





# Xplorlabs: The Science of Fire Safety

Fire safety is a complex problem without a single answer. Engineers, architects, designers, and technicians all work together to make the spaces where we spend our time safe. The Science of Fire Safety supports student exploration of a well-known but often overlooked fire safety technology – fire sprinklers. With real lab experiment footage and hands-on investigations students explore how thermal energy and molecular motion relate to fire sprinkler activation. At the conclusion of the pathway, students think critically about fire safety in their own spaces and how they could incorporate fire sprinklers and other fire safety technologies to engineer and design fire-safe spaces.

	Engage	Explore	Explore/Explain	Elaborate
Part of the Pathway				
NGSS	<a href="#">MS-PS1-1 Matter and its Interactions</a> / <a href="#">HS-PS1 Matter and Its Interactions</a> and <a href="#">MS-PS3 Energy</a> / <a href="#">HS-PS3 Energy</a>			
Time	20 minutes	50 minutes	50 minutes	10 to 20 minutes
Overview	<p>Elicit student thinking about what makes a fire safe space.</p> <p>Students engage with real lab footage and <b>data</b> that shows a fire in two spaces: a space that is protected with fire sprinklers and a space without fire sprinklers. Just like real fire protection engineers, <b>students ask questions about how fire sprinklers affect experiment outcomes as they observe the footage</b></p>	<p>Explore the <b>structure</b> of fire sprinklers in the pathway or with real fire sprinklers. Students notice and wonder about their <b>structure and function</b>.</p> <p>Using an apparatus with <b>components</b> similar to a glass bulb sprinkler, students <b>plan and carry out an investigation</b> to observe the <b>interaction</b> between <b>thermal energy</b> and <b>matter</b>. This simulates how a real glass bulb fire sprinkler works, and supports students to begin constructing explanations.</p>	<p><b>Obtain and evaluate information</b> from Xplorlabs pathway to understand how <b>thermal energy</b> and <b>matter interact</b> to activate fire sprinklers and make connections to the apparatus investigated in the explore phase.</p> <p>Students communicate what they have come to understand by <b>constructing a model or explanation</b> that describes how fire sprinklers activate.</p>	<p>Students transfer their understanding about how fire sprinklers work to local spaces and designs (e.g., school, home). Students argue why these spaces are consistent with a safe design based on our known patterns for <b>interactions of thermal energy and matter</b>.</p> <p>Students also begin to imagine other technologies and <b>design solutions</b> that make fire safe spaces because of the predictable interactions between energy and matter.</p>
Supporting Resources	<a href="#">Side by Side Burn Experiment Footage</a>	<a href="#">Fire Sprinkler Interactive</a> <a href="#">How Do Fire Sprinklers Work? Video Investigation Video</a> <a href="#">How Do Fire Sprinklers Work? Investigation Handout</a>	<a href="#">Fire Sprinklers Interactive Experience</a> <a href="#">The Science of Fire Sprinklers</a>	<a href="#">Fire Safety Tips and Solutions From the Experts</a> <a href="#">What is a fire safe space? Student Reading</a>
	<a href="#">Fire Sprinklers Interactive Experience</a> / <a href="#">The Science of Fire Sprinklers</a>			