

Air Sensors for Science, Technology, Engineering and Math Outreach

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New low cost air pollution sensors and communication technology affords a unique opportunity for science, technology, engineering, and math (STEM) outreach by scientists, who participate in events ranging from classroom presentations to engineering festivals. Interactive demonstration units can be developed using available low cost components, such as a sensor and communications housed in a clear container, with sensor signals controlling visual data indicators. EPA ORD recently designed one such system which was displayed at the 2012 World Maker Faire and has been used locally at museum and school demonstrations. The setup demonstrated how an LED array can be used to indicate relative air pollutant levels. Additional more visually pleasing and interactive designs are in development for future demonstration applications. Sensors can be designed to address specific problems/pollutants of interest to provide for the greatest possible learning experience. For example, nitrogen dioxide, carbon monoxide, and particulate matter sensors could be used to indicate pollution in areas with traffic exhaust, while carbon dioxide sensors could support user-interaction and allow a participant to trigger a visual indicator when they exhale on the sensor. Building these sensor systems facilitates hands-on learning and provides additional STEM opportunities for school groups and can also be used at many types of outreach events. These systems provide a novel and interactive platform to learn about scientific research, programming, electronics, and air pollution in a real world application.