XPLORLABS | UL Research Institutes

HOW DO FIRE SPRINKLERS KEEP US SAFE?

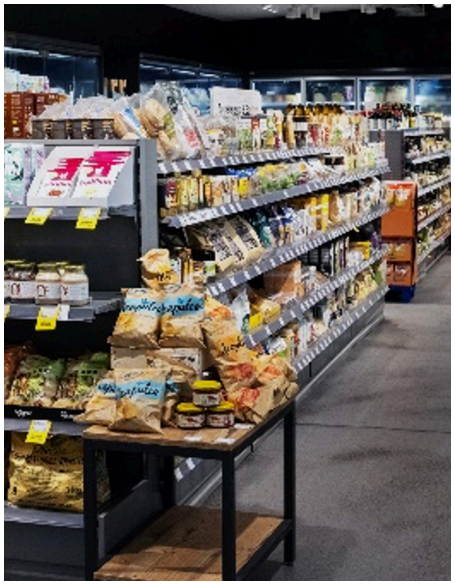
Student Document
The Science of Fire Safety

STUDENT GUIDE

YOUR NAME HERE:

Take a look at the pictures of the school hallway, market, and home kitchen.
If a fire were to occur in one of these spaces, how would they keep us safe?

1. Use the box below each image to describe what you see in each space.



Watch the side-by-side burn lab footage. In the space provided, write down things that you notice, and wonder while watching the lab footage.

2. In the space provided, write down things that you notice and wonder while watching the video.

Notice	Wonder

SENSE MAKING

Sense Making: Now that you have seen fire sprinklers in action, take some time to draw an initial model for how you think they work. Include as many labels as possible.

Carefully observe the three different fire sprinklers by zooming and rotating.

4. Record your observations about the fire sprinklers below.

Residential Pendant Sprinkler	Horizontal Sidewall Sprinkler	Storage Fast Response Sprinkler

5. What do you notice they have in common?

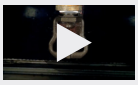
6. What is different about them?

7. Can you form some initial guesses about how they might work?

SENSE MAKING

Sense Making: Return to your original sprinkler model at the top of this page, adjust your original work. If you change something, cross it out rather than erasing it.

Watch this video investigation to understand the interaction between thermal energy and a liquid.



8. Use the checkpoints below to record your predictions, observations, reflections, and explanations for the video experiement. Stop the video when prompted by each checkpoint

1 **STOP AT 1:20**

What do you predict will happen in this investigation...
What do you think will happen? Why do you think it will happen?

2 **STOP AT 2:30**

What did you observe in this investigation? You may rewatch this video to collect data or draw the exprimental setup.

3 **STOP AT 2:30**

Take a moment to reflect on what you saw take place. Tell the story of what you saw happen in the experiment.

4 **FINISH VIDEO**

What are your initial explanations for what happened?

Respond to the following questions using evidence from your experience so far to try and explain the phenomena you have witnessed.

9. How do you think a fire sprinkler works?

10. What is the relationship between thermal energy and matter?

11. What else are you curious to investigate about fire sprinklers?

12. How might you plan an investigation to explore this?

SENSE MAKING

Sense Making: Return to your original sprinkler model at the top of this page, adjust your original work. If you change something, cross it out rather than erasing it.

Use the **Fire Sprinkler Interactive Experience** to see what conditions are required to activate a sprinkler and what happens on a molecular level to the red liquid.

13. Gather information from the interactive and complete the table below.

Object	Stove	Toaster	Heater
Did the object activate the sprinkler system?			
Why or why not?			
What happened to the molecules in the bulb?			

Consider all the the information you have gathered from The Science of Fire Safety.

14. Create a model with labels that shows how fire sprinklers work.

    Consider all the information you have gathered from The Science of Fire Safety pathway. Feel free to go back to work you have done and the resources found in the pathway to support your thinking.

Gather information from the sprinkler data.

15. What is a fact that you found surprising or interesting and why?

16. Where have you seen fire sprinklers, and where do you think they are missing?

17. What other technologies and designs make our spaces safe if a fire were to occur?

18. How can you advocate for safety in your home and community?