

Air Quality Education Landscape Survey

September, 2018

Recommendations for the updated curriculum include:

- Revamp the On the Air curriculum, **using existing content**, and **align with NGSS**, connect to Common Core (ELA and Math), and have clear cross curricular connections (social sciences) for middle and high school.
- The curriculum should be driven by investigations that address local (school grounds/neighborhoods) and regional phenomena (Chesapeake Bay).
- The curriculum should take into consideration the k-12 learning progression. That is consider how learning “connects and builds” from one year to the next.
- The curriculum should integrate elements of Green School Certification and Green Ribbon and use as part of a school ground investigation.
- The curriculum should be developed as individual stand-alone units instead of a book.
- Revamped curriculum should be put through an official NGSS EQIP rubric and quality review process.
- Revamped curriculum should be ground-proofed during the summer by group of MWCOG region teachers paid a stipend.



STEM vs NGSS

The urgency for STEM (science, technology, engineering, and mathematics) education was heralded by a [workforce imperative](#) and the need to supply an [increasing demand for STEM jobs](#).

The NGSS was introduced at a time when concerns over science education were running high – the PISA (Program for International Student Assessment) scores had come out, painting a bleak picture of today’s students’ scientific understanding.

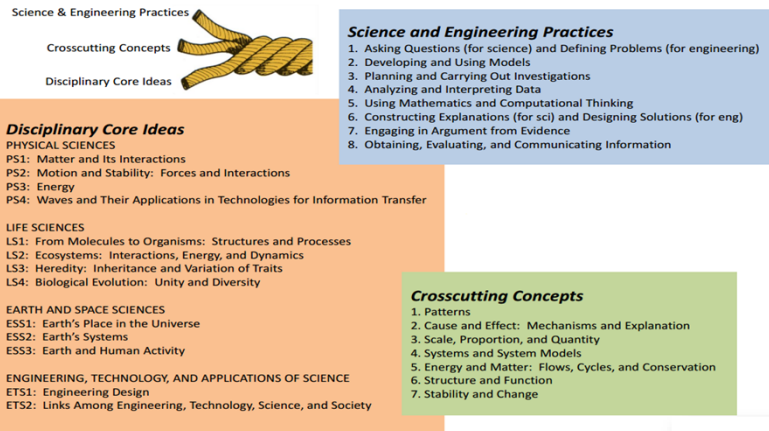
A good STEM education focuses on problem-solving: identifying the source of a problem, exploring alternate solutions, and then designing and constructing the solution. It’s real-world science as real-world scientists experience it, designed to allow students to experience the satisfaction that comes with the successful implementation of a solution.

NGSS takes a broader perspective, **focusing on scientific inquiry, developing scientific curiosity and finding solutions.** It aims to make **science accessible and enjoyable for everyone.** The NGSS learning outcomes were designed not just to prepare future scientists and engineers, **but also to instill a scientific way of thinking in each and every citizen.** It originates from the belief that a good science education provides the knowledge that allows us to [think through the impact of our actions in different ways](#), providing every citizen with **the knowledge and ability to affect the future in ways that are constructive and positive.**



NEXT GENERATION SCIENCE STANDARDS

NGSS, set firmly on the foundation of [three-dimensional learning](#) – scientific and engineering practices, crosscutting concepts and disciplinary core ideas



NEXT GENERATION SCIENCE STANDARDS

Over 40 states showed interest in the standards,^[11] and as of November 2017, 19 states, along with the **District of Columbia (D.C.)**, have adopted the standards: Arkansas,^[12] **California**, Connecticut,^[13] Delaware, Hawaii,^[14] Illinois,^[15] **Iowa**,^[16] Kansas, Kentucky, **Maryland**, Michigan, Nevada, New Hampshire, New Mexico,^[17] New Jersey, Oregon,^[18] Rhode Island, Vermont, and Washington. These represent over 35% of the students in U.S. ^{[19][20][21][22][23]}

The 26 states involved in developing the NGSS, called Lead State Partners, were **Arizona**, Arkansas, California, Delaware, Georgia, Illinois, **Iowa**, Kansas, Kentucky, Maine, Maryland, Massachusetts, **Michigan**, Minnesota, Montana, New Jersey, New York, **North Carolina**, Ohio, Oregon, Rhode Island, South Dakota, Tennessee, Vermont, Washington, and West Virginia.^[25]



This collage displays various educational resources for air quality education, categorized by school level:

- Elementary School Curricula:** Includes 'Up in the AIR', 'Air, Air, Everywhere' (Teacher's Guide and Activities), 'THE ADVENTURES OF CLAIR & CAM', 'Protect Your Climate', and 'Welcome to the Present Year Climate'.
- Middle School Curricula:** Features 'The STORM Project' and 'Air Quality Education Program'.
- High School Curricula:** Shows 'What's in the Air Curriculum', 'The STORM Project', and 'MEECs'.



Elementary school

- “Up in the Air” has [k-2](#) and [grades 3-5](#) lessons that lets students explore air pollution through engaging hands-on science lessons. [Maricopa, Arizona](#)

K-2 *The Mystery Jar, Let's sort it out, Recipe for Air Pollution, Got Air?, What is in our Air, What color is our air?*

3-5 *You can't live without it!, Air, Is it Really There!, It's just thin Air, Up in the Air, Air Pollution: It all adds up!, Just Breathe, Be Air Aware*

- [Air, Air Everywhere](#) has ready lessons for [grades 3-5](#) on air quality and the importance of clean air for our health. [Wisconsin](#)

3-5 *Where's the Air?, Air Soup, The Weight of Air, Does Clear Air=Clean Air?, Clean Air- How Far We've Come, The Clean Air Act, Milkweed Magic, AQI Detectives, Breathing is Easy Isn't it, Air Quality Knows-it-All*

- [Climate Change Basics](#), Lessons/activities and inspiring change projects for [grades 4-5](#) related to air quality with a focus on [California](#)

Climate Change Basics (Studying Air Pollution), Reducing Impacts from Energy Use, Reducing Impacts from Waste, Reducing Impacts from Transportation (car tally)

- [The adventure of Clair and CAM North Carolina](#)

K-2 *What is air!, IS THE air Clean Today, Know the Code!, How can we Help Clair and Cam Prevent Air Pollution?*

3-5 *Air and the Respiratory System, the Plastic Bag Air Lift, Using the AQI to Stay Healthy*

Preventing Air Pollution by Saving Electricity and Driving Less, Magic School Bus Gets Cleaned Up



Middle School

- [University of Northern Iowa middle school Activities in Air Quality](#)

Acid Rain & Environmental Effects, Air Quality Index, Criteria Pollutants, Finding the Planetary Boundary Layer, Factories - Friends or Foes, Concentration is Essential for this Task!, There's a Whole Lotta Spillin' Goin' On Particulate Matter

- [Air Quality Education Program Delaware Grades 6-12](#)

Why study air pollution? (cornering) What impact does Industry have on air pollution? What impact does transportation have on air quality? Why Study indoor air pollution? What impact does open burning have on air quality? What. Is acid rain? What are the health impacts of air pollution?

- [PBS MEECS series of 10 video lessons on Air Quality Michigan Environmental Education Curriculum Support](#)

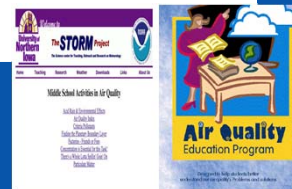
Composition of Ambient Air, How is Air Pollution Produced, Reactants and Products of Combustion, One Breath at a Time, Major Air Pollutants, Local Sources of Air Pollution, Particle pollution, Air Quality Index, The History of Air Pollution, Making Decisions about Air Quality

- [EPA Tool Kit](#)

What are the health impact of air pollutants, Tracking Air Quality (Ozone and PM), Smog Alert, **Trapping Air Pollution Temperature Inversion, What's Riding the Wind in your community?, Save Smog City 2 from Ozone**

- [Air Pollution: What is the solution?](#)

Center for Innovation in Engineering and Science Education (CIESE)



High school

- [University of Northern Iowa High School Activities in Air Quality](#)

5 E's Engage, Explore, Explain, Extend, Evaluate and National Science Standards

Carbon Dioxide in the atmosphere, Concentration is Essential for this Task!, Finding the Planetary Boundary Layer, Dispersion Models, Indoor Air Pollution, Oxygen Give and Take, Particulate Matters, There's a Hole in my umbrella, There's a Whole Lotta Spillin' Goin' On, Time for Change, To burn or Not to Burn, You're One in a Million

- [It's Our Air 3 modules 9 Videos and 15 activities](#) North Carolina

What is Air, Combustion & Combustion Equations, Parts per Million, Criteria Pollutants/Closer look at Ozone, Making and using ozone indicators, Sampling Particulate Matter, What's an air quality index?, Making a simple predictive model for ground level ozone pollution, Forecasting Air Quality, Scientific Literacy and Air Quality, Introduction to solutions & home energy choices, Driving Choices & calculating car emissions, Regulations, Clean air Act, Research and Action

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