

FREQUENTLY ASKED QUESTIONS

WHAT IS XPLORLABS?

The purpose of Xplorlabs is to spark passion and excitement for real-world science and engineering. UL Xplorlabs is a Next Generation Science Standards-aligned, module-based educational platform that encourages middle schoolers to solve real-world engineering challenges through science. Interest in science often declines as students approach middle school. The modules build problem solving and processing skills that will help students adapt to new and emerging technologies, while encouraging curiosity by engaging young minds in a way that cultivates a passion for inquiry. There are two Xplorlabs modules—**Fire Forensics: Claims and Evidence** and **Portable Electrical Power**.

WHO IS UL?

UL fosters safe living and working conditions for people everywhere through the application of science to solve safety, security and sustainability challenges. The UL Mark engenders trust enabling the safe adoption of innovative new products and technologies. Everyone at UL shares a passion to make the world a safer place. We test, inspect, audit, certify, validate, verify, advise and train and we support these efforts with software solutions for safety and sustainability. To learn more about us, visit UL.com.

WHY DID UL CREATE XPLORLABS?

UL designed Xplorlabs to bridge the gap between the classroom and real-life engineering challenges. UL also wanted to provide flexible learning solutions for educators and students that could be easily incorporated into existing curriculum and serve as a springboard for deeper understanding, curiosity and robust classroom discussion.

DOES XPLORLABS FULFILL NGSS?

Yes, UL carefully crafted every Xplorlabs component in conjunction with scientists and teaching professionals to align with NGSS, including crosscutting concepts, application of science and engineering practices and attention to disciplinary core ideas.

HOW SHOULD I TEACH AN XPLORLABS MODULE?

UL Xplorlabs is flexible enough to complement science, engineering and technology curricula and adapts easily to a variety of settings. The modules are designed to be self-led, with the teacher facilitating conversation, but can be adapted for teacher-led programming.

WHAT'S IN THE FIRE FORENSICS MODULE?

The module includes a series of interactive videos, known as The Investigators Academy, that students watch on the Xplorlabs website, along with hands-on classroom activities and creative challenges. The hands-on Classroom Investigations are **downloadable** through the Xplorlabs website and include both teacher and student guides. The teacher guide explains how to conduct in-class experiments, lists the supplies you'll need, includes a rubric for assessing students Claims, Evidence & Reasoning (CER) and provides in-depth overviews of key learning takeaways.

CLAIMS, EVIDENCE & REASONING

Claims, evidence, and reasoning (CER) is a strategy for students to explain the results of an investigation. This is the language of scientists and engineers who's practice centers on arguing claims supported by evidence. The fire researchers formulate a question that is meaningful to the fire community, test it, make a claim, or several claims based on the evidence they find. They apply their reasoning based on their expertise in fire science.*

Throughout the module CER is discussed in fire forensics as entering the story at the end of the book and putting the pieces of evidence together to tell the story – where and how a fire started. The beginning of the story is the claim. The building of the storyline from end to beginning is the chain of evidence collected based on knowledge and understanding of fire behavior and fire science.

ABOUT THE MODULE

The module which can be completed in two to four class periods includes:

1. The Investigators Academy where students learn about fire science through interactive videos
2. Live Burns where students observe videos where full-sized structures are burned under different experimental conditions
3. Guided Investigation where students work with a UL expert to learn how to build a claim explaining the cause of a fire and where it started
4. Independent Investigation where students examine a kitchen to determine the origin and cause of a fire
5. Students use their gathered evidence to tell their story of what happened
6. Challenge where students share their claim and learn what happened

The module also includes four supplemental Classroom Investigations where students learn about the fire triangle, heat transfer and ignition, energy and combustion and fire lab data analysis. The in-class prep work gives students the necessary background to make claims about fire and solve an investigation. Most investigations can be completed in one to three classroom periods, depending on the length of class time and the depth of exploration. Each investigation corresponds with a video, so the module can be implemented with or without a lab setup. If conducting experiments in a lab, please ensure your school's lab is equipped to handle small open flames and smoke.

* McNeill, K. L. & Krajcik, J. S. (2012). Supporting grade 5-8 students in constructing explanations in science: The claim, evidence, and reasoning framework for talk and writing. NJ: Pearson Education.

DO I HAVE TO KNOW ANYTHING ABOUT FIRE TO TEACH THIS?

No, the module was designed to provide a complete understanding of fire, fire dynamics, and fire behavior.

CAN MY STUDENT DO THIS INDEPENDENTLY?

Yes, the interactive videos and experiments can be done independently or as a whole class. However, the experiments included in the classroom investigations do require adult supervision.

HOW MANY CLASS PERIODS DOES THE MODULE TAKE?

The module takes two to four class periods. Each classroom investigation will take one to three class periods depending on the length of class time and the depth to which you explore the tests with your students.

DO STUDENTS NEED TO WATCH ON INDIVIDUAL DEVICES?

No, you can project the interactive videos onto one main screen in the front of the classroom. The benefit of students watching videos on individual devices is the opportunity to go at their own pace.

DO I HAVE TO DO THE ENTIRE MODULE WITH STUDENTS?

Yes, we recommend doing the entire module, as every section builds on the previous sections. Students are able to progressively develop the knowledge to ultimately solve their own burn case.

WHAT SUPPLIES WILL I NEED?

Each classroom investigation has a list of common household items you'll need to do the exercise. Here are some examples: a glass jar, aluminum foil, a pillar candle and a long-reach lighter. You probably have some of these materials on hand and many are the same for each activity. If you do end up purchasing supplies, the total cost for the entire module will be less than \$50. For a supply list by activity, [download the teacher guide](#).



HOW DOES FIRE FORENSICS FIT INTO MY CURRICULUM?

Fire Forensics: Claims and Evidence supports students understanding of the Disciplinary Core Ideas (DCI) from NGSS Middle School Physical Science. The module will cover MS-PS1: Matter and its Interactions and MS-PS3: Energy.

WHAT SCIENTIFIC CONCEPTS SHOULD MY STUDENTS KNOW BEFORE STARTING THIS MODULE?

It is helpful for students to have some experience with properties of matter, specifically solids, liquids, and gases, including identifying materials based on their measurements through observations and measurements (Grade 5, PS1-3).

IS IT HARD TO LEARN HOW TO IMPLEMENT?

No, UL designed the module to be flexible and easy to implement. You can lead it, or have your students explore on their own. Download the teacher's guide to get a more in-depth understanding of the module and check out the [videos](#) to better understand the experiments.

It is also helpful, though not required, for students to have experience with the NGSS benchmark 4-PS3 Energy, and some familiarity with argumentation in:

- Defining a simple problem
- Generating/comparing multiple possible solutions to a problem based on constraints and criteria
- Planning and carrying out fair tests with controlled variables

WHAT DOES IT COST?

UL Xplorlabs is a completely free resource. The modules are on the UL Xplorlabs website and include interactive videos and classroom activities. It's a flexible complement to middle school science, engineering and technology curricula, and it's fun.

WILL YOU ADD NEW MODULES OVER TIME?

Yes! UL Xplorlabs will continue to develop new modules and resources. **Sign up** on the home page for email updates to stay in the know. You can also follow us on social media channels at **Facebook**, **Twitter** and **Instagram**.

WHY SHOULD I USE THE XPLORLABS MODULES?

Teachers like the modules because it allows students to solve real-world problems with creative STEM solutions, not prescribed results. It's also flexible and adapts to a teacher's individual learning style, so teachers can use content in different ways. With Xplorlabs, middle schoolers ignite their passion for science and get introduced to new and exciting STEM career paths.

HOW DO I GET THIS FOR MY CLASS?

Xplorlabs modules are free and everything you need to get started is here on the Xplorlabs website. [Download the teacher guide](#) for explanation about the Classroom Investigations and watch the videos online.