



## Perceptions of student abilities:

“How can you teach chemistry to deaf students?”

“Her English isn’t good enough to pass the AP exam.”

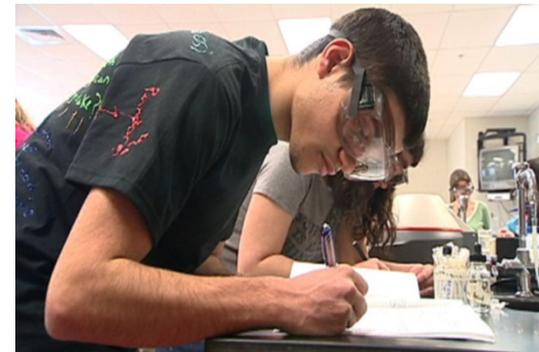
“What’s *he* doing in AP chemistry?”

“Why don’t you “weed out” the weak students?”

*Do we really believe that all students, including English Language Learners, can succeed in STEM?*

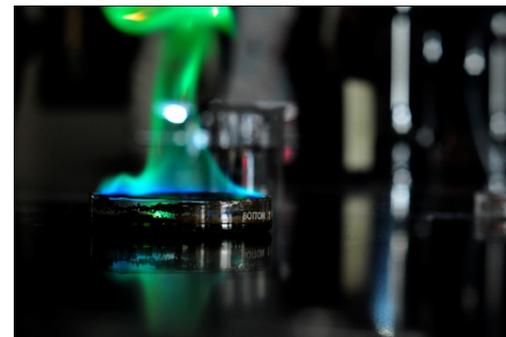
# Strategies for including Deaf students in STEM education

- make it visual! (ASL, computer graphics, etc.)
- hands-on, minds-on (inquiry-based instruction)
- “experience before content” (ABC = activity before concept, LBC = lab before content)
- examples before general concepts
- “write to learn” (lab research notebooks)
- be ready to detour and “fill the gaps”
- make it relevant! (chemistry in our world)



# Strategies for including English Language Learners in STEM

- STEM as its own “language”
- create a shared identity: “You are a chemist.”
- focus on abilities; learn English through STEM experiences
- write to learn: lab research notebooks, markerboards
- emphasize vocabulary and finding the “right words”
- validate students’ use of their native language
- avoid grade penalties related to language proficiency
- include activities with “universal appeal”
- “The classroom is my mirror.” Model respect!



# *ALL students need STEM knowledge to acquire 21<sup>st</sup> century skills*

## The 3 R's

- Reading
- Writing
- Arithmetic



## The 4 C's

- Critical thinking
- Creative problem solving
- Collaboration
- Communication

