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# Supporting Cybersecurity Teachers in the Classroom



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Students demand more **career exploration in high school** to help them turn a passion into a profession, but **many lack access to quality career-focused programs** that lead to in-demand jobs.

College Board is building **AP Cybersecurity** to provide a pathway for career-aware students.

# Career Preparedness is a rising priority in K-12 education

Among students and families surveyed, only 35% of schools offer job-relevant skills education.

## Top 10 Purpose of Education Rankings

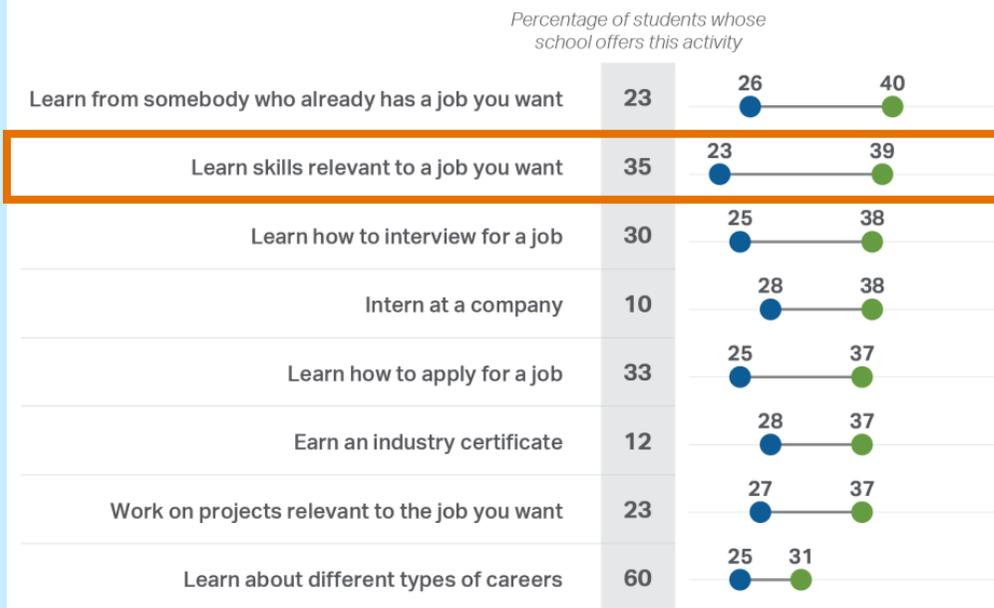
Attributes	2022	2019
Students develop practical skills (e.g. manage personal finances, prepare a meal, make an appointment)	1	1
Students are able to think critically to problem solve and make decisions	2	4
Students demonstrate character (e.g. honesty, kindness, integrity, and ethics)	3	3
Students can demonstrate basic reading, writing, and arithmetic	4	14
All students receive the unique supports that they need throughout their learning	5	19
Students are prepared for a career	6	27

## Future career confidence increases among students whose schools offer career-related activities.

Does your school offer any opportunities to ... ?

% Very prepared for "How prepared do you think you will be to do each of the following in the future: Succeed in a career"

● School does not offer this activity ● School offers this activity



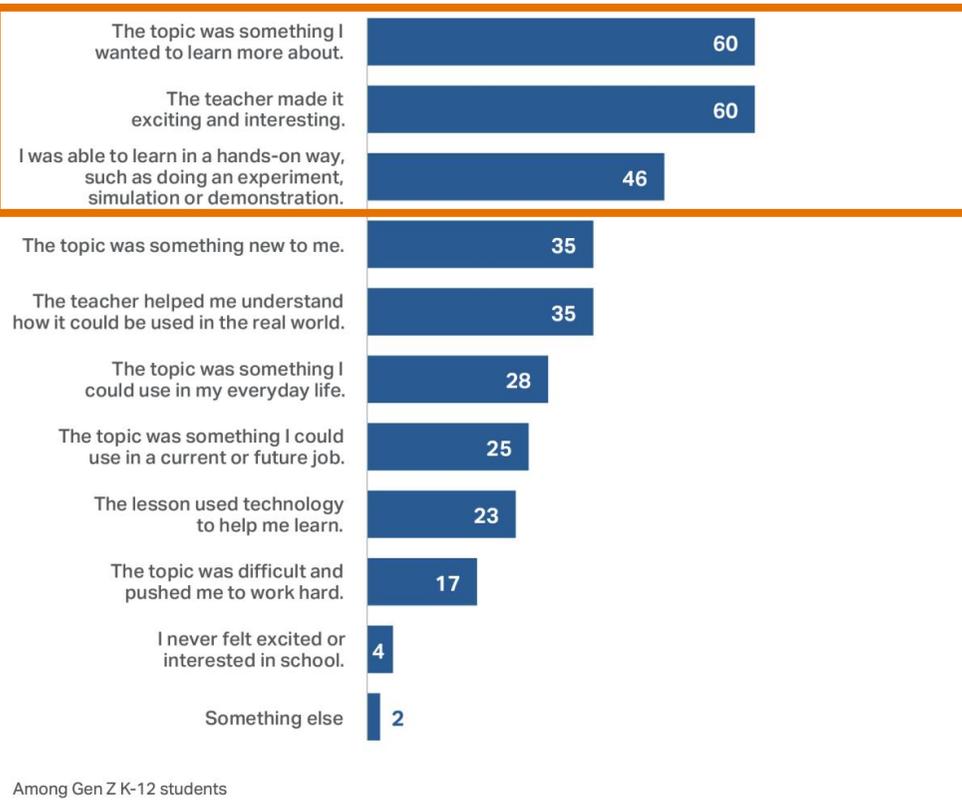
Among Gen Z K-12 students

Source: [https://nextgeninsights.waltonfamilyfoundation.org/wp-content/uploads/2024/08/Walton\\_Gallup\\_Voices-of-Gen-Z\\_Year-2-2024-Final-Report.pdf](https://nextgeninsights.waltonfamilyfoundation.org/wp-content/uploads/2024/08/Walton_Gallup_Voices-of-Gen-Z_Year-2-2024-Final-Report.pdf)

# Engagement in Gen Z is down. The study found topic, teacher, and applied learning are critical to engaging students.

Please think about the times you have been very excited about or interested in what you learned in school. Why did you feel interested or excited? Select all that apply.

% Selected



The study also found **engagement is particularly low among students who don't plan to pursue a 4-year degree, and high schools today emphasize college a lot more than other opportunities.**

Source: [https://nextgeninsights.waltonfamilyfoundation.org/wp-content/uploads/2024/08/Walton\\_Gallup\\_Voices-of-Gen-Z\\_Year-2-2024-Final-Report.pdf](https://nextgeninsights.waltonfamilyfoundation.org/wp-content/uploads/2024/08/Walton_Gallup_Voices-of-Gen-Z_Year-2-2024-Final-Report.pdf)

# Why AP Cybersecurity?

**500,000**

High-paying, job postings, many that don't require a 4-year degree<sup>1</sup>

**1.2%**

Students have access to cybersecurity pathways<sup>2</sup>

**2,300**

Cyber attacks per day, one attack every 38 seconds<sup>3</sup>

*As we attempt to better the lives of our students, Cybersecurity is a field that is here to stay and will help provide our students with upward mobility opportunities, create new opportunities for generational wealth, change their families' lives, and help improve their communities.*

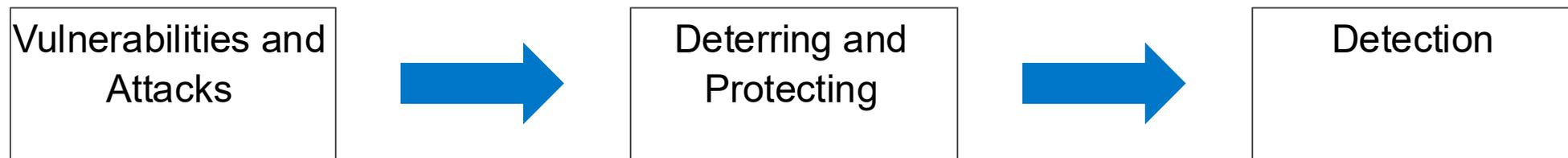
*— Dr. Diego Tibaquirá, Professor, Miami Dade College, and Advisory Board Member*

Sources: 1. <https://www.cyberseek.org/heatmap.html> 2. <https://cybersupply.org/>  
3. <http://https://www.forbes.com/advisor/education/it-and-tech/cybersecurity-statistics/>

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# AP Cybersecurity Overview

- Unit 1: Introduction to Cybersecurity
- Unit 2: Physical Security
- Unit 3: Network Security
- Unit 4: Device Security
- Unit 5: Data and Application Security



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# Legal and Professional Standards of Practice

## AP Cybersecurity

- The practice of cybersecurity is shaped by laws, regulations, and professional standards.
- The CED will include a page explaining to teachers and students the importance of following the legal and professional norms of practice in cybersecurity.
- This page will also outline some of the key laws and professional norms.

# Timeline

1

2024-25

Approximately 125 schools participated in a pilot in target states

2

2025-26

Approximately 450 schools will participate in an expanded pilot across 25-30 states

3

2026-27

AP Cybersecurity launches nationally

4

2027-28

AP Networking launches nationally

# Best-in-class cybersecurity curricula built for teachers by teachers

## Vision



A future where the nation's cybersecurity needs are met by a knowledgeable, skilled, and passionate workforce

## Mission



Ensure that every K-12 student gains foundational and technical cybersecurity knowledge and skills

## Approach



Empower teachers with resources and training needed to deliver cyber content to students

- One of the nation's only cybersecurity curriculums trusted by the Cybersecurity & Infrastructure Security Agency
- Built to CompTIA Security+, Network+ and Linux+ standards
- Comprehensive and easy-to-use K-12 Cybersecurity Learning Standards available nationwide to educators at no cost and wholesale to industry
- Immediate access and effortless onboarding
- Self-paced training with expert support



# Curricula & Resources



# Industry leading curricula for elementary, middle, and high school

**Cybersecurity Basics**  
Introduction to protecting devices and information

Home Course Information

**Digital Citizenship**

**Cyberbullying**  
Students will discuss how cyberbullying can occur when using digital devices and how to respond.

- K-2: Don't Be Mean Behind the Screen
- 3-5: Taking a Stand Against Cyberbullying
- 6-8: Cyberbullying and How to Respond Part 1
- 6-8: Cyberbullying and How to Respond Part 2

**Motivations of People Online**  
Students will discuss the various types of people online and why they may choose to behave in different ways with a goal of keeping students safe during their online interactions with others.

- K-2: Good and Bad Users of Devices
- 3-5: Types of People Online
- 6-8: Hacker Motivations

**Personally Identifiable Information**  
Students will discuss the various types of information that is shared and tracked online especially personally identifiable information.

- K-2: Personal or Public Information
- 3-5: Sharing Personal Information
- 6-8: Risks and Benefits of Sharing PII
- 6-8: Risks and Benefits of Sharing PII, Part 2

**Digital Footprints**  
Students will discuss how technology use can be tracked and what online activities can be tracked.

**User Assessments**  
Students will discuss the various types of information that is shared and tracked.

**6-8 Digital Citizenship Standards**  
Students will explore the motivations and behavior of people on the Internet and the

## Cybersecurity Basics

- Introduces cybersecurity topics that affect everyday life
- Security, digital citizenship, and computing systems

**Intro to Cybersecurity**  
Introduce students to basic cybersecurity concepts and inspire interest in cybersecurity careers

Home Course Information

**Support Materials**

Name	Lesson Guide	Resources
Course Teaching Guide	Syllabus Course Map One Semester Plan	Course Allow List

**Course Content**

**Unit 1 - Foundations and Threats**  
[Unit 1 Assessment](#)

**Section 0.1 - First Day Info & Ethics Agreement**  
[Lesson Plan](#)

0.1.1 - First Day Info & Ethics Agreement  
[Lesson Guide](#)  
[PowerPoint](#)  
[Activity - Course Interest Survey](#)  
[Ethics Agreement](#)

**Section 1.1 - CIA Triad and Authentication**

## Intro to Cybersecurity

- Intro to basic cybersecurity concepts
- Inspire interest in cybersecurity careers
- No prerequisite knowledge required
- Utilizes the CYBER.ORG Range

**Cybersecurity**  
Understanding the interconnectedness of devices and how to protect them

Home CompTIA Security+ Objective Order Course Information

**Teacher Resources**

Resources	Influences	Accomplishable User Policy	Lab Descriptions	Case Studies	Skill Content
CompTIA Security+ Information	STO 201 Objectives				

**Supplemental Resources**

**Case Studies**  
[Cybersecurity - Behavior](#)  
[Cyber Laws](#)  
[CISPA Great Firewall](#)  
[Digital Evidence Availability](#)  
[IT Arms of Ubiquity](#)  
[MS-CERT and Incident Response/Investigation Basics](#)

**Unit 1 - Actors/Motivations, CIA & Authentication**  
[Unit 1 Lesson Plan](#)

1.1.1 Threat Actors  
[Lesson Notes](#)  
[Guided Notes](#)  
[Firewall, IDS, IPS](#)  
[Other Tools](#)

## Cybersecurity

- Comprehensive year-long course
- 150+ lesson topics and activities
- Real-world cybersecurity concepts and skills
- Aligned to CompTIA Security+ objectives



# Industry leading curricula for elementary, middle, and high school

**Cyber Literacy**  
An introduction to cyber engineering through programming

Home [Jump to: micro:bit](#) [Scripting](#) [Encryption](#) [Radio Networks](#) [Attacks and Defenses](#)

micro:bit

- Get Started  
[Lesson Guide](#)  
[Slides](#)
- Save and Reopen Scripts  
[Lesson Guide](#)  
[Slides](#)
- UI Controls and Side Panels  
[Lesson Guide](#)  
[Slides](#)  
[Handout](#)
- Serial Monitor Intro  
[Lesson Guide](#)  
[Slides](#)  
[Handout](#)

Scripting

## Cyber Literacy

- Blends physical computing and Python programming with cybersecurity
- Provides hands-on opportunities to understand network topologies and how cyber attacks affect them
- Works with the BBC micro:bit and CYBER.ORG cyber:bot.

**Networking**  
Prepare high school students for networking certification exams

Home [Course Information](#)

Support Materials

- Course Teaching Guide  
[Teacher Guide](#)  
[Suggested Order](#)
- CompTIA Network+ Information  
[N10-008 Objectives](#)

Supplemental Materials

- Coming Soon: Book - Tubes  
[Chapter Questions](#)  
[Answer Key](#)

Course Content

Lesson Name	Teacher Notes	Guided Notes	Resources	Assessments
<b>1.0 - Networking Fundamentals</b>				
1.1.1 - OSI Model	<a href="#">Teacher Notes</a> <a href="#">PowerPoint</a>	<a href="#">Guided Notes</a> <a href="#">Answer Key</a>	<a href="#">Activity - OSI Model Creative a Mnemonic</a> <a href="#">Activity - OSI Model Creative a Mnemonic - Answers</a>	Quiz - Key
1.1.2 - Encapsulation and Decapsulation	<a href="#">Teacher Notes</a> <a href="#">PowerPoint</a>	<a href="#">Guided Notes</a> <a href="#">Answer Key</a>	<a href="#">Lab - Encapsulation and Decapsulation with Wireshark</a>	Quiz - Key

## Networking

- Comprehensive year-long course
- Foundational knowledge for network administration
- Prepares students for CompTIA Network+ certification

**Intro to Linux**  
Engage students in the fundamentals of using and navigating within the Linux OS

Home [CompTIA Objective Order](#) [Course Information](#)

Teacher Resources

Resources  
[Syllabus Examples](#) [Acceptable Use Policy](#) [Lab Descriptions](#) [Linux Commands Cheat Sheet](#)

CompTIA Linux+ Information  
[XK0-005 Objectives](#)

Fun with Linux  
[Fun with Linux Lab](#)

Unit 1 - FSH, Using CLI & File Editing  
[Unit 1 Lesson Plan](#)

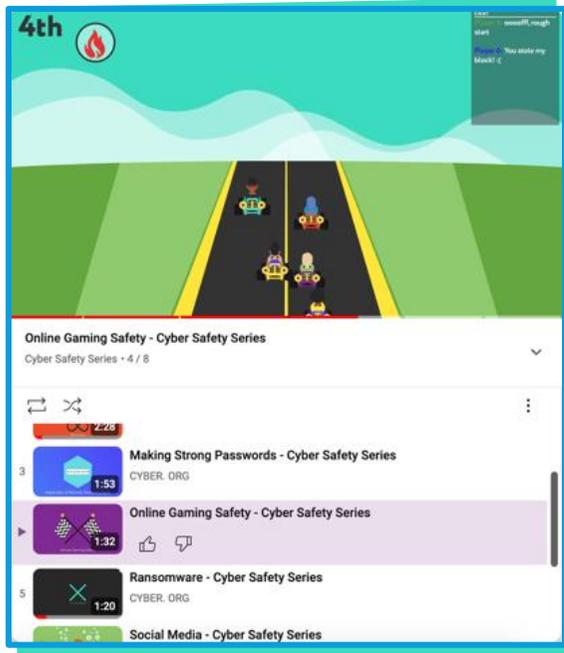
1.1.1 - File System Hierarchy  
[Lesson Notes](#)  
[PowerPoint](#) [Guided Notes](#)  
[Answer Key](#) Quiz - Key

## Intro to Linux

- Comprehensive semester-long course
- Linux administration and management
- Prepares students for CompTIA Linux+ certification

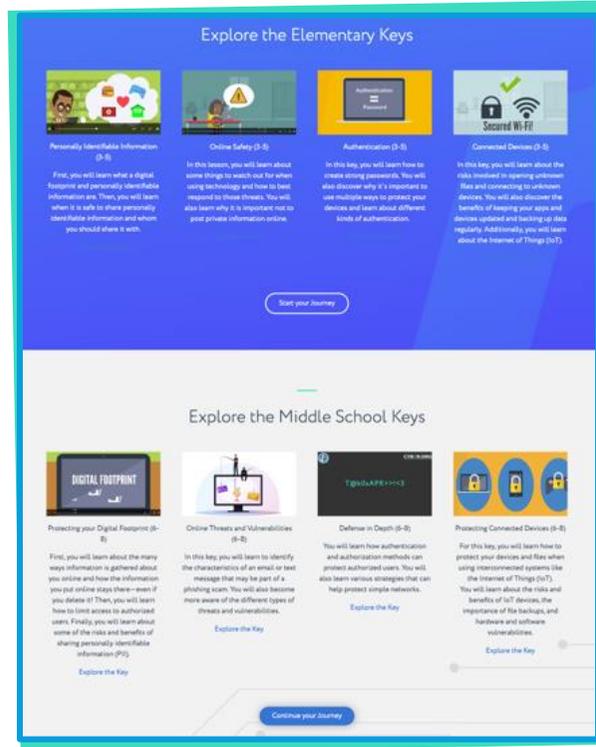


# Engaging materials and activities



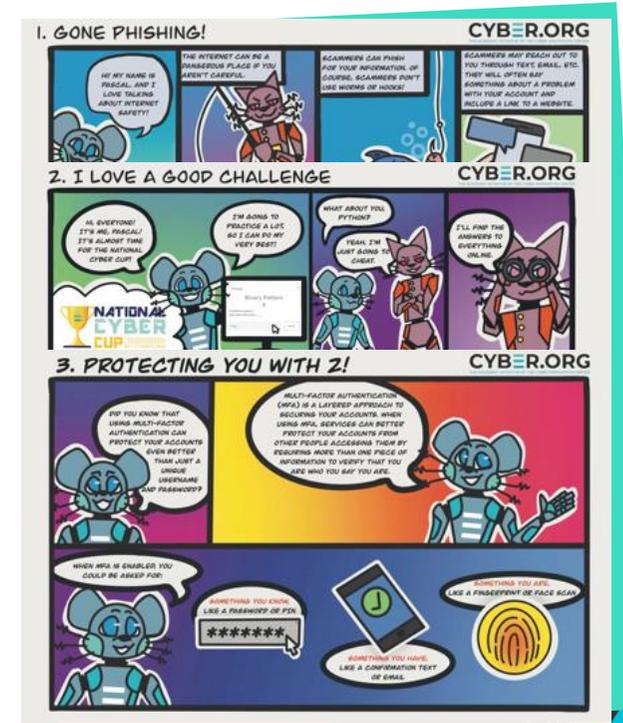
Cyber Safety Video Series

## Keys to Cybersecurity



Career Profiles

## Pascal & Python Comic Series



# CYBER.ORG Range

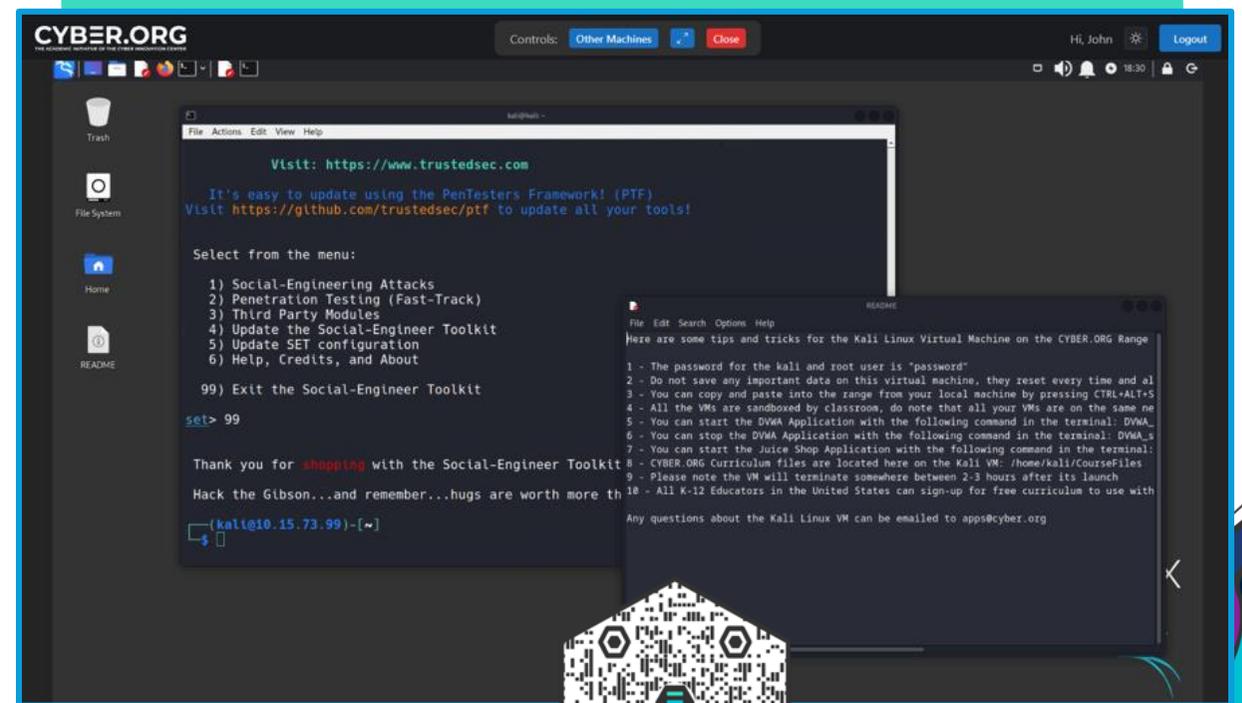


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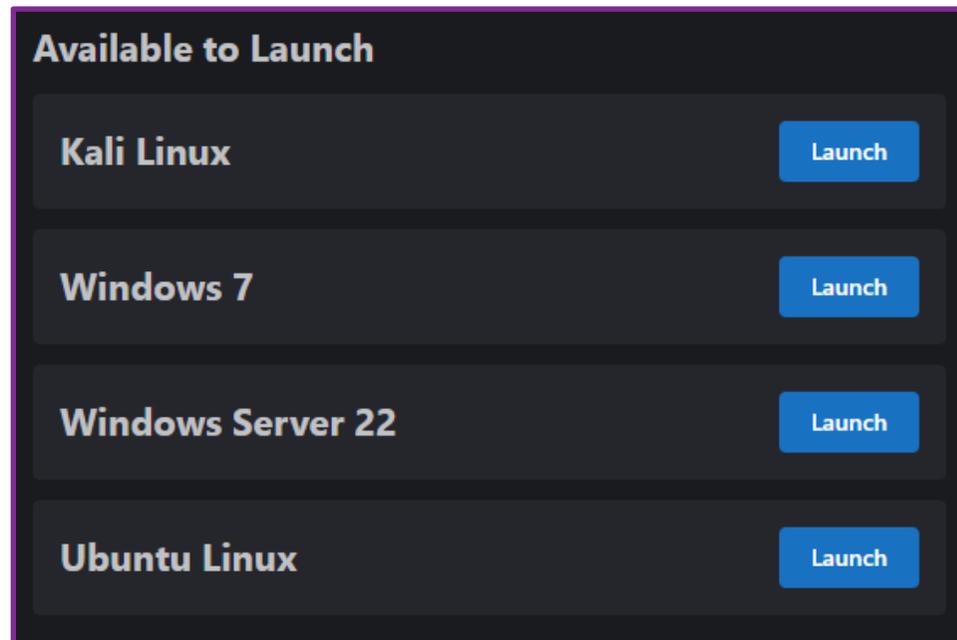
# CYBER.ORG RANGE

- A secure, virtual environment to practice cybersecurity skills
- Cloud-based and capable of running virtual machines with access to the internet but closed off from any private networks
- No additional hardware or software necessary
- Lead students through labs to experience simulated cyber attacks
- Complete labs in multiple courses within the Range
- Available to all K-12 educators in the U.S.



# I'm logged in... Now what?

- You should see a classroom listed and your instructor's name
- Click on it



- Inside the classroom, you will see the virtual machines listed
- Click “Launch” which will start that machine, but remember it is like starting up a real computer so it will take time to boot up



# Launching Machines

The screenshot displays the CYBER.ORG interface for managing virtual machines. At the top, the logo 'CYBER.ORG' is visible with the tagline 'THE ACADEMIC INITIATIVE OF THE CYBER INNOVATION CENTER'. A 'Logout' button is in the top right corner. The interface is divided into two main sections: 'Current VMs' and 'Available to Launch'.

**Current VMs:**

- Windows 7:** Status: setting up, IP: 10.15.119.193. It has 'Connect' and 'Terminate' buttons. A progress bar is partially filled with orange.
- Kali Linux:** Status: booted, IP: 10.15.23.212. It has 'Connect' and 'Terminate' buttons. A progress bar is fully filled with blue.
- Windows Server 22:** Status: queue to boot, IP: (blank). It has 'Connect' and 'Terminate' buttons. A progress bar is mostly empty with a small red segment at the beginning.

**Available to Launch:**

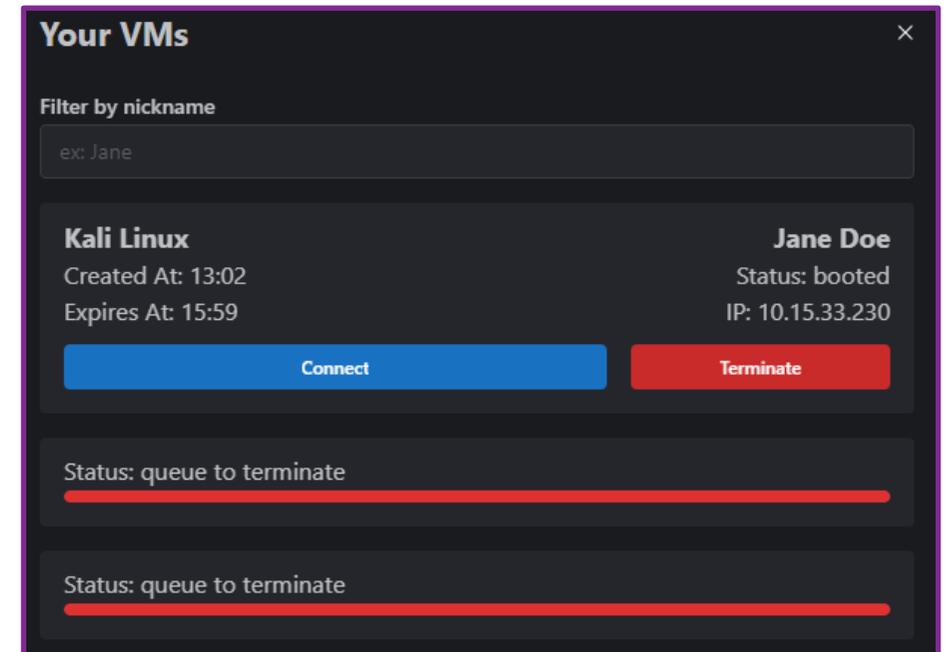
- Ubuntu Linux:** It has a 'Launch' button.

- Launch all the machines if you have not done so
- Clicking “Launch” on a machine will set it to queue to boot – Like hitting the main power button
- Once launched, it has to setup everything to run – Like the loading time before logging in
- Once fully booted, you will have the option to “Connect” and “Terminate”



# Non-persistence

- After you hit the “Terminate” button or if your machine times out after the set expiration time, then anything saved to the virtual machine will be lost/erased
- Launching a new one means the virtual machine will start as if it is a brand-new machine
- This proves useful when we start using stronger tools and programs down the road that could lead to machines failing or crashing



# Cyber Career Spotlight



**MEDIAN SALARY**  
\$120,000+

Designs and links various types of data networks

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Degree not required



 **CYBER.ORG**  
THE ACADEMIC INITIATIVE OF THE CYBER INNOVATION CENTER





# Q&A

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