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STEM Laboratory Safety on a Shoestring

Emily K. Faulconer
Embry-Riddle Aeronautical University, faulcone@erau.edu

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Classroom laboratory activities promote learner development in scientific reasoning and interest in science.[1] Learner safety is a critical concern. Many states have adopted OSHA standards (e.g. The Laboratory Standard 29 CFR 1910.1450 or Hazard Communication Standard 29 CFR 1910.1200) or developed their own standards to protect public school teachers and staff, but these do not extend to students. However, beyond the ethical imperative to do so, educators have a duty of care to ensure the safety of their students.[2] Many state departments of education have adopted standards to address duty of care, including duty of instruction, duty of supervision, and duty to properly maintain facilities and equipment.[3] Despite these guidelines, accidents do happen in secondary school laboratories. In some cases, schools have been found liable in a court of law.[4–11] Teacher training in safety best practices can mitigate risks.[12] This is particularly important since the NGSS are content standards and therefore do not contain lab safety standards.[13]

When considering hands-on activities in your STEM classrooms, make safety a consideration. Here are some no-cost suggestions for fostering safety culture:

PLANNING

- Read your (school, district, or state) Chemical Hygiene Plan and/or Science Safety Manual to refresh your understanding.
- Perform risk assessments.
- Use hierarchy of controls to determine how to mitigate risks.
- Select activities that are appropriate for the existing engineering controls and personal protective equipment available in your laboratory.

IMPLEMENTING

- Clearly communicate safety expectations and locus of control; convey a sense of individual safety responsibility and ownership.
- Model safe behavior.
- Encourage and reward safe behavior (e.g. grade student "professionalism.")
- Expect student reflection and communication on safety in the activities.

Safety does not cost too much, while safety failures have costs beyond money. You can create a more effective STEM laboratory environment without a single purchase order.

Emily K. Faulconer
Embry-Riddle Aeronautical University

NOTES

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