**Reducing achievement gaps in undergraduate general <- Article**

**chemistry could lift underrepresented students into**

**a “hyperpersistent zone”**

Students from underrepresented groups start college with the same level of interest in STEM majors as their   
peers, but leave STEM at higher rates. We tested the hypothesis that low grades in general chemistry contribute to   
this “weeding,” using records from 25,768 students. (p. 1)

6-year STEM-completion rates vary   
from 52% for Asian-Americans and 43% for Caucasians to 22%   
for African-Americans, 29% for Latinos/Latinas, and 25% for Native   
Americans (p. 1).

For the overall stu-  
dent population, poor performance in first-year STEM courses is   
negatively correlated with persistence in STEM (p. 1).

General chemistry is a year-long course   
sequence that most STEM-interested students begin in the first fall   
of their first year of college. It functions as a gateway or gatekeeper   
because it is required for many STEM majors, including virtually all   
of those offered in the life sciences and most in engineering, and has   
been shown to have an especially large impact on students who are   
interested in careers in medicine, dentistry, or pharmacy. (p. 1)

studies that followed cohorts of talented URM students who   
entered college on a premedical track found that for the individuals   
who abandoned that ambition, poor performance in general chem-  
istry was the most important factor driving their decision (p. 1)

the hazard for   
not continuing was highest in the first general chemistry course, (p. 3).

These results suggest that grades in GenChem 1 make a   
major contribution to the attrition of underrepresented students in   
STEM majors (p. 3).

**One of the most important results from our analysis is establishing**

**a strong connection between grades in general chemistry and attri-**

**tion from a course sequence required to continue in STEM. Students**

**in all four underrepresented subpopulations have a higher probability**

**of not progressing to the second course in the series than their well- represented peers. On the basis of the data in Figs. 3 and 4, this result**

**appears to be due to students in all four subgroups having a dispro-**

**portionately high probability of failing outright and/or entering the**

**“drop” status after poor performance in the initial general chemistry**

**course. Students who leave the introductory chemistry series are ef-**

**fectively prevented from pursuing a STEM major unless they complete**

**the general chemistry series at a different institution. In addition, the**

**hazard and survivorship data graphed in Fig. 2 indicate a dispropor-**

**tionately large impact of GenChem 1. Together, these observations**

**support the GenChem Hypothesis: Poor performance in the initial**

**general chemistry course is correlated with attrition of STEM-interested**

**but underrepresented students (p. 4)**

observations suggest that something about undergraduate   
STEM courses, beyond differences in preparation, is having a strong   
negative impact on underrepresented students (p. 5).

This call focuses on the hypothesis that synergistic effects   
occur when an improved classroom culture is combined with ele-  
ments of deliberate practice. More specifically, the hypothesis is that   
courses would better support underrepresented students if they en-  
couraged belonging, science identity, and self-efficacy; emphasized   
active learning approaches that engage all students and increase   
exam scores and lower failure rates (p. 5).

**https://www.washington.edu/news/2020/06/10/genchem-underrepresented-students/**

“General chemistry is often the first science course that many would-be STEM majors take in college, and it has a brutal reputation for causing lots of attrition,” [Scott Freeman](https://www.biology.washington.edu/people/profile/scott-freeman), a UW principal lecturer emeritus of biology