

Connecting to the *Next Generation Science Standards* (NGSS Lead States 2013)

Standard	
MS-ETS1-4: Engineering Design https://www.nextgenscience.org/pe/ms-ets1-4-engineering-design The chart below makes one set of connections between the instruction outlined in this article and the NGSS. Other valid connections are likely; however, space restrictions prevent us from listing all possibilities. The materials, lessons, and activities outlined in the article are just one step toward reaching the performance expectations listed below.	
Dimensions	Classroom Connections
Science and Engineering Practices Developing and Using Models - Develop and/or use a model to generate data to test ideas about phenomena in natural or designed systems, including those at unobservable scales. Analyzing and Interpreting Data - Analyze and interpret data to provide evidence for phenomena. Engaging in Argument From Evidence - Write an argument supported by empirical evidence to support or refute an explanation or a model for a phenomenon or a solution to a problem.	- Students use the computational model to test ideas about how different groups of people are impacted by the spread of a virus in a community and how to prevent the spread. - Students analyze and interpret data from the computational model and other data sources (e.g., frontline worker report) to provide evidence for the disproportionate impact of COVID-19 on racial and ethnic minority groups. - Students use evidence from the computational model and other data sources to argue that frontline work helps explain the disproportionate impact of COVID-19 on racial and ethnic minority groups.
Disciplinary Core Ideas ETS1.B: Developing Possible Solutions - Models of all kinds are important for testing solutions. - A solution needs to be tested, and then modified on the basis of the test results, in order to improve it.	- Students use the computational model to test whether mask wearing helps solve the problem of disproportionate impact of a virus on different groups of people. - Based on their tests, students figure out that individual solutions, such as mask wearing, are necessary but not sufficient

	for solving the problem. Thus, students argue for systemic solutions.
Crosscutting Concepts Patterns - Students use graphs and charts to identify patterns in data and cause and effect relationships. Systems and System Models - Students use models to represent systems. Students understand that systems may interact with other systems as part of larger complex systems. Cause and Effect - Students use cause and effect relationships to predict phenomena in natural or designed systems.	- Students identify patterns in data from multiple sources (e.g., COVID-19 data, graphs from the computational model, graphs from the frontline worker report). - Students use the computational model to understand how the behavior of agents in a system (e.g., how people interact in a community) produces the behavior of the system as a whole (e.g., how the virus spreads through a community). Students recognize how systems interact (e.g., transit system, housing system). - Students identify two conditions that contributed to the disproportionate impact of COVID-19 on racial and ethnic minority groups: (a) frontline work and (b) household living arrangements.
<i>Building Towards Performance Expectation (PE listing with Clarification Statement and Assessment Boundary)</i> MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	

Connections to the *Common Core State Standards* (NGAC and CCSSO 2010)

ELA CCSS.ELA-LITERACY.SL.6.5 Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.
Mathematics CCSS.MATH.CONTENT.6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems.