SOLVE THE OUTBREAK

Attention teachers!

Are you interested in using CDC's Solve the Outbreak app in the classroom? This app, which is now available for Android and iPad tablets, as well as desktop computers, is a great tool for introducing a variety of science concepts at the middle and high school grade levels. Be sure to check out the quick reference matrix on pages 2-5 to choose a scenario that covers Next Generation Science Standards in a fun and interactive manner, that will keep your students engaged.

If you're not familiar with the Next Generation Science Standards, be sure to review the definitions on pages 6-7 to get a better understanding of how each standard is defined for middle and high school grade levels.

Also, check out the sample lesson plans that are customized for middle and high school students. Each lesson features three different scenarios, suggestions for additional activities that will reinforce scientific concepts, and more.

Disclaimer: All scenarios that are included in this app are fictional. While each scenario is inspired by real-life investigations, modifications have been made to introduce different epidemiological concepts. The scenarios do not necessarily reflect CDC best practices for outbreak investigations.

Quick Reference Matrix: Level 1 Next Generation Science Standards

Legend

- Concept is "touched upon" but not in an in-depth manner.
- Concept is presented and discussed within the scenario, includes 1 example.
- Direct application of the concept, including more than 1 example.

Core Competencies	Solve the Outbreak Scenarios											
	Breathless in the Midwest	Village of Gold	The Queens Killer	Case of the Conference Blues	Sugar Plantation Blues	Hiding in Plain Sight	Deadlier than War	Connect the Spots	Laid Low in the Desert	Birthday Party Gone Wrong	Up Sick Creek	Midterm Revenge
Planning and Carrying Out Investigations	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆
Asking Questions and Defining Problems	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆
Cause and Effect	◆◆◆	◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆
Engaging in Argument from Evidence	◆◆◆	◆◆	◆◆	◆◆◆	◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆	◆◆	◆◆	◆◆◆
Scientific Knowledge is Based on Empirical Evidence	◆◆	◆◆	◆◆	◆◆◆	◆◆	◆◆	◆◆	◆	◆◆	◆◆	◆◆	◆◆
Analyzing and Interpreting Data	◆◆	◆◆	◆◆	◆	◆	◆◆	◆◆	◆◆	◆◆	◆◆	◆◆◆	◆◆
Scale, Proportion, and Quantity	◆◆	◆◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Using Mathematics and Computations Thinking	◆	◆		◆								
Patterns	◆	◆◆	◆◆◆	◆	◆	◆	◆◆	◆◆	◆	◆◆	◆	◆◆
Constructing Explanations and Designing Solutions	◆◆	◆◆	◆◆	◆◆◆	◆◆	◆◆	◆◆	◆◆	◆◆	◆◆	◆◆◆	◆◆◆

Core Competencies	Solve the Outbreak Scenarios											
	Breathless in the Midwest	Village of Gold	The Queens Killer	Case of the Conference Blues	Sugar Plantation Blues	Hiding in Plain Sight	Deadlier than War	Connect the Spots	Laid Low in the Desert	Birthday Party Gone Wrong	Up Sick Creek	Midterm Revenge
Obtaining, Evaluating, and Communicating Information	◆◆	◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆	◆◆	◆◆◆	◆◆◆
Developing and Using Models	◆	◆	◆	◆	◆◆◆	◆	◆	◆	◆	◆	◆	◆◆
Stability and Change	◆	◆◆◆	◆	◆◆	◆◆	◆◆◆	◆	◆◆	◆◆	◆◆	◆	◆◆
Influence of Science, Engineering, and Technology on Society and the Natural World	◆◆	◆◆◆	◆◆	◆◆	◆◆	◆	◆	◆	◆	◆	◆	◆
Scientific Knowledge is Open to Revision in Light of New Evidence	◆◆◆	◆◆◆	◆◆◆	◆◆◆	◆◆	◆◆	◆◆◆	◆◆	◆	◆	◆	◆
Developing Possible Solutions	◆◆	◆◆	◆◆	◆◆◆	◆◆	◆◆◆	◆◆	◆◆	◆◆	◆	◆◆	◆◆
Natural Resources	◆	◆◆	◆◆	◆	◆		◆	◆	◆	◆	◆	◆
Optimizing the Design Solution	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

Quick Reference Matrix: Level 2 Next Generation Science Standards

Legend

- Concept is "touched upon" but not in an in-depth manner.
- Concept is presented and discussed within the scenario, includes 1 example.
- Direct application of the concept, including more than 1 example.

Core Competencies	Solve the Outbreak Scenarios			
	Spring Break Fever	Sick-o Kiddos	Lockdown Blues	Fever in the Field
Planning and Carrying Out Investigations	◆◆◆	◆◆◆	◆◆◆	◆◆◆
Asking Questions and Defining Problems	◆◆◆	◆◆◆	◆◆◆	◆◆◆
Cause and Effect	◆◆◆	◆◆◆	◆◆	◆◆◆
Engaging in Argument from Evidence	◆◆◆	◆◆◆	◆◆	◆◆◆
Scientific Knowledge is Based on Empirical Evidence	◆◆◆	◆◆◆	◆◆	◆◆◆
Analyzing and Interpreting Data	◆◆	◆◆	◆◆	◆◆
Scale, Proportion, and Quantity	◆◆	◆◆	◆	◆◆
Using Mathematics and Computations Thinking	◆◆	◆		◆◆
Patterns	◆◆	◆	◆◆	◆◆
Constructing Explanations and Designing Solutions	◆◆	◆◆	◆◆	◆◆
Obtaining, Evaluating, and Communicating Information	◆◆	◆◆◆	◆	◆◆
Developing and Using Models	◆	◆	◆	◆

Core Competencies	Solve the Outbreak Scenarios			
	Spring Break Fever	Sick-o Kiddos	Lockdown Blues	Fever in the Field
Stability and Change	◆◆	◆◆		◆◆
Influence of Science, Engineering, and Technology on Society and the Natural World	◆	◆	◆	◆
Scientific Knowledge is Open to Revision in Light of New Evidence		◆	◆◆	
Developing Possible Solutions	◆	◆	◆	◆
Natural Resources		◆		
Optimizing the Design Solution	◆	◆	◆	◆

Next Generation Science Standards Definitions

Core Competencies	Middle School Level (6-8)	High School Level (9-12)
Planning and Carrying Out Investigations	Planning and carrying out investigations to answer questions or test solutions to problems in 6-8 builds on K-5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or design solutions.	Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.
Asking Questions and Defining Problems	Asking questions and defining problems in grades 6-8 builds from grades K-5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models.	Asking questions and defining problems in 9-12 builds on K-8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.
Cause and Effect	Cause and effect relationships may be used to predict phenomena in natural or designed systems.	Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.
Engaging in Argument from Evidence	Engaging in argument from evidence in 6-8 builds from K-5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world.	Engaging in argument from evidence in 9-12 builds on K-8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current or historical episodes in science.
Scientific Knowledge is Based on Empirical Evidence	Science knowledge is based upon logical and conceptual connections between evidence and explanations.	
Analyzing and Interpreting Data	Analyzing data in 6-8 builds on K-5 and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.	Analyzing data in 9-12 builds on K-8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.
Scale, Proportion, and Quantity	Proportional relationships (e.g. speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and process.	Algebraic thinking is used to examine scientific data and predict the effect of a change in one variable on another (e.g., linear growth vs. exponential growth).
Using Mathematics and Computations Thinking	Mathematical and computational thinking at the 6-8 level builds on K-5 and progresses to identifying patterns in large data sets and using mathematical concepts to support explanations and arguments.	Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and non-linear functions including trigonometric functions, exponentials, and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.
Patterns	Graphs and charts can be used to identify patters in data.	Different patterns may be observed at each of the scales at which a system is studied and can provide evidence of causality in explanations of phenomena.
Constructing Explanations and Designing Solutions	Constructing explanations and designing solutions in 6-8 builds on K-5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories.	Constructing explanations and designing solutions in 9-12 builds on K-8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.
Obtaining, Evaluating, and Communicating Information	Obtaining, evaluating, and communicating information in 6-8 builds on K-5 and progresses to evaluating the merit and validity of ideas and methods.	Obtaining, evaluating, and communicating information in 9-12 builds on K-8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs.

Core Competencies	Middle School Level (6-8)	High School Level (9-12)
Developing and Using Models	Modeling in 6-8 builds on K-5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.	Modeling in 9-12 builds on K-8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s).
Stability and Change	Small changes in one part of a system might cause large changes in another part.	Much of science deals with constructing explanations of how things change and how they remain stable.
Influence of Science, Engineering, and Technology on Society and the Natural World	All human activity draws on natural resources and has both short and long-term consequences, positive and well as negative, for the health of people and the natural environment. The uses of technologies and limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.	All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. The uses of technologies and limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.
Scientific Knowledge is Open to Revision in Light of New Evidence		Scientific argumentation is a mode of logical discourse used to clarify the strength of relationships between ideas and evidence that may result in revision of an explanation.
Developing Possible Solutions		When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.
Natural Resources		All forms of energy production and other resource extraction have associated economic, social, environmental, and geopolitical costs and risks as well as benefits. New technologies and social regulations can change the balance of these factors.
Optimizing the Design Solution		Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (tradeoffs) may be needed.