

# Chapter 5

## GENERAL SAFETY

**A**ddressing the “Hierarchy of controls” including elimination, substitution, engineering controls, administrative controls and personal protective equipment as discussed in previous chapters is not a 100% guarantee the makerspaces, Fab Labs and STEM Labs will be safe and accident free. Remember—labs can only be made safer—not safe! When viewing safety from a general overview, DeLuca, Haynie, Love, and Roy (2014) suggested viewing safety from a systems approach. The first element they discuss is environmental factors (lighting, sound control, temperature, air quality, etc.). These environmental factors influence the specific content and practices taught from STEM courses (ex. energy and power technologies, agricultural and biotechnologies, medical technologies, physics, chemistry, etc.). To teach and provide hands-on experiences, potentially hazardous materials, processes, and, tools and equipment are often used. Makerspaces, Fab Labs or STEM Labs are no exception to the presence and use of this broad range of potential hazards. DeLuca et al. (2014) asserted that the safety of these items is influenced by affective, cognitive, and psychomotor factors as defined below:

- **Affective**—How one feels about safety and values safety. Developing a safer attitude or mindset to help demonstrate safer practices at all times.

- **Cognitive**—The analytical aspect of planning and carrying out investigations and activities in a safer manner. Are the application of content, practices, and safety procedures developmentally appropriate for students of this grade and ability level?
- **Psychomotor**—The physical aspect of performing investigations and activities safer. Are the materials, tools, machines, and processes developmentally appropriate for students to use in a safer manner?

When viewing safety from a systems approach it is apparent that there are many critical pieces of the puzzle that need to fit together to provide safer makerspaces, Fab Labs and STEM Labs. These critical components are described in detail in the subsequent sections of this chapter.

### Entry and Exit

There are building and fire codes that require all makerspaces, Fab Labs and STEM Labs over 1,000 square feet to have a minimum of two exit doors that open outward to prevent occupants from being trapped inside during an emergency. The exit access should never be blocked with furniture, computer tables, or any other items. In addition, flammable materials should not be stored near the exit(s). These instructional spaces