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# Equity for All

## Essential for All Facets of the Scientific Enterprise

ANN HALEY MACKENZIE

Under the microscope, the cell being observed does not care who is observing it. Woman, man, queer, African American, Latinx, Asian, gay, middle-class, hearing-challenged, Native American: why has the scientific playing field not been equal for ALL? How can we, as science educators, erase inequitable practices in our teaching?

A common misconception exists that equity and equality refer to the same thing. *Equity* is the proportional representation (by race, gender, class, etc.) with all opportunities. *Equality* is ensuring everyone is treated the same and giving everyone access to the same opportunities, rights, and resources in whatever endeavor is being pursued.

Generally, students of poverty do not come to school on an equal footing. They need more resources in order to improve reading and math skills and to experience science, to begin to close the achievement gap. By leveling the playing field, equality can be achieved.

Equity provides more to those who need it (Mann 2014). Schools that emphasize equity understand “their students’ needs and provide resources to overcome their specific challenges” (waterford.org 2019).

Think of equity in terms of being adaptable, individual-focused, and fair (waterford.org 2019). Vertical equity should be the goal for schools; this form of equity “assumes that students have different needs and provides individual resources based on said needs” (OECD 2008). During the COVID-19 pandemic while students learn from

home, an example of vertical equity would be to ensure that all students have an electronic tablet AND internet access at home. Equality would just mean that all students have a tablet.

### Equity in STEM Fields

Equity in STEM career fields is a long-standing issue. As of 2015, African Americans represented 4.8 percent of the workforce in STEM, while Caucasians represented 66.6 percent (Census Bureau 2015). In 1993, African Americans represented a mere 3.6 percent. This increase represents only 1.2 percent in 25 years!

The statistics for Latinos are equally dismal. According to the National Council for Minorities in Engineering, Latinos accounted for only 6.3 percent of the engineering degrees awarded in 2010, and a tiny 1.2 percent of those awarded doctoral degrees.

Why aren’t these voices present in the scientific community? What can we as science teachers do to encourage ALL students to pursue, or at least consider, STEM careers?

African American and Latino students enter school scoring below Caucasian students in reading and math assessments. As they matriculate through school, these differences persist. They are less likely to enroll in AP courses, participate in STEM-related extracurricular activities, and take fewer math and science courses. Do they feel welcome and wanted in these courses? Are they counselled to enroll in more math and science classes? How can we help them get caught up to their counter-

parts who are succeeding at school?

Lower socioeconomic status can pressure students to enter the workforce and forego higher education (Taningco, Mathew, & Pachon 2008). We must provide resources, role models, mentors, and encouragement to these students and their families if we expect them to be on an equal playing field.

How many Latino scientists can you name and what contributions to science did they make? What African American scientists can you name as well as their contributions? Do you include these voices in your science classroom? Do you do more than hang posters of “Women in Science?” Do you only mention African American scientists during February’s Black History Month? If so, consider broadening your approach so that every student benefits from the stories of these accomplished STEM professionals.

The time for a more diverse conversation to be present in the scientific enterprise is now. We, as science educators, must insist on being an integral part of the conversation by providing an equitable science experience for ALL of our students.

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## Strategies for an Equitable Science Classroom

- Ensure parents have information on the school system and the social services and community resources available to them.
- Provide opportunities for small-group work, self-directed learning, peer-group activities, and leadership opportunities.
- Closely monitor science discussions. Encourage student voice in your classroom. There should be more student talk than teacher talk. After all, knowing is in the explaining, and when students share their knowledge with each other, then you know they understand the information.
- Make your classroom a place where conversations of how bias is reflected in science by the culture is brought to the attention of the students.
- “Move toward indigenous (cultural) resources in order to be culturally relevant rather than use resources tied to affluence” (Baker 2016).
- Engage students in multi-faceted learning experiences, such as stations that have data to be interpreted, art work to be created, science equipment to be manipulated, and other forms of instruction that taps into the strengths of all students.
- Provide opportunities for students to be mentored by university and industry professionals that can engage the students in seeing what it means to do science.
- Provide career information that addresses the strengths of the students.

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