# High School Laboratory Safety Course

## Professional Development Outline

For more than 30 years Flinn Scientific has been considered the leader in laboratory safety by high school and middle school science teachers and administrators. We developed the Flinn Scientific Chemical Storage Pattern that is used by a majority of schools across the country to safely store laboratory chemicals. Flinn Scientific annually publishes the world-renowned *Flinn Scientific Catalog/Reference Manual,* which provides teachers with over 50 pages of laboratory safety articles and chemical disposal information.

Flinn Scientific has trained more than 100,000 teachers on classroom and laboratory safety through workshops, seminars, and monthly Department Safety Training Notes email—earning the reputation of being the science teacher's "Safer Source for Science Supplies." Now, all science teachers have the opportunity to become "Flinn Certified" in classroom laboratory safety. To be "Flinn Certified" means that you have received training from a company that is recognized nationwide by both teachers and administrators as the "go to" source for school science laboratory safety information.

You may become "Flinn Certified" by completing our High School Laboratory Safety Certification Course. This is a comprehensive online safety training video series that covers the 45 video chapters listed below. The total viewing time for the videos is just over seven clock hours and this viewing time is tracked by the course software. If you are completing the course for certification, you will not be able to proceed to the next video in the course until the time requirement for the video chapter you are currently viewing is fulfilled. The 45 video chapters in the course comprise 10 different units organized by topic. You will be required to complete a 12 question assessment at the end of each unit and will not be able to proceed to the next unit until a minimum passing requirement is met. (*Note:* There is not an assessment after Units I and X).

Once all of the video chapters have been viewed to completion and all eight unit exams have been passed, you will be able to print a certificate of completion for the course. This certificate will note the date of completion and the name of the teacher that has been certified. The certificate is valid for three years from the completion of the course. You will also be able to print a document of professional development after you have completed the course. This form can be found by selecting your state on the Professional Development section of the Flinn Scientific Laboratory Safety Course Web site. The professional development document will include the clock hours spent in training and the content that was covered. You can also print a sample of this document from any of the state professional development pages.

### Unit I. Introduction and Overview

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| **Chapter 1** | Why Safety Is Important! | Flinn Scientific's goal is to provide the necessary knowledge you need to successfully and safely teach science. We identify and discuss most common safety issues, providing logical and affordable solutions. |

### Unit II. Safety—The Teacher's Duty of Care

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| **Chapter 2** | The Teacher's Duty of Care | Teachers are responsible for providing instruction, supervision, and a safe learning environment in their science classrooms. |
| **Chapter 3** | Legal Foundation of Negligence | Negligence and liability are determined based on whether a teacher has followed the required duty of care. |



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| **Chapter 4** | Causes of Laboratory Accidents | Learn how to prevent accidents in the science lab by reviewing common causes of accidents and identifying responsible solutions to avoid these problems. |
| **Chapter 5** | Legal Analysis—Teacher's Duty to Instruct and Warn | Teachers are responsible for demonstrating proper laboratory techniques and discussing potential safety hazards before laboratory activities. |
| **Chapter 6** | Ideas to Demonstrate You Are a Responsible Science Teacher | Larry Flinn discusses how teachers can set the precedent that they have acted responsibly and proactively with respect to safety in the science lab. |

### Unit III. Chemical and Laboratory Safety Regulations

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| **Chapter 7** | Legal Analysis—Establishing the Teacher's Duty of Care | An in-depth look at specific case studies involving negligence. |
| **Chapter 8** | Hazard Communication and the Laboratory Standard | Specific actions are required in order to properly follow both the Hazard Communication and the Laboratory Standards. |
| **Chapter 9** | Laboratory Ventilation and Use of Fume Hoods | Laboratory ventilation must be well-designed, meet specific criteria, and be regularly tested for proper functionality. |
| **Chapter 10** | Material Safety Data Sheets and Chemical Label Requirements | Material Safety Data Sheets require specific information, which can then be included on the chemical label. |
| **Chapter 11** | Five-Minute Safety Inspection | This brief safety inspection ensures that the most crucial items in the science lab are in proper working condition. |
| **Chapter 12** | Emergency Alert and First Aid | Emergency alerts and first aid procedures should be in place and practiced before the event of an accident. |

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### Unit IV. Principles of Toxicology

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| **Chapter 13** | Basic Principles of Toxicology | Toxicology depends on variables such as dosage and routes of exposure. |
| **Chapter 14** | Relative Toxicity—Understanding and Assessing Risks | In order to understand toxicity it is important to understand the basic terminology and guidelines. |
| **Chapter 15** | Reducing Exposure to Laboratory Chemicals | There are two main types of toxicity—acute and chronic. Avoid the effects of toxic chemicals by protecting yourself from exposure. |
| **Chapter 16** | FAQs—Applying the Principles of Toxicology | Learn how to protect yourself against toxic chemicals and the steps regulatory agencies take to protect end users. |

### Unit V. The Use of Personal Protective Equipment

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| **Chapter 17** | Goggle Safety | Proper eye protection that is suitable for a given activity should be worn in the laboratory at all times. This basic rule must be strictly enforced by the instructor. |
| **Chapter 18** | Aprons, Gloves, and other PPE | In addition to goggles, students and teachers must wear the necessary personal protective equipment in order to avoid exposure to laboratory chemicals. |
| **Chapter 19** | FAQ—Proper Lab Attire | Tips on how to enforce the rule that proper lab attire is not optional, but required. |

### Unit VI. Laboratory Safety Equipment and Procedures

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| **Chapter 20** | The Duty to Provide and Maintain Safe Laboratory Facilities | The duty to provide a safe learning environment requires that teachers, administration, students, and parents work together. |

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| **Chapter 21** | Master Utility Controls | It is important to know how the water, electric, and gas shutoffs work in the laboratory. |
| **Chapter 22** | Electrical Safety | Understand the safety precautions that apply to outlets, cords, and other electrical equipment. |
| **Chapter 23** | Fire Blankets | Fire blankets have diverse applications that make them valuable for several safety problems in the science lab. |
| **Chapter 24** | Fire Extinguisher Basics and Training | Choose a fire extinguisher based on your laboratory needs and learn how to properly operate the fire extinguisher. |
| **Chapter 25** | Eyewash Requirements | An effective eyewash must provide a continuous flow of clean water to both eyes for 20 minutes. |
| **Chapter 26** | Safety Showers | Essential safety equipment for the laboratory includes safety showers, which are offered in many forms. |
| **Chapter 27** | FAQ—Lack of Proper Safety Equipment | A teacher may be found liable if the proper safety equipment is not provided for an activity in the laboratory or regular classroom. |

### Unit VII. Safe Laboratory Practices

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| **Chapter 28** | The Duty to Supervise—Classroom Management Tips | These tips offer solutions for common classroom management issues so teachers can fulfill their duty of supervision. |
| **Chapter 29** | How to Conduct a Safe Lab Activity | Teachers need to make sure students understand the common language of chemistry warnings. Teach this language using demonstrations. |

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| **Chapter 30** | Safety Guidelines for Chemical Demonstrations | Learn about the 12 safety guidelines for chemical demonstrations provided by the American Chemical Society. |
| **Chapter 31** | Biology Lab Safety—Dissection and Microbiology | The biology lab can be hazardous too. Here are some proper procedures, instruments, and safe methods. |
| **Chapter 32** | Glassware Safety | It's important to be aware of standard safety precautions that should be taken when using, heating, or handling glassware. |

### Unit VIII. Safe Chemical Management—Principles and Practice

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| **Chapter 33** | Chemical Purchasing Guidelines | Always ask yourself five simple questions before purchasing a chemical! |
| **Chapter 34** | Procurement Procedures | Be informed and only select quality products from reliable suppliers. |
| **Chapter 35** | Classroom Chemical Storage and Security | Chemicals must be stored under lock and key—there are no exceptions to this rule. |
| **Chapter 36** | Dispensing Chemicals and Acid Safety | Chemicals should be bottled, dispensed, and stored properly. |
| **Chapter 37** | Chemical Spill Control | Every science laboratory should be equipped with the proper materials to treat a chemical spill and the science instructor should be aware of proper cleanup techniques. |

### Unit IX. Storage and Disposal of Chemicals

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| **Chapter 38** | Safety and Design of the Chemical Storeroom | Chemical storerooms should be properly designed and possess the necessary safety resources. |

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| **Chapter 39** | Chemical Storeroom Ventilation | Chemical storerooms should be vented to allow proper air exchange. |
| **Chapter 40** | Chemical Storage—Storing Chemicals by Compatible Families | Chemicals should be stored according to a logical and safe pattern known as compatible chemical families. |
| **Chapter 41** | Chemical Treatment and Disposal Options | Promote methods to minimize hazardous waste by source reduction, reuse and recycling, and chemical treatment. |
| **Chapter 42** | FAQ—Radioactive Chemicals | Learn about radioactive chemicals, how they can be properly stored, and options for disposal. |
| **Chapter 43** | Licensed Hazardous Waste Disposal | Hazardous waste disposal companies should be EPA certified, provide reliable references, and give detailed and specific cost estimates ahead of time. |

### Unit X. How To Improve Laboratory Safety

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| **Chapter 44** | FAQ—Administration Won't Address Safety Concerns | The administration is more likely to address safety concerns when presented with well-organized, thoughtful facts. |
| **Chapter 45** | How to Get Action—Developing a 3-Year Plan | Develop a detailed three-year plan that explains to the administration exactly what needs to be done to improve safety. It's not enough to identify problems—you must present solutions! |



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