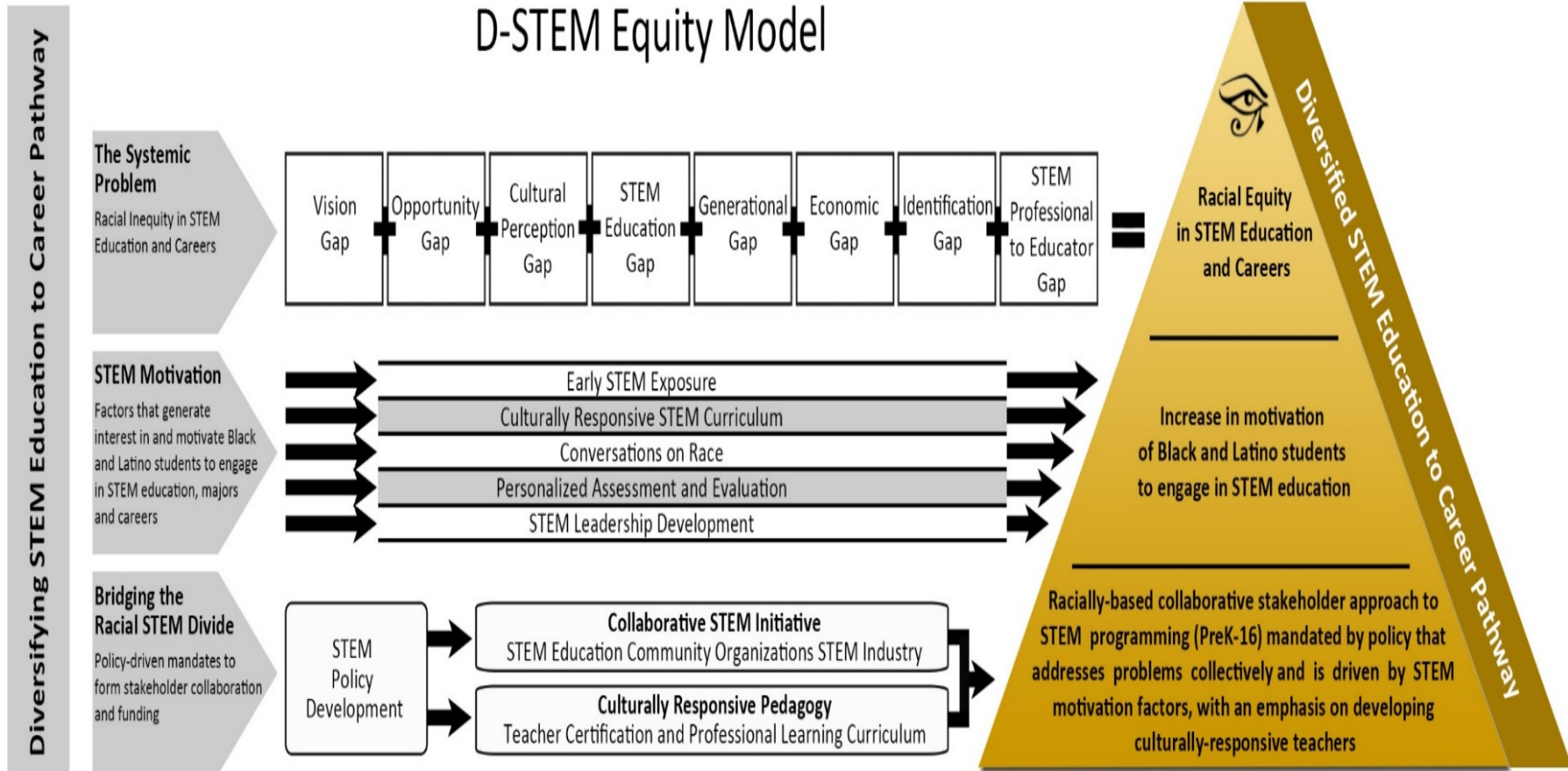
- **Obligation to Black/Latino Community/Break Negative Stigma - Be different**
- **Future Success/STEM is a Prominent, Progressive Field**
- **Learning: Discovery of Knowledge and real-life applicability**
- **STEM Passion/Enjoyment**
- **Solve Problems/ To Advance Humanity**
- Family/ Teacher Influence
- Challenge/ Competitive Nature of STEM
- Money
- Self-Motivated
- Not good at math
- Leadership

$n_t$  = Total # of Participants,,  $n_s$  = Total # of Responses  
 Since subjects can respond more than once to the question, the values for  $n_t$  and  $n_s$  are often not equal.

# STEM EQUITY

## DIVERSIFYING THE STEM EDUCATION TO CAREER PATHWAY

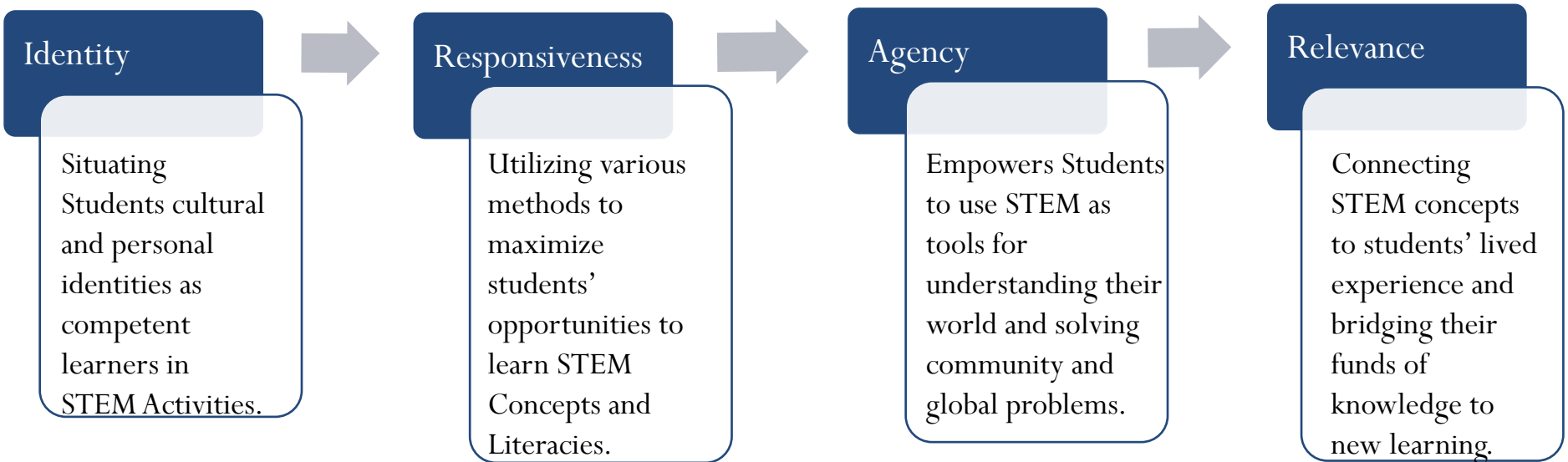
### D-STEM Equity Model



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# CULTURALLY RESPONSIVE STEM CURRICULUM

Culturally Responsive STEM Teaching and Learning Pays Attend to:



GREAT LAKES EQUITY CENTER - [HTTPS://GREATLAKESEQUITY.ORG/RESOURCE/STEM-EDUCATION-NEEDS-ALL-CHILDREN-CRITICAL-EXAMINATION-EQUITY-ISSUES](https://greatlakesequity.org/resource/stem-education-needs-all-children-critical-examination-equity-issues)

# EQUITY AND EXCELLENCE POLICY

[https://digitalcommons.imsa.edu/diversity\\_resources/2/](https://digitalcommons.imsa.edu/diversity_resources/2/)

The Academy recognizes and acknowledges the historical underrepresentation and marginalization of culturally, linguistically, and economically diverse groups, both universally, and particularly, in STEM education and professions. These disparities also exist in the representation of the Academy's workforce. We are committed to advancing equity in STEM education and representation and creating a diverse, inclusive community of global citizens who can realize their full potential, and execute our mission to advance the human condition, through a model of Equity and Excellence.

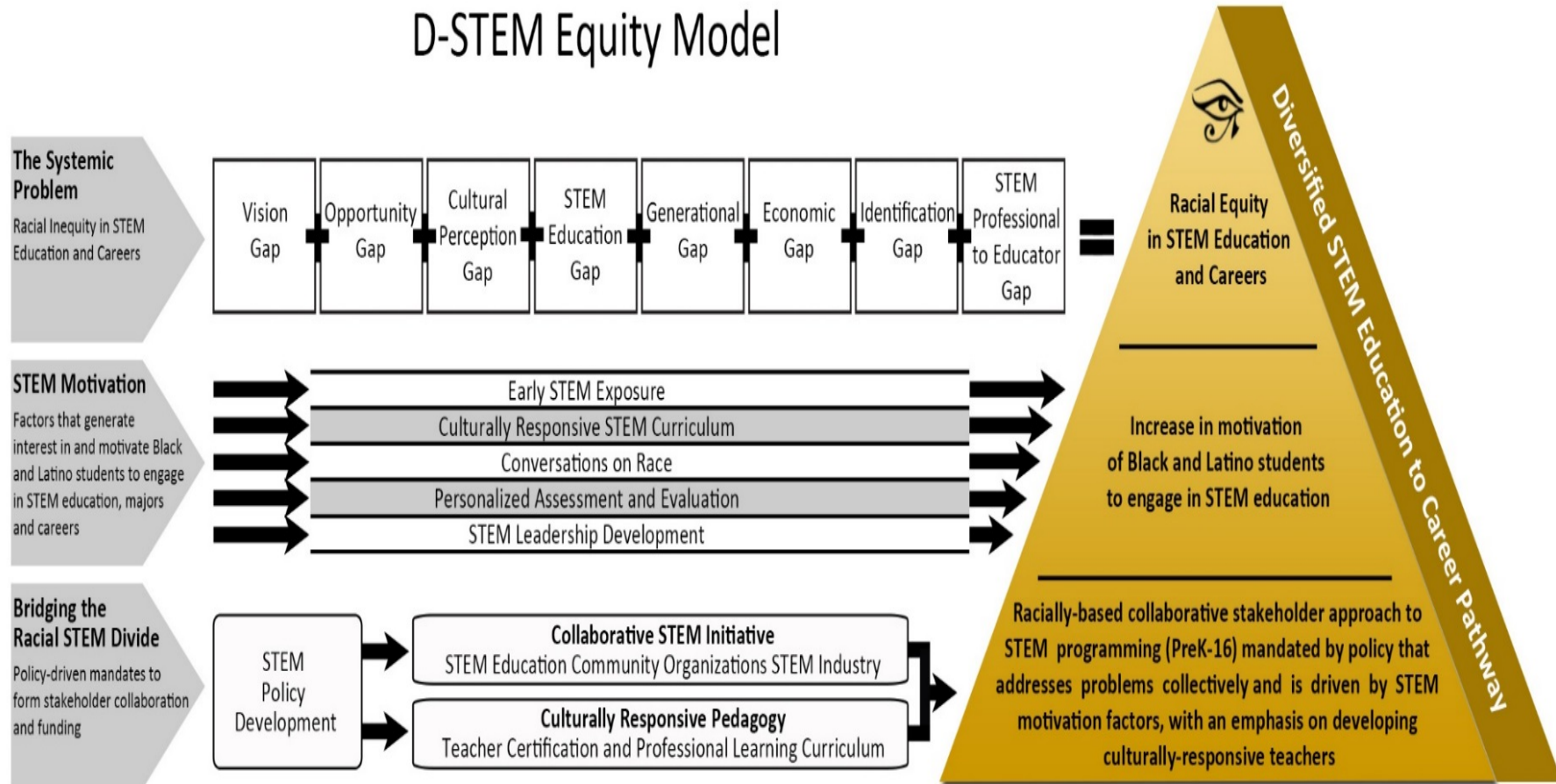
1. Developing and using an equity lens when considering major policies, programs, practices, or decisions in order to realize more equitable outcomes.
2. Implementing strategies based on the Equity and Excellence Model to recruit, support and retain staff, including faculty, as well as board members and external partners.
3. Providing professional learning that continuously develops the Cultural Competence and equity awareness of staff, including faculty, as well as board members and external partners.
4. Supporting research, scholarship and innovative expression of staff, including faculty as well as external partners that either address or promote the Equity and Excellence Model.
5. Implementing strategies to recruit, support and retain Culturally, Linguistically and Economically Diverse groups and support and retain Marginalized groups.
6. Differentiating resources as necessary to provide every student with access to Culturally Competent pedagogy, curriculum, co-curriculum, support, facilities and other educational resources with an ultimate goal of achieving Excellence.
7. **Addressing Culturally, Linguistically and Economically Diverse and gender-based STEM education/ career gaps by developing student and professional programs and services, as well as conducting research, that will inform strengthening and diversifying the STEM education to career pipeline.**

# STEM EDUCATION EQUITY ANALYSIS TOOL

<https://greatlakesequity.org/resource/stem-education-equity-analysis-tool>

Diversifying STEM Education to Career Pathway

## D-STEM Equity Model



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