NOVA CYBERSECURITY LAB STANDARDS ALIGNMENT

Next Generation Science Standards

The following performance standards* are addressed by the Cybersecurity Lab videos and game:

Middle School

Scientific and Engineering Practices

- ✓ **Developing and Using Models:** Develop or modify a model—based on evidence – to match what happens if a variable or component of a system is changed.

- ✓ **Analyzing and Interpreting Data:** Analyze data to define an optimal operational range for a proposed object, tool, process or system that best meets criteria for success.

- ✓ **Using Mathematics and Computational Thinking:** Create algorithms (a series of ordered steps) to solve a problem.

Crosscutting Concepts

- ✓ **Patterns:** Students recognize that macroscopic patterns are related to the nature of microscopic and atomic-level structure. They identify patterns in rates of change and other numerical relationships that provide information about natural and human designed systems. They use patterns to identify cause and effect relationships, and use graphs and charts to identify patterns in data.

- ✓ **Cause and Effect:** Students classify relationships as causal or correlational, and recognize that correlation does not necessarily imply causation. They use cause and effect relationships to predict phenomena in natural or designed systems. They also understand that phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.

- ✓ **Systems and System Models:** Students can understand that systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. They can use models to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems. They can also learn that models are limited in that they only represent certain aspects of the system under study.

Common Core Standards for Literacy in Science and Technical Subjects

- ✓ **RST.6-8.7:** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

- ✓ **SL.8.2:** Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally)…

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NOVA CYBERSECURITY LAB STANDARDS ALIGNMENT

Next Generation Science Standards

The following performance standards* are addressed by the Cybersecurity Lab videos and game:

High School

Scientific and Engineering Practices

✓ **Developing and Using Models:** Design a test of a model to ascertain its reliability.

✓ **Analyzing and Interpreting Data:** Evaluate the impact of new data on a working explanation and/or model of a proposed process or system.

✓ **Using Mathematics and Computational Thinking:** Use mathematical, computational, and/or algorithmic representations of phenomena or design solutions to describe and/or support claims and/or explanations.

Crosscutting Concepts

✓ **Patterns:** Students observe patterns in systems at different scales and cite patterns as empirical evidence for causality in supporting their explanations of phenomena. They recognize classifications or explanations used at one scale may not be useful or need revision using a different scale; thus requiring improved investigations and experiments. They use mathematical representations to identify certain patterns and analyze patterns of performance in order to reengineer and improve a designed system.

✓ **Cause and Effect:** Students understand that empirical evidence is required to differentiate between cause and correlation and to make claims about specific causes and effects. They suggest cause and effect relationships to explain and predict behaviors in complex natural and designed systems. They also propose causal relationships by examining what is known about smaller scale mechanisms within the system. They recognize changes in systems may have various causes that may not have equal effects.

✓ **Systems and System Models:** Students can investigate or analyze a system by defining its boundaries and initial conditions, as well as its inputs and outputs. They can use models (e.g., physical, mathematical, computer models) to simulate the flow of energy, matter, and interactions within and between systems at different scales. They can also use models and simulations to predict the behavior of a system, and recognize that these predictions have limited precision and reliability due to the assumptions and approximations inherent in the models. They can also design systems to do specific tasks.

Common Core Standards for Literacy in Science and Technical Subjects

✓ **RST.11-12.7:** Evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

✓ **SL.9-10.2:** Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

*Please note standards are referenced from the Next Generation Science Standards.
Find the full standards here: www.nextgenscience.org

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NOVA CYBERSECURITY LAB STANDARDS ALIGNMENT

Next Generation Science Standards	**Cybersecurity Lab Components**			
Three Dimensions	Coding Challenge	Password Cracking Challenge	Social Engineering Challenge	Network Attacks
Scientific & Engineering Practices				
1. Planning and carrying out investigations				
2. Developing and using models	√			√
3. Engaging in argument from evidence				
4. Analyzing and interpreting data		√	√	√
6. Constructing explanations and designing solutions				
7. Using mathematics and computational thinking	√			
Crosscutting Concepts				
1. Scale, proportion, and quantity				
2. Structure and function				
3. Patterns		√	√	
4. Systems and system models	√			√
Disciplinary Core Ideas				
Asking Questions and Defining Problems				
Common Core Reading Anchor #7: Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.	√		√	
Analyzing and Interpreting Data				
Common Core Speaking and Listening #2: Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.			√	