

Applications of Low-Cost Sensors for Youth Education in Arizona

Hilary Hafner¹, Hilary Minor¹, Tami Lavezzo¹, Jenny Frank²

¹Sonoma Technology, Petaluma, CA; ²Maricopa County Air Quality Department (MCAQD), Phoenix, AZ



What Is Kids Making Sense[®]?

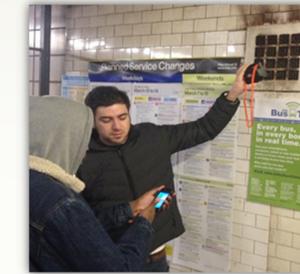
Emerging air quality sensor technology is creating new educational opportunities. Kids Making Sense (KMS) is an environmental education curriculum that teaches students to measure particle pollution using hand-held, low-cost AirBeam sensors and interpret the data they collect. Developed by Sonoma Technology's (STI) air quality scientists, HabitatMap, and educators, and thoroughly tested by teachers and students around the world, KMS unites Science, Technology, Engineering, and Math (STEM) education with a modern, low-cost sensor. The program encourages community interest in low-cost sensors, educates students about air pollution at a young age when they are forming their driving and consumption habits, and empowers students to drive positive change in their communities.



Learn



Measure



Discover



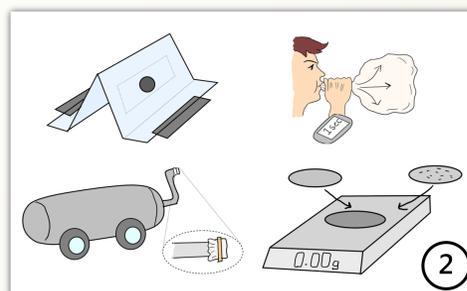
Interpret

Kids Making Sense Components

Kids Making Sense engages students with real-world, hands-on science. The curriculum begins with in-classroom investigations that teach students about the properties of air, sources and characteristics of particle pollution, and the health effects of air pollution. Working in teams, students use the scientific method to develop a testable research question and design a study to monitor air pollution around their school and communities. Using low-cost sensors, such as AirBeams, students collect credible air quality data. Back in the classroom they analyze the data and discuss their findings with their classmates and STI scientists. The KMS website, www.kidsmakingsense.org, allows students to view their routes on a sharable map, identify key areas of pollution, and share their data with the global air quality community. Finally, students develop an air quality monitoring campaign to share what they've learned with members of their community.



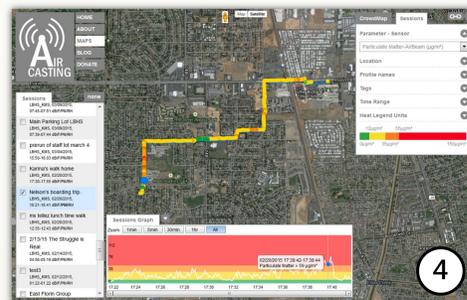
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2



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The KMS Kit (1) includes hands-on activities (2) that teach students about particulate matter. The kit also includes AirBeam sensors (3) that enable students to collect air quality data and view it on the web (4).

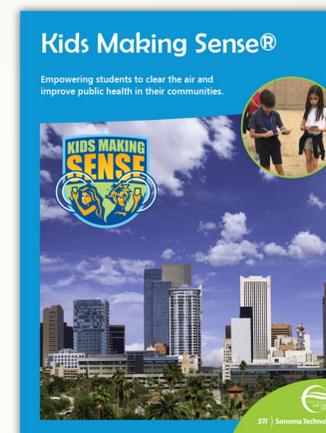
Curriculum for STEM Applications

The Maricopa County Air Quality Department (MCAQD) is leading a rollout of KMS in Maricopa County classrooms. They tailored the KMS curriculum to align with current Arizona academic standards for grades 6-12. The Arizona academic standards aim to help students, through experiential learning, develop both the skills and knowledge necessary to be scientifically literate members of the community.

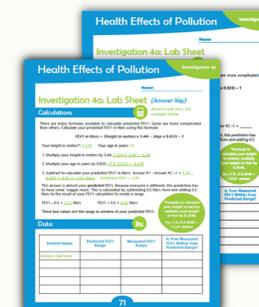
The KMS program contains eight Investigations, which can be completed in 12 50-minute class periods. The Investigations are designed to be flexible and can stand alone. Each Investigation includes:

- Background information
- Key vocabulary
- Discussion questions
- Potential sources of error
- Accommodations and modifications
- Assessments
- Labs and experiments
- Cross-curricular connections to English Language Arts (ELA) and mathematics
- Opportunities to extend learning
- Additional resources
- Digital tools

Each Investigation is aligned to Arizona academic standards.



The cover of the KMS Teacher's Guide, adapted for Arizona state standards.



Examples of student lab sheets, which include procedures, data logs, calculations, discussion questions, and an answer key (for teachers).

MCAQD Future Plans

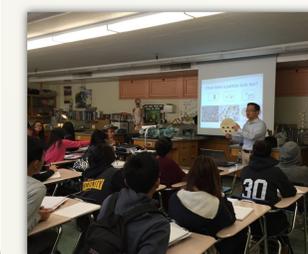
MCAQD plans to expand outreach by:

- Purchasing additional classroom kits through funding from an Arizona Department of Administration (ADOA) Department of Energy grant.
- Conducting teacher training workshops.
- Demonstrating AirBeam sensors at school and community STEM events.
- Partnering with local organizations to promote the Kids Making Sense program.

KMS Future Plans

STI plans to expand the KMS program by:

- Incorporating new sensors and air quality data parameters.
- Adding new curriculum and investigations, including expanded curriculum developed for kindergarten through 5th grade students.
- Increasing the number of KMS collaborators and deployments.



Contact Us

707.665.9900 | sonomatech.com
 Hilary Hafner (Hilary@sonomatech.com)
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