

Fall 2020

## STEM Laboratory Safety on a Shoestring

Emily K. Faulconer

Embry-Riddle Aeronautical University, [faulcone@erau.edu](mailto:faulcone@erau.edu)

Follow this and additional works at: <https://commons.erau.edu/publication>



Part of the [Higher Education Commons](#), [Higher Education and Teaching Commons](#), and the [Science and Mathematics Education Commons](#)

---

### Scholarly Commons Citation

Faulconer, E. K. (2020). STEM Laboratory Safety on a Shoestring. *The Science Teacher*, 88(1). Retrieved from <https://commons.erau.edu/publication/1925>

This Article is brought to you for free and open access by Scholarly Commons. It has been accepted for inclusion in Publications by an authorized administrator of Scholarly Commons. For more information, please contact [commons@erau.edu](mailto:commons@erau.edu).

# STEM Laboratory Safety on a Shoestring

Classroom laboratory activities promote learner development in scientific reasoning and interest in science.<sup>1</sup> 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.<sup>2</sup> 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.<sup>3</sup> Despite these guidelines, accidents do happen in secondary school laboratories. In some cases, schools have been found liable in a court of law.<sup>4-11</sup> Teacher training in safety best practices can mitigate risks.<sup>12</sup> This is particularly important since the NGSS are content standards and therefore do not contain lab safety standards.<sup>13</sup>

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.

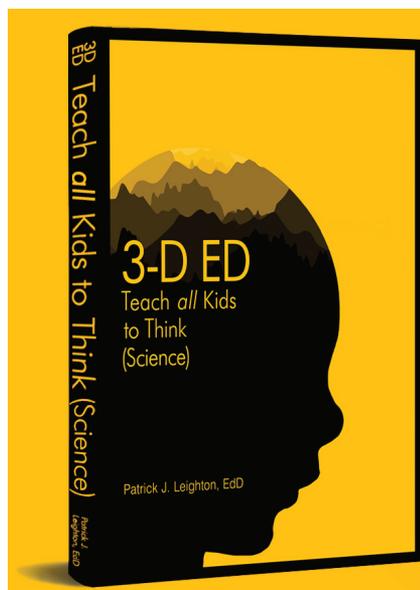
Safety does not cost too much, while safety failures have costs beyond money. You can create a more effective STEM laboratory environment without a single purchase order.

*Emily K. Faulconer*

Embry-Riddle Aeronautical University

## NOTES

1. National Research Council. 2006. America's Lab Report: Investigations in High School Science. Washington, DC: The National Academies Press. <https://doi.org/10.17226/11311>.
2. National Science Teachers Association. NSTA Position Statement: Liability of Science Educators for Laboratory Safety. 2007; Available at: <http://www.nsta.org/about/positions/liability.aspx>.
3. Florida Department of Education. 2015. A Summary of Safety Statutes, Rules, and Recommendations for Science. <http://www.fldoe.org/core/fileparse.php/9958/urlt/2015-safety-in-science.pdf>
4. Wronski R. and J.K. Durbin. 2001. 7 students burned in chemistry class. *Chicago Tribune*, October 12.
5. *Bush v. Oscoda Area Schools*. 2016.



## 3-D ED

### Nail NGSS ... but Build Higher-Order Thinking

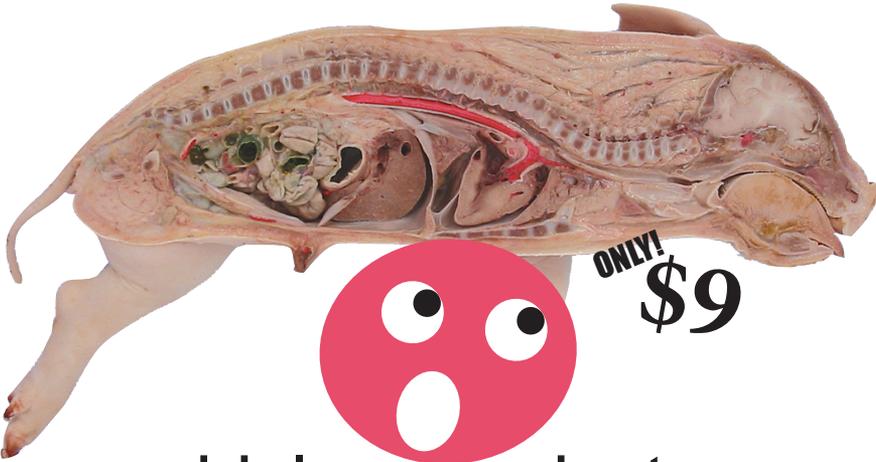
- ✓ Designed for online teaching & learning
- ✓ Teacher developed: 2<sup>nd</sup> Grade to AP Science
- ✓ Theory to practice and \$\$'s for *your* creative teaching
- ✓ 600 pages, 9 appendices:
- ✓ the seminal source for the 3-D paradigm

[www.barleyeducation.com](http://www.barleyeducation.com)

October 1<sup>st</sup> 2020 on Amazon

6. Mongelli L, N. Velez N, and L. Italiano 2014. Two high school kids burned in lab accident. *New York Post*, January 2.
7. Trager R. 2015. Chemistry accident at US high school prompts changes. November 6. <https://eic.rsc.org/news/chemistry-accident-at-us-high-school-prompts-changes/2000204.article>.
8. Clark K. 2015. Two Lincoln High School students hospitalized in science experiment mishap. *WCTV Eyewitness News*, May 22.
9. Ashton D. 2012. Explosive chemistry lesson learned at David Douglas High. *East Portland News*.
10. *Station v. Travelers Insurance Co.* 2012. November 26.
11. Gerlovich J, E. Wilson and R. Parsa 1998. Safety Issues and Iowa Science Teachers. *Journal of the Iowa Academy of Science* 105: 152–157.
12. Minister A. 2015. Unsafe Science. *NFPA Journal*. September 1.
13. NGSS Now. 2015. 14 things you need to know about the NGSS this month. <https://www.nextgenscience.org/sites/default/files/January2015NGSSNOW.pdf>.

Preserved specimens for a  
high quality zoology lab



**ONLY \$9**

[www.biologyproducts.com](http://www.biologyproducts.com)



**Reinforce key  
concepts with  
free STEM  
materials**

**[classroom.iihs.org](http://classroom.iihs.org)**

**Crash science lessons  
@school or @home**