



Creating Exceptional Learning Environments through Comprehensive Indoor Air Quality Management

May 21, 2013
2:30 - 3:30 PM EDT



Indoor Air Quality (IAQ)

Tracy Enger: Hello everyone and welcome to our webinar today.

During the course of the day today, I will have a pleasure of serving as your facilitator as we move through a terrific program, featuring our two speakers today, Barbara Worth and Dave Hill. As we continue to explore enhancing your ability to act on implementing quality, indoor air quality management programs, within your schools and districts, with the great examples.

So please join me in welcoming our speakers today, Barbara Worth.

Introductions

Facilitators:

Tracy Washington Enger
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Speakers:

Barbara C. Worth
Director of Strategic & Private Development
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Indoor Air Quality (IAQ)

Barbara Worth: Hi. It's Barbara. I just want to say CEFPI is both proud and delighted to join EPA in our collaborative effort to improve the health and safety in the places where children learn, by improving the air quality in their learning environment. As you will see, by taking some straightforward and very inexpensive steps, schools can overcome many indoor environmental problems, creating buildings that foster student and staff health.

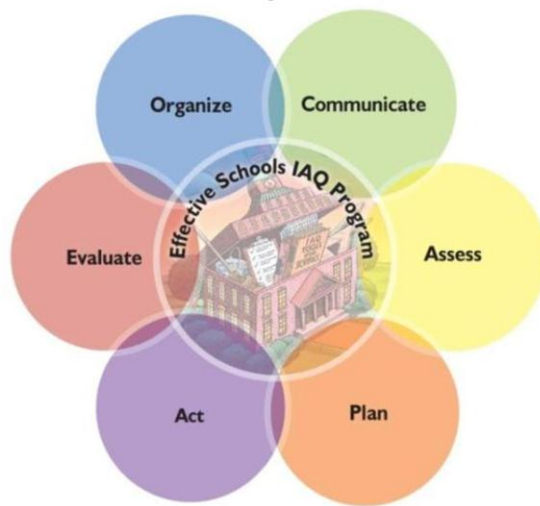
Tracy Enger: Thank you, Barbara. And Dave Hill.

Dave Hill: Thank you, Tracy. It's a pleasure to be here with all of you and with everyone listening today. I look forward to talking to each of you.

Tracy Enger: Terrific. Both Barbara and Dave – Barbara representing the Council for Education of Facility Planners International (CEFPI) and Dave representing as the Executive Director for Facilities and Operations at the Blue Valley School District of Kansas – represent two really strong elements of a much broader national network that we have worked together here at EPA to present to the stakeholders across the country to, again, improve their capacity to create healthy, green, clean indoor, school indoor

environments.

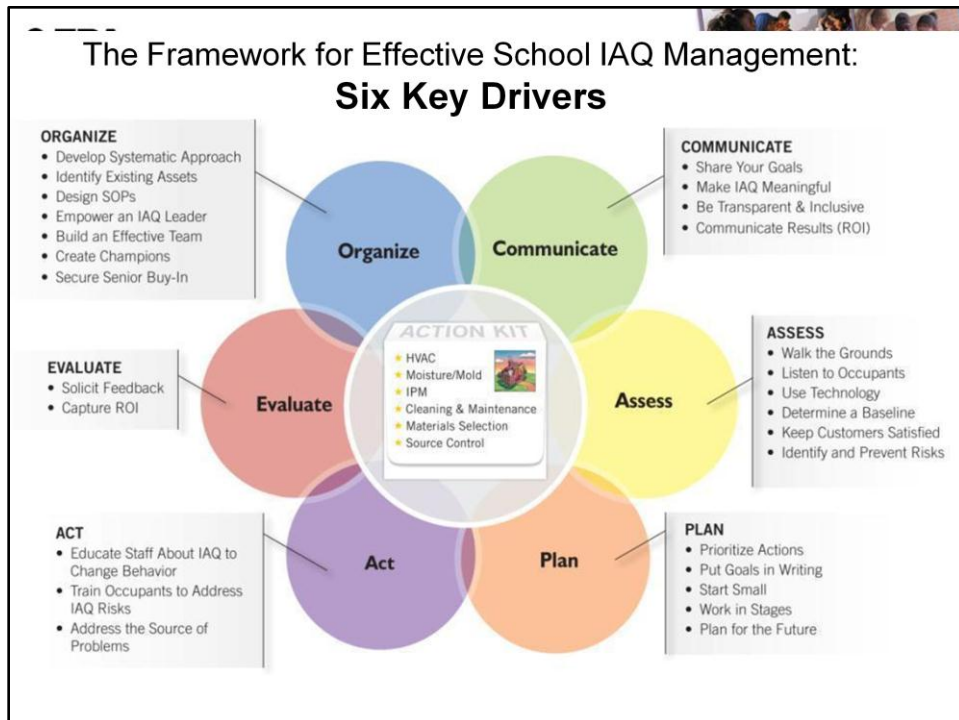
The Framework for Effective School IAQ Management



Indoor Air Quality (IAQ)

Tracy Enger: So during the course of our webinar today, what you're going to be hearing is, from two, like I said, two of our strong network members, primarily from Dave Hill at the Blue Valley School District, who is a Sustained Excellence Award winner in indoor air quality. And what you're going to be hearing is really how we bring the framework that you see before you to life.

Dave represents thousands of schools across the country who have been using this Framework successfully in order to see improved academic performance, health, and educational and facilities outcomes in their schools or school district. And what we – what you will hear here is a representation of one of the many schools that we looked at in order to surface the Key Drivers that you see here – organized, communicate, assess, plan, act and evaluate, in order to put them in place in comprehensive programs, IAQ management programs, in schools. They garnered the kinds of results you're going to hear from Dave.



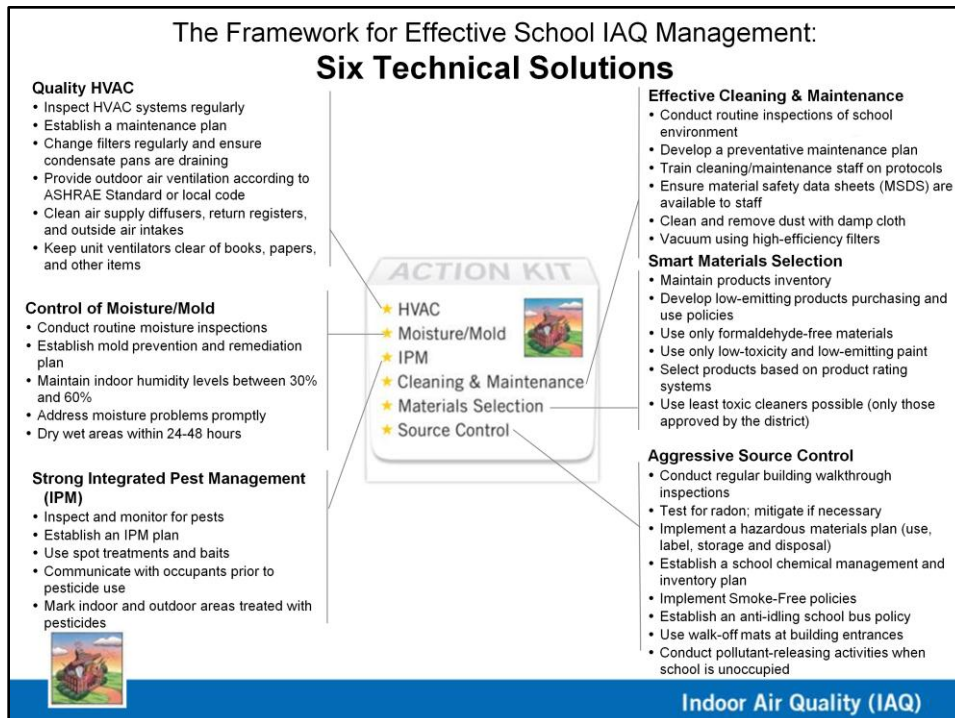
Tracy Enger: Under each of those key drivers, we also have a number of strategies that we have identified really with the assistance of schools and school districts across the country, to help explain how it is they're putting these key drivers into action, and what it looks like across the board in distinct school districts when these key drivers are operating in its way. Next slide please.

The Framework for Effective School IAQ Management: **Six Technical Solutions**



Indoor Air Quality (IAQ)

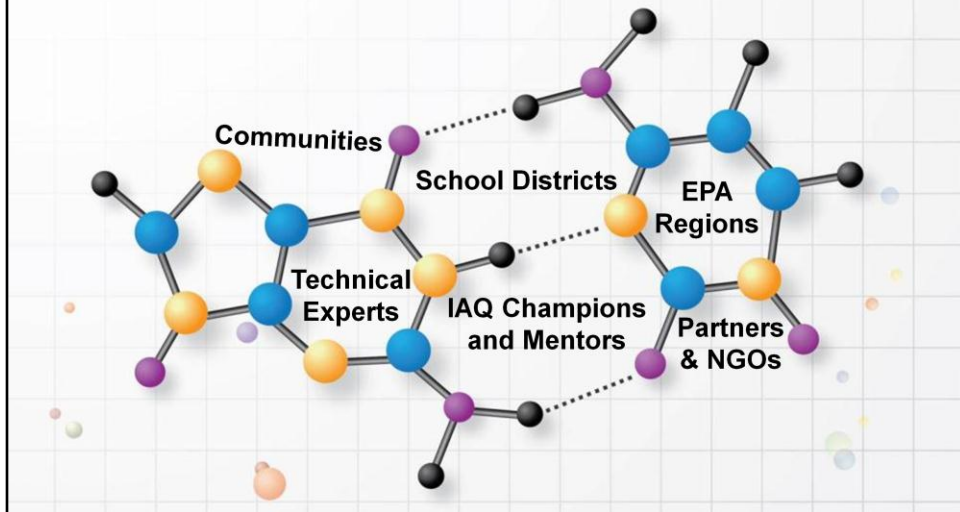
Tracy Enger: In addition of putting a system in place that creates a kind of roadmap the school districts used, once we had that system in place, many of you came back to us and said, “OK. That’s great. I understand the framework. But to what should I be applying it to get the most out of it most effectively?” And that’s how we were able to surface what you see here in terms of the six technical solutions. These are the areas that when you take that framework and apply it to these specific technical issues in your school, you’re likely to have the most success. Next slide, please.



Tracy Enger: And just like with the key driver strategies, what you will also see is different elements to take you a level deeper into what it means to have a quality HVAC system, how you go about controlling moisture, what it means to have a strong integrated pest management system, and how it is you can put them in place, because sometimes when you're using contract, as many of us do, what it means to have effective cleaning and maintenance, smart material selection, and aggressive source controls. So all of those different elements that you can put in place applying the framework to these areas to make sure that you're having the best success as possible.

National Network – Connections to Spur Action

Strengthening the National Network through Pacing Events

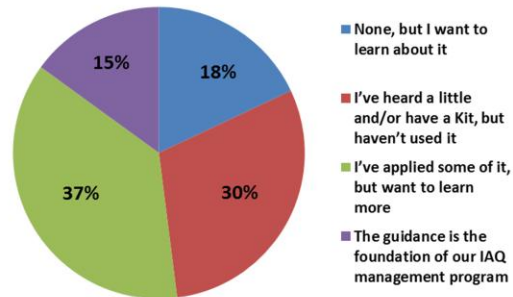


Tracy Enger: We take all of those elements and we, and that really constitute a great deal of the technical guidance and knowledge that we have in the program, that again, has been garnered from our experience with thousands of schools across the country. And we take that information and through a series of events, like the one you're experiencing today, we connect the different parts of our national network into that system of learning, into that system of action learning. And so we have school districts across the country, technical experts in our regions, and like you will experience today, strong school district and NGO partners who are helping us move this information forward.

So as we get ready to launch into the presentation by Dave Hill, before we do, I'd like to, for all of us to have a better understanding of who we have, who we're engaging with here, and where you are, so along the continuum, when it comes to this kind of program.

Polling Question

1. What is your experience with *IAQ Tools for Schools* guidance and Action Kit?



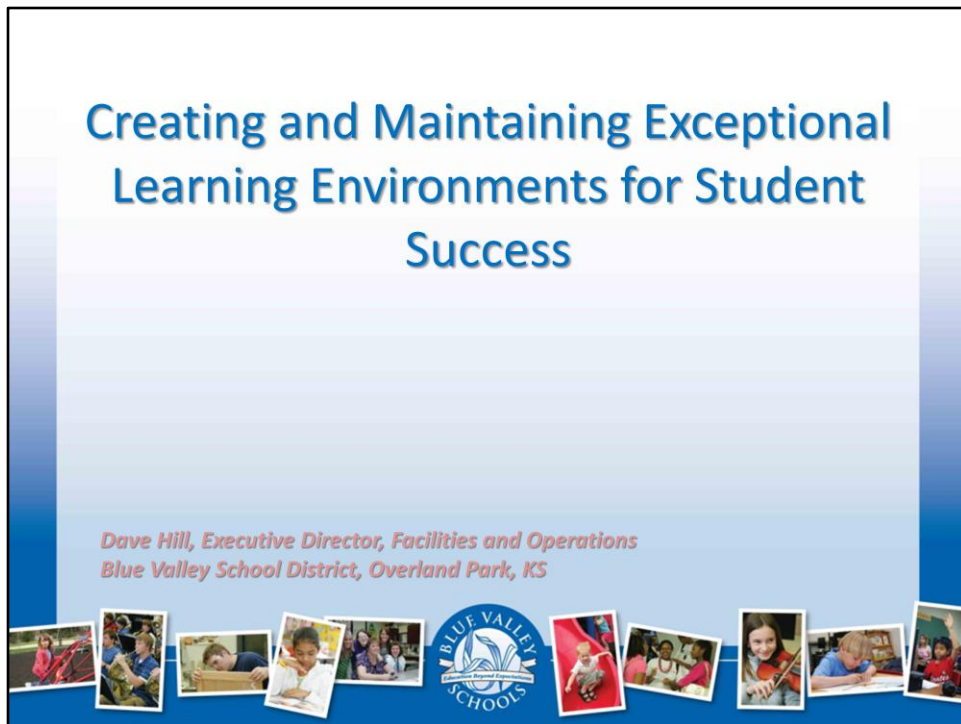
Indoor Air Quality (IAQ)

Tracy Enger: So we have a polling question for you. And what we're going to ask you to do is to identify which of these answers most represents where you are right now when it comes to having an indoor quality management program in place. What is your experience with IAQ Tools for Schools with the guidance and the Action Kit? So you can just indicate there. A, being none, but you're excited to learn about it; you know; B, a little, maybe you have a kit but you haven't used it, C, you replied some of it but you're here to learn more; or D, the guidance as the foundation for your IAQ management program. Let's take a look and see where we are.

So we see that there is a variety of experience levels here, which is very reflective of what we find overall when we start talking to people across the country about this. That 18 percent of you have no experience but you're excited to learn about it. And about a third of you have heard of the kit but you haven't used it yet. Another 37 percent said it's a great place to be but you've applied some of the kit but you'd like to learn more so you've gotten a great start and you're ready to build on that foundation. And about 15 percent of you, that's awesome, have this guidance of the foundation for your IAQ management program.

And I could certainly say that, you know, 5 or 10 years ago, it was from an audience like this, you know, just 15 percent of people saying that this the foundation of their IAQ management program, is really exciting. Because as we like to say, you know, we didn't invent IAQ management, people were doing it but it's just a matter of how it is

you apply a system that help you do it optimally, which is what we're here to help you do.



Tracy Enger: And so without further ado, you're going to hear it with someone who is doing – who use this guidance as a foundational component of IAQ management program. And then put that program on steroids. And so we're really excited about innovation and the leadership that Dave Hill has provided for this program. So please join me in welcoming Dave Hill.

Dave Hill: Tracy, thank you very much. I appreciate it. And thanks for the opportunity to speak to each one of you today.

I got a quite a long history now with the EPA and supporting what they do and in turn them supporting what we do here in Blue Valley School District, developed some great friendships with Michele and Tracy and others, in EPA, and those who support EPA.

What I'm going to talk to you about today is, and share with you, are some of the great things we're doing at our school district, how those things show up in our district, what they look like, what things are important to us, and why we do what we do.

So keep in mind, as I talk about that, these are things that are unique or specific to Blue Valley. But it's my hope that a lot of what I talk about today are things that you could take back to your school district or school districts that you work with and

make those a better place for kids. That's what we all want. So all of it is about creating and maintaining exceptional learning environment. And that's really our mission in Facilities and Operations here at the Blue Valley School District. Next slide, please.

About Blue Valley Schools

- Located in the Southwest Kansas City Metropolitan area
- Suburban, 91 square miles
- 22,000 students
- 34 schools, pK-12
- 4,300,000 square feet



Dave Hill: Just a little bit about our school district. We're located in the Kansas City Metropolitan area. We're about 91 square miles in area. We're just across over 22,000 students. We're a growing district in a suburban area. And we continued to experience growth. We have about 34 – we have 34 schools and about 4.3 million square feet. Next slide, please.

Facilities and Operations

- Highly trained and highly qualified staff
- Understand how to
 - create and maintain exceptional learning environments
 - conserve energy, and are
- Supported at the highest levels, including Board and Superintendent



Dave Hill: A little bit about how we're organized. We do have a highly trained staff of architects and engineers within the Facilities and Operations Department. And in addition to that, we do rely on consulting teams to help us with technical applications and designs. But we do have a core group of folks that do work with us on staff as architects and engineers, and really understand the building, and all of what goes into creating and maintaining exceptional learning environment.

In addition to that, we meet regularly with the highest levels of administration, including the Board and Superintendent, so that we – so they know what we're doing and what's important to going – what goes into a healthy and successful learning environment. We meet with them regularly and talk about best practices and we talk about and update them on all the great things we're doing to improve our facilities. Next slide, please.

Facility Design and Construction

High performance building design (LEED)

- Highly insulated roofs, walls, and glazing systems; strong building envelope system
- High efficiency mechanical systems, lighting systems, and plumbing systems
- Central electronic HVAC control and monitoring systems
- Demand control ventilation/ CO2 sensors
- Displacement or UFA ventilation



Dave Hill: When we talk about high-performance building design, in some cases, specifically LEAD design, I wanted to share with you some examples. You see here on this screen of what Blue Valley School District defines as a high-performance building design. So many of the things you see on there go into a high-performance building and there are lot of the things that we have the systems here in our school in Blue Valley. Next slide, please.

Facility Design and Construction

High performance building design (LEED)

- Light sensors
- Lighting retrofits
- Passive solar design
- Daylight harvesting
- Commissioning, Testing and Balancing – involve the maintenance and custodial staff
- Energy misers on vending machines and other devices



Dave Hill: And continuing on with that list, another examples, six more examples of things that we do in our district, that are – in some cases, fairly innovative, in some cases, they're just no-brainer things that you really should do to make the building a high-performance building.

Next slide, please.

Operations and Maintenance

Primary goals

- **Maintain exceptional learning environments, maximize efficient operation, and protect taxpayers investments**
- Concentrate efforts on what matters most: Heating, Cooling, Lighting, and Ventilation
- **Establish an effective and efficient Preventative Maintenance (PM) program**
- Utilize a Work Order Management System that is easy for schools to use
- **Provide excellent communication, customer service**
- Identify and predict system replacement cycles and develop a Capital Improvement Plan



Dave Hill: Within our Facilities and Operations team, we have a subgroup, the Operations and Maintenance folks. These are the ones that maintain the building. And primarily, we're focusing here on the heating, cooling, and fresh air ventilation, lighting systems within our school district. Those folks are the ones that everyday see the systems, maintain them, they give us important feedback on what's working, what isn't, and we continuously learn from them. It's an important group that provide us great feedback in maintaining those excellent learning environment. Next slide, please.

Indoor Air Quality

National Awards & Recognitions

- 2003 EPA IAQ TFS
Excellence Award
- 2005 EPA IAQ TFS
Sustained Excellence Award
- 2007 EPA IAQ TFS
National Mentorship Award



Dave Hill: OK. As Tracy mentioned, we've had quite a history with the Environmental Protection Agency. We first were recognized for the excellence of our program in 2003. And two years later, we recognized for Sustained Excellence with our program. And then years later after that, in 2007, we received a National Mentorship Award. All of those awards are very special to us. They are nice external validations. But it's not really why we do what we do here. We really do what we do for our kids. We want to provide the absolutely best learning environment for their success. Next slide, please.

How and why did our IAQ program get started?

- To provide a framework for a number of important IAQ activities
- A neighboring school district had to close a school for a year due to IAQ issues
- To provide exceptional learning environments for student success
- Because it's the right thing to do



Dave Hill: OK. Just a little background for you on why the Blue Valley School District got involved in the Tools for Schools Program. First, we recognized right away that this was going to be a good fit for us. We were doing a lot of independent things very well. We had it building envelope program. And we had a preventative maintenance program, and lots of really great things that were, kind of on their own, operating independently.

And when we saw the framework within the Tools for Schools Program, we said this is a perfect fit for our district. This provides a framework, a skeleton if you will, that wraps around all those great things that we do and collectively, they are the indoor air quality movement that we have in our district.

Another important thing that kind of pushed us into really paying more attention to indoor air quality was, we have a neighboring district in our area that had to close the school for a year. It was an elementary school, and that was really, kind of a wakeup call. You know that hey, we could be next. That could happen to us. Because this district, next to us, was a highly successful district. They were known for their high academic achieving students and just like we are. And we just needed to make sure that we were doing everything we could so that that didn't happen to us.

Another reason, and you'll hear this as a theme throughout my presentation, is that, we want to absolutely create exceptional learning environment for student's success.

It's something we say everyday around here, something that's very, very important to us, and we want to do everything we can to make those students successful. Excellent indoor environment is just one way that we do that.

And then finally, we do what we do here because it's very obvious to us that that's the right thing to do. Next slide, please.

How do we use the IAQ TjS Framework in BVSD?

- 1. Organize for Success**
 - *Systems Matter*
 - *You Need Heroes*
 - *Process, Process, Process*
- 2. Assess Your Environments Continuously**
 - *Technology Makes It Easier*
 - *Keep the Customer Satisfied*
- 3. Plan Your Short and Long-Term Activities**
 - *Start Small to Get Big*



Dave Hill: OK. So you're maybe asking what does that framework look like in Blue Valley? How do you see that work reflected?

And so if you remember back to those six key drivers that Tracy mentioned earlier, I'm going to go over each one of those and just briefly show you or give you some examples of what they mean to us and how they show up in our district.

So first of all, organizing your program. I'll select one here, the heroes. You need a champion. You need a face for your program. And in our case, we have a guy named, a gentleman named Sid Cumberland, who is kind of the face of our indoor air quality program. But when Sid leaves, that doesn't mean that the program goes away. Our program is sustainable. We have institutionalized our program so that it will live over time no matter who is heading that up, who is responding on a daily basis, or who's behind the scenes working to make sure that all systems are running at an optimum level.

The second framework is – the second tool is assess. One of the things we do there is, use technology. We have sensing equipment. We happen to use a system called an Air Acuity machine, which is the brand. But basically, what it does is it allows us to respond in real time and usually the same day or even the same morning or afternoon to an indoor quality concern that's expressed to us.

We'll set up the machine. We'll begin testing data. We'll start using measurable and objective data to deal with the problem. We still respond with empathy. But at the same time, we're collecting data to better understand what's going on in that person's environment, why they might be concerned with a temperature, humidity, or a particulate matter issue, CO2, whatever it is. We're able to sense that with this equipment. And very quickly, it assessed what's going on and respond, not only with empathy, but then also using data to help further understand what's going on.

Our program – number three is plan. Our program didn't start, you know, like it is today. We started much smaller. Tracy likes to say, every step begins with a journey. Or, you know, you don't eat the elephant all at one time. You take one bite at a time. We started small. We did a few things that we were able to celebrate. We were able to fix some problems, you know, fix that leaky roofs so that it wasn't causing mold problems, or, improved the filtration of our airflow and get better fresh air into the classroom. Those little things make a difference and they help build confidence in your ability or, in our case, the Maintenance Department's ability to respond and react in a positive way and improve relations with those with whom we work. Next slide, please.

How do we use the IAQ TjS Framework in BVSD?

4. **Communicate** with Everyone, All the Time

- *Share your goals*

5. **Act** to Address Structural, Institutional, and Behavioral Issues

- *Training and Education Can Change Behavior*
- *Root Cause Analysis Works*

6. **Evaluate** Your Results for Continuous Improvement

- *Survey Your Customers*



Dave Hill: The next one is communicate. And not only do we share our goals but we also share our successes. We let people know when we fix something. We also let them know if there's a challenge, you know, how long it's going to take. We don't sugar-coat it. We don't try to make it something it's not. We really do operate transparently and make sure that the person that originally complained or has a concern is continually updated on the progress of what we're doing to improve their environment.

The next one is act. One of the things we do there is root cause analysis. And another way to think of that is we have what we call a leak protocol. So if a custodian, for example, who in many ways, are our eyes and ears for the program, and they may be the first person to notice a stained-ceiling tile. What they do is they have a system that we use and they report that leak. And a lot of times, the leak is really nothing more than overflow, a drip pan that maybe stuck on his mechanical equipment, or condensation that's dripping and following a wire above the ceiling. It could be a leaky wall. But a lot of times, it's not the roof leaking. But regardless, we want to attack that with all of the energy that we can and find out and fix that root cause rather than just change the stain-ceiling tile and mask the problem and have that continue to reoccur.

And finally, evaluate. We want to survey our customers. How are we doing? How can we improve our service to you? We always want to know how we can be better. Next

slide, please.

IAQ Team and Support

- Cross Discipline Operations Team
- IAQ Coordinator
- Regular Coordination Meetings
- Design and Construction Committee
- Flywheel



Dave Hill: OK. I wanted to talk a little bit about how we make up our team in Blue Valley and how we support each other. We have a team within Facilities and Operations that is made of those who care for the building, those who design the building, and folks just talking all the time. So people from our Risk and Safety Department, our Design and Construction, our Operations and Maintenance. So we got plumbers talking to architects, talking to safety people. And we meet on a regular basis, as necessary, either weekly or monthly. And we're talking regularly with our IAQ coordinator who is fielding those calls and seeing what the concerns are on a daily basis.

We have a Design and Construction committee that I, as I mentioned earlier that has on it, not only patron members within our district, but also Board members. So we're connecting to our leaders – our elected officials – our leadership within the district, and they understand, every month, when we meet with them, all the things we're doing to improve air quality and indoor environment for our kids. Next slide, please.

And then finally, we use the metaphor, for a lot in our district, of the flywheel. That comes from a book written by Jim Collins called Good to Great. Perhaps some of you have read it or know of it. And one of the concepts in that book is basically building momentum for what you do. And in this case, our indoor quality program, we have a flywheel that's spinning so fast and with so much force and power that we continue

to, I think, do good work and be recognized for that work.

And I think when people, when they hear that we're going to take care of them and we're going to respond and get things fixed, they understand that that will be true and they believe it because we have a reputation for that and we continue to, everyday, push on the flywheel to keep it going. Because if you stop pushing on it, eventually, the flywheel will stop. So we, everyday, make small pushes on that flywheel to keep the momentum going. And that makes our program successful.

How Do You Measure Success?

- Reduced IAQ-Related Concerns
- Staff, Student Satisfaction
- Community Support
- District Culture
- Academic Improvements



Dave Hill: So how do you measure your success? Well, one of the ways that we do that is track the number of complaints or concerns that are logged, which we continually see reductions in. But even in our district, with everything we do, the best IAQ program is not going to be without its challenges. It's really how you respond to those concerns when they're raised that make your program successful because everyone is going to have issues.

We also regularly measure student and staff satisfaction level. We have community support. We make what we do as part of our strategic plan within Facilities and Operations. We talked about institutionalizing the goals of the program. And we also feel we can measure the success of our program by the academic success that our students enjoy. Next slide, please.

Objective Data

- BVN Major Mechanical Systems Retrofit, results – *improved IAQ, reduced energy consumption*
- Air monitoring and testing – *reduced complaints and cases, AirCuity, IAQ Coordinator*
- Improved student performance – *test scores, dancing dots, Strategic Plan*



Dave Hill: Some objective or measurable data that I can offer you as to example the successful program, three of them here. One is a major mechanical retrofit that we did at one of our high schools. It was very first displacement air technology that we did on a building-wide basis. We're going to be talking in more detail with you about that. Second is, how we monitor and test our air quality on a regular basis. And then finally, some examples of improved student performance. Next slide, please.

BVN Major Mechanical Systems Retrofit

- Introduced first Displacement Ventilation and Demand Control systems in the district
- Improved indoor air quality
 - Increased fresh air ventilation rates by 50%
- Reduced energy consumption by 17%
 - Building-wide lighting retrofit
 - High efficiency Pulse Combustion Boilers



Dave Hill: So back to the Blue Valley North High School major mechanical system retrofit, we did a major retrofit, about 10 years ago, at this high school. It was the first of its kind. And as far as we know, the first school, not just high school, but first school in the nation to be retrofitted completely through this, almost 300,000 square feet with displacement air system. And this is really not a new mechanical system. It's more the air delivery system. It's a new approach to delivering air. And I'm going to show you some graphics afterwards, after this slide, which helps illustrate that, how that work.

We really believe in displacement ventilation and think that is something that, if you're interested in optimizing your learning environment, that it's something you really should consider. One of the things that we learned after doing that, kind of a post-construction analysis of Blue Valley North High School, we found that we were able to, not only meet ASHRAE standards, but actually exceed ASHRAE standards in fresh air ventilation rates.

We increased the fresh air ventilation rate by 50 percent over what they were before the project was implemented. And in addition to that, we were able to actually reduce overall building energy consumption by 17 percent, that included a combination of building-wide lighting retrofit at the same time, in addition to combining the displaced air technology with high efficiency post-combustion boiler. Next slide, please.

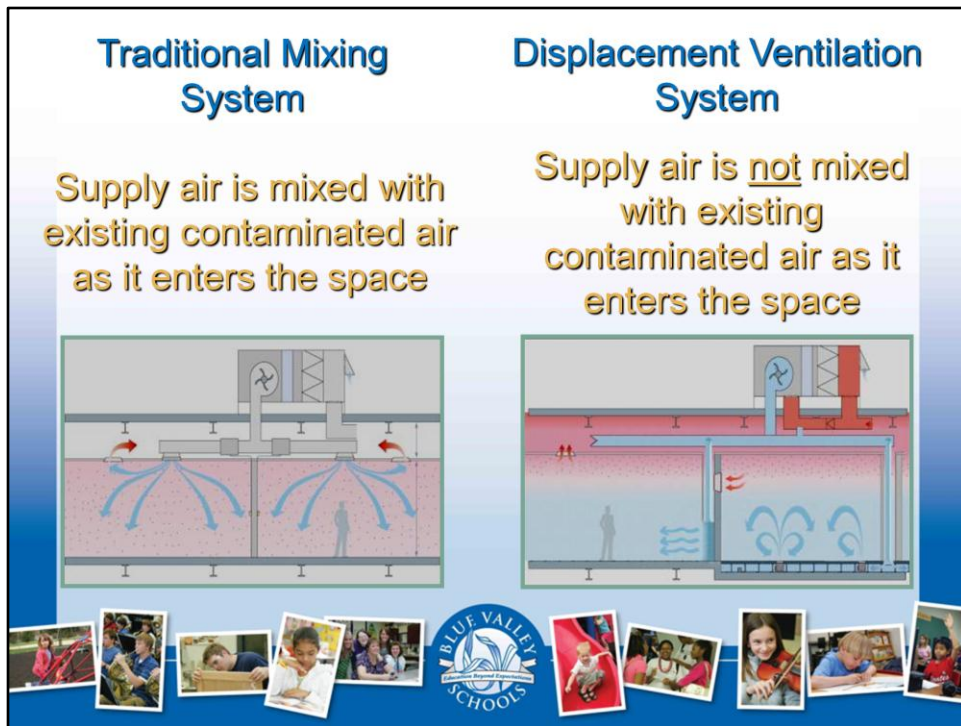
Mixing Systems



Dave Hill: OK. So a little bit more about mixing systems and displacement air. I have a graphic here that tries to help understand that.

On the left you see, what we call the traditional air delivery system or the dilution method. It's typically where fresh air, which you have – if you look into most classroom in most schools in United States, or office buildings for that matter – you would see fresh air ventilation louvers on the ceiling grid, as well as air exhaust out of the ceiling. So it's being delivered and exhausted out of the top, just like it is with this example, where you form water here.

On the right side of the diagram, we have a separation system. So picture, if you will, instead of water, clean water, being introduced at the low level of this container, picture fresh air. So fresh air is being pumped in at where the occupant in that space normally sits. And that's where the best air, the fresh air, is delivered. And you have a better chance of breathing in that air in this method, than you would in a dilution system. And then the bad air or the (stale) air, in this case, the bad water, goes out the top. The same concept with air. Next slide, please.

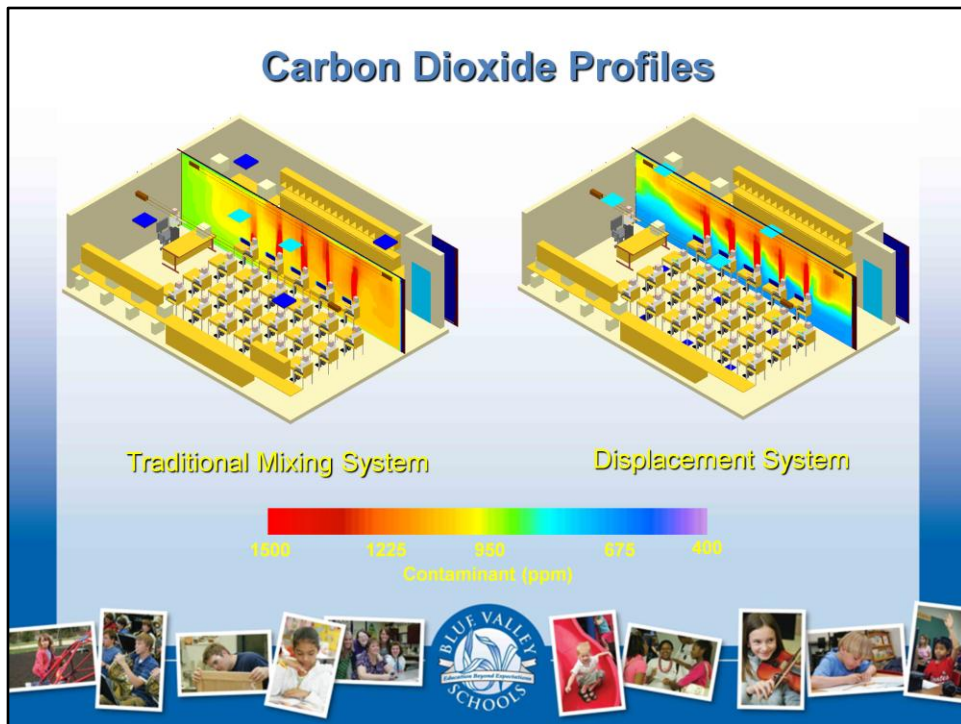


Dave Hill: OK. Just another example to further reinforce that.

On the left is a section of a typical building or space where your fresh air is being delivered with the blue line, into the space, at the ceiling level, and also exhausted with the red line, also at the ceiling level. The chances of good, fresh air, without major particulate in it, or contaminants in it, reaching your nose, is much less likely than the system on the right side.

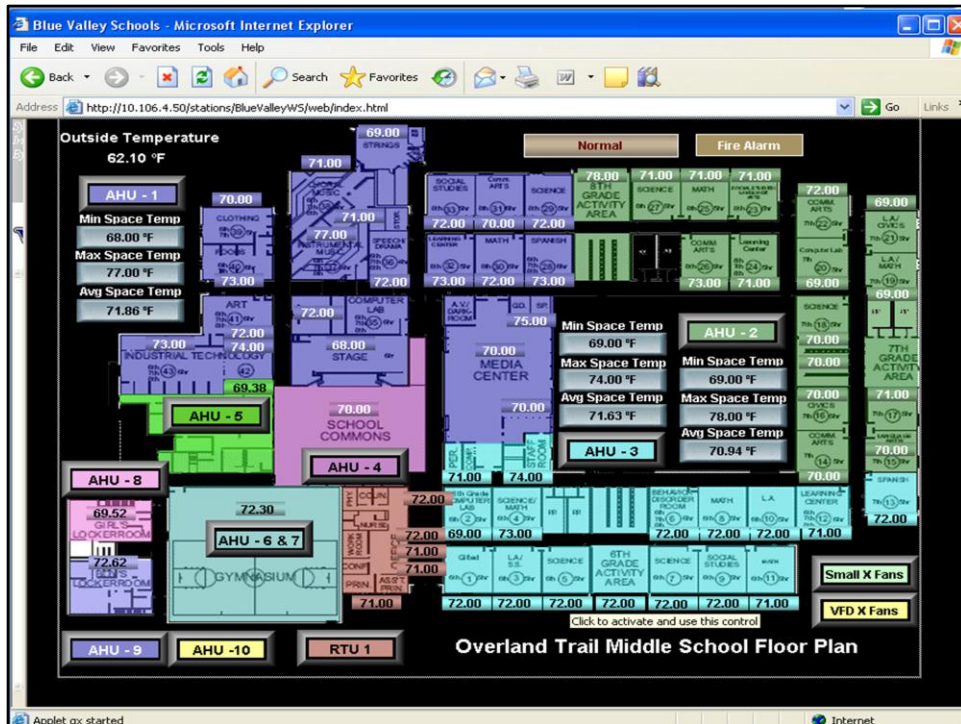
So on the right side, I have two different rooms. One is displacement air with the pipe down the middle, that's on the left side. And the other is displacement air being delivered under floor, or UFA under floor air system.

In both cases, the fresh air with less contaminant or no particulates is reaching the occupant much quicker, much sooner. And then it's going up and being exhausted out of the top or near the top of the room.



Dave Hill: So one more example to reinforce displacement air. They're going to click through the slide as I talk about this. On the left is the traditional mixing system, where the fresh air is being pushed down through the top. On the right side is displacement air. And noticed the number of contaminants expressed as parts per million.

So on the right side, the displacement air, far fewer contaminants or particulates are being seen in this diagram, on the lower level, where the students might be in a normal or natural seated position. Whereas on the left side, you see a much more of a mixing system where things just churned up all over the room. So again, the best air is reaching the students where it needs to and has it naturally going from low in this room to high in the room, as it's being exhausted at the top. Next slide, please.



Dave Hill: So this is a diagram, it's a screenshot of our air monitoring and testing equipment. This is a building floor plan. And we have the ability in our district to see the temperature, humidity, airflow, or ventilation rate and carbon dioxide, in every space, every learning environment in our district. We can also control them independently. So this is real-time information and it gives us a really good handle on where we're at with all of those measurable items. It's really a good useful tool and good piece of technology that we utilize to optimize learning environments. Next slide, please.

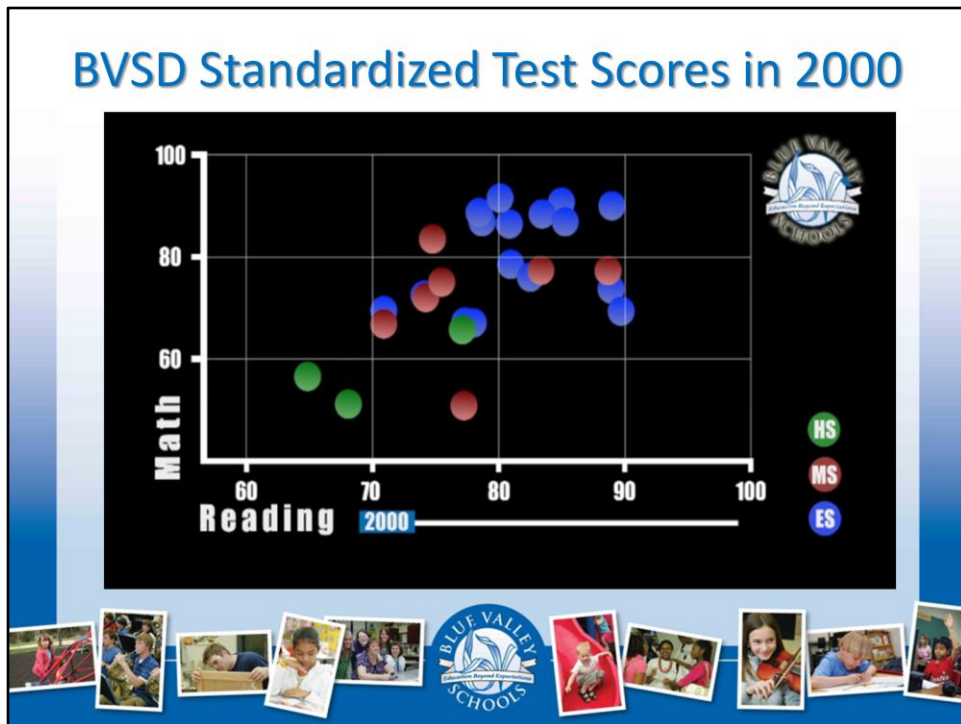
Improved Student Performance

- District Strategic Plan
- BVSD Mission - Unprecedented academic success and unparalleled personal growth for every student
- Vision - Together, we will enable each child to become more than he or she ever hoped they could be
- Tag line - Education Beyond Expectations
- Improved test scores (Dancing Dots video)



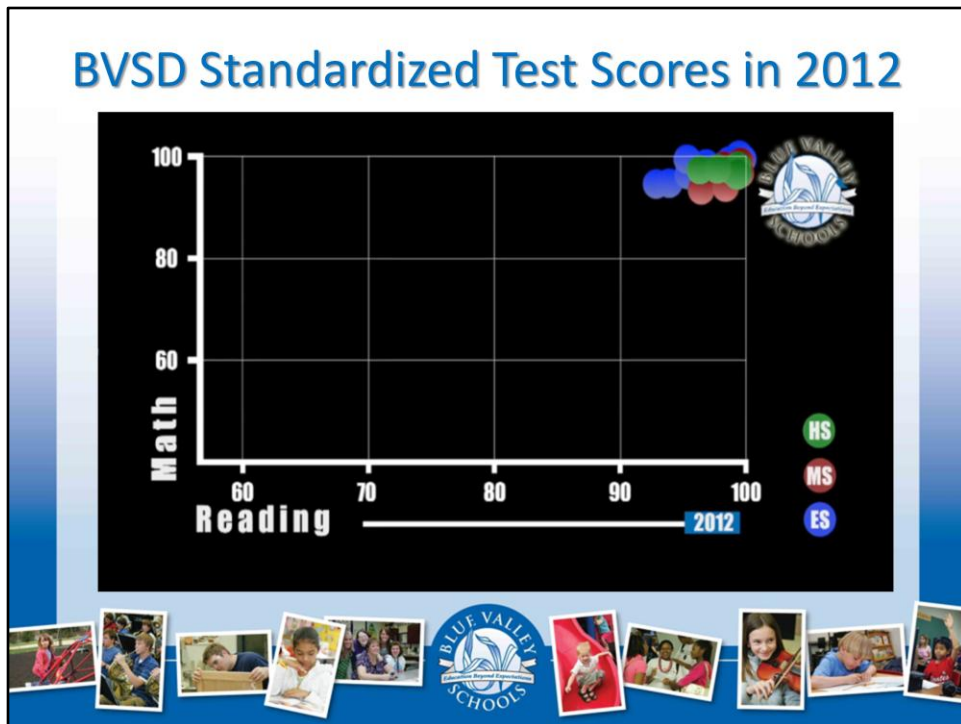
Dave Hill: So a little bit about improved student performance in our district. As I mentioned before, our district believes in and has a regularly updated strategic plan. We have, within that plan, a part of Facilities and Operations that contributes its mission and goals underneath that strategic plan. And a big part of what we do in Facilities and Operations is creating and maintaining exceptional learning environment. A big part of that is our IAQ program.

I won't read through all of these, but just a little bit there about the school district's mission, the school district's vision, and our tagline. We're very, very focused on what's best for our kids. And we do that each and every day with what we do in Facilities and Operations to support that. Next slide, please.



Dave Hill: The next slide is just kind of a before and after. It's a video that – I'll give you the link to this website. You can see the entire video at your pleasure. But it's about a four-and-a-half to five minute video that explains how the Blue Valley School District standardized test scores have changed from 2000 to 2012. And about that same amount of times.

But I'll tell you that if you look at the scores, which are the standardized test scores in the State of Kansas, for each of our elementary, middle, and high school, those are good scores. In fact they're scores that most school districts would be proud of - to have their schools score at those range. when we really started focusing on indoor environment.



Dave Hill: But if you go to the next slide, I'll show you what happened to our focused strategic plans. And that didn't happen; we don't think that happened by chance. Go backwards again, and actually look at where those dots were, and I'll go forward, fast-forward to last year or the current year, and look at the dramatic improvement that every one of our schools, elementary, middle and high schools, have made in 12 years in terms of improving their standardized test scores on a state assessment.

This is what can happen to you when you have a dedicated teaching staff, outstanding building leadership, committed employees and support roles, and a very supportive community, along with a focused strategic plan. That's when great things can happen in a school district.

I encourage you to watch the video. The next slide shows the link.

Improved Student Performance

To access the Dancing Dots Video, visit:
[Blue Vally K12 Schools Website.](#)



Dave Hill: You want to follow that link to the video afterwards. We call it, affectionately, our dancing dots video. But it's a really dramatic illustration of how far we come. And a big part of that, we believe, from the Facilities and Operations side, is our indoor air quality program. Next slide, please.

Energy Efficiency/Learning Environment

No Compromise Principles

- Fresh Air Volumes and CO2 Levels
 - *Key to maintaining exceptional learning environments*
- Building Design
 - *Natural day lighting*
 - *Large amounts of glazing, not as “energy efficient”*
- Extensive Community Use
 - *Fee structure not designed for 100% cost recovery*



Dave Hill: I want to share with you three important things that we've discovered as we look at, kind of the difference, or the conflict that we see between maintaining excellent indoor air quality and excellent learning environment that are in conflict sometimes with saving energy.

One of those things – we called them our no-compromise principles. But one of the things that we noticed as we were looking at why our buildings maybe more performing compared to some other districts that were getting better results in terms of dollars per square foot spent on energy. And we've – we're just wrecking our brains trying to figure out why aren't our buildings – because we put in high efficiency systems, we operate those buildings as efficiently as possible with night setback mode, and we have different thermostat settings for winter and summer, heating and cooling, and we came – we hit upon these three issues that make so much sense when you start – when you think about them and talk through if these things are more important than saving energy.

So we know that if your goal as a district is to save energy, save as many dollars as possible, if that's your primary goal, then, you're probably not optimizing the learning environment, the fresh air volume, building designs, and things like that. In our case, we still want to save as much energy as we possibly can, but we're going to first focus on creating the optimal learning environment for student success. And to us, that means paying attention to indoor air quality. That means improving fresh air volume,

maintaining those at a high level, reducing CO2 levels. That also means focusing on building design, having buildings that have lots of natural daylighting, that have lots of windows.

And obviously, if your goal is to save energy first, then you're going to build smaller buildings with very little daylighting or smaller windows. We don't do that because we believe, in addition to air quality, we believe that a lot views to the outdoors, and lots of natural light are very, very important to learning. And we have research to back that up.

We also recognize, that this is an important concept that our Board has conveyed, that our community paid for this building. Through their generous support, with bond issues and capital programs, we've been able to create wonderful learning environment for kids. These buildings are huge investments that our taxpayers make. And our Board recognizes that.

And when those buildings are not being used as learning environments, you know, between the hours of 7:00 a.m. and 5:00 p.m., or even earlier, we try to make them open and available to our patrons to use as much as possible.

So as you look at, and take in total, those three things, you can see how the extensive use for our buildings, the way they're designed, and the way they're operated, might not result in the best energy savings possible. So we stand by all three of these things and think they are absolutely the right thing to do. Once we've done all those things, we still want to save as much energy as possible. And we think after fulfilling these objectives, we do that. Next slide, please.

Going Green

- LEED, Site and Building Design
- Green Cleaning Program (Green Seal Products)
- Energy Star
- Low VOC Products
- Energy Management Guidelines
- Practical Approach



Dave Hill: OK. So a little bit more about specifically, the Blue Valley School District and what 'going green' means to us. I think that's a term that's thrown around a lot. So I'm going to attempt to define it here.

What it means for us is paying attention to building a site design, following the principles of LEAD or other high-performance building program. It means also selecting carefully (green-seal) cleaning products, when it makes sense to do so. Similarly, following Energy Star guidelines in selecting products, using products that have low emissions. And establishing, and following energy management guidelines. And above all of that, taking a practical approach. There are things that are promoted as green that just don't make financial sense. And those are not things that we're going to pursue, if it doesn't make sense for us. Next slide, please.

High Performance and Innovation

- Daylight harvesting and sensing
- Demand Control Ventilation
- Bio filtering
- Recycling of construction waste
- Tar free, highly reflective roofing systems
- Diesel emissions scrubbers
- Ultra low water flow fixtures
- Ultra low maintenance finishes
- High Efficiency LED Exterior Lighting



Dave Hill: So back to defining, kind of a common definition, or at least what it means to us in Blue Valley, when we talk about high performance and innovation. I'm not going to go over each one of these in detail but on the screen there, you can see nine examples of what high-performance and what innovation means to us. Next slide, please.

What Can I Do?

- Get EPA's (free) *IAQ Tools for Schools* Framework for Effective School IAQ Programs and Action Kit
- Start Small, Celebrate Success
- Find Champion
- Engage a Mentor District
- Document and Promote your Success
- Communicate Well



Dave Hill: So you may be thinking and listening to what I'm talking about and wondering, what can I do? How could I possibly do what Blue Valley is doing? Well, we were in that same position just less than 12 years ago.

The first thing you can do, and it's free, is to get IAQ Tools for Schools program from the EPA. The program and the action kit are free. And the EPA would love to share those with you.

As I mentioned earlier, start small and celebrate your successes. Focus on one thing and do it well. And let everybody know that you've done it well. And celebrate that. Talk about the great things that you've done to create a better learning environment for student success.

Find someone that can be the face of your program, someone that can support it and be a champion for it.

Engage in mentor school district. Blue Valley School District is just one of dozens of mentor school districts that the EPA has made available to people that are interested in learning more about how they can create a successful indoor air quality program in their district.

And as I mentioned earlier, celebrate your successes and promote that and

communicate well. Make sure people understand what you're doing and how you're doing it. Next slide, please.

Low Cost, No-Cost Strategies

- Turn off lights, computers, etc.
- Train your staffs and students
- Model positive behaviors for students, be visible, do the right thing
- Education and communication, including regular tips given to staff on how to save energy
- Collect and use data



Dave Hill: OK. Again, you're maybe wondering, well, OK, I can start a program but I don't have any money. How am I going to – how am I going to do that? How can I do all of those things?

Well, you have to start somewhere. And I'm going to list for you a couple of slides, I've got two slides worth here. These are all things that you can do that are either very low cost or no-cost things – to save energy, can improve the environment, to save money, but at the same time, promote student success. Next slide, please.

Low Cost, No-Cost Strategies

- Establish and broadly communicate Energy Guidelines and follow them
- Audit your facilities
- Create a culture of stewardship, conservation and sustainability
- Adjust thermostats; raising/lowering the set points for cooling and heating
- Celebrate positive results, no matter how small; build momentum and support for your program; push the flywheel



Dave Hill: OK. I mentioned several of these earlier, but celebrating your results, creating a stewardship, a culture of stewardship, talking about adjusting your thermostats for heating and cooling, making sure though that you're still not jeopardizing the optimal learning environment for your kids.

And again, we talked about celebrating the results. But its' very important to communicate out the success that you're having. It fills momentum for your program. And it continues to push on this flywheel. Next slide, please.

Contact information:

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913-239-4143



Dave Hill: On the screen there is my contact information. I would be happy to have a conversation with each of you, if you would like to contact me as a mentor school district for the EPA Tools for Schools program. I'm in contact on a regular basis with people that are wanting to start their program or just have a question, maybe to talk about, or they're stumped on something, or they want a problem solved. I'm there. And I always make myself available and really enjoyed meeting and talking to districts that are working on their indoor air quality program.

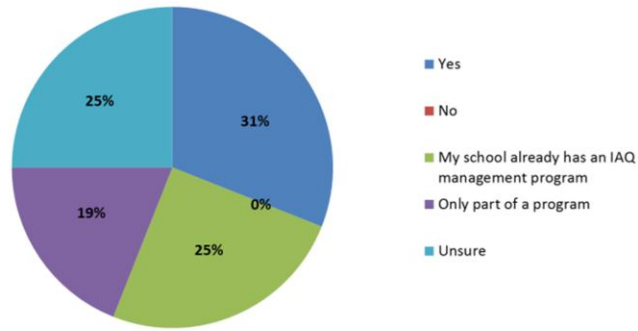
Tracy Enger: Dave, thank you so much. And thank you for that beautiful and generous offer that you made there at the end. And I would tell all of our participants that I and those of us in the program here at EPA know from experience that Dave is not just blowing sunshine there, that he has been a phenomenal mentor to this program throughout the time that he's been involved with it. And when he says contact him, he means it. And so thank you for that offer.

And when we do do that, when we get a mentorship with one another, everyone benefits. Dave learns from you no matter where you may think your program is, or how much help you may think that you need with it, he still learns from you, you learn from him, and we can also work together to put you in contact with, if it's not Dave Hill, others that we have, also within the network, who may have a story that is more similar to the demographics of your school district, of where you come from in your school district.

Dave had the good benefit of not having a major IAQ crisis, driving his work. But many of those folks that we have, who are award winners, do have that experience. So, you know, of having to kind of deal, you know, face the (torch-bearing) villagers that they're trying to put their programs in place. And so we have resources to help you with that as well. And we have great places for you to access those resources as well.

Polling Question

2. After hearing this presentation, do you plan on implementing an IAQ management program?



Indoor Air Quality (IAQ)

Tracy Enger: Why don't we go ahead and do the polling question before we go to resources. Yes. We're going to go ahead do this polling question because then, we'll also help you when we look at our resources to give an idea of where it is you want most to find some of these resources.

So after hearing this presentation, do you plan on implementing the IAQ management program? Yes. No, not quite convinced yet. Or, my school already has an IAQ management program. D, you're really excited about entering into part of the program, like Dave said. You know, start small and grow from there. Or E, still a little bit unsure about how it is that you might be able to engage with this program.

OK. Thank you so much. This happy little bureaucrat's heart has believed to see that there is no one who does not plan on taking any action in regards to what you've heard today. 31 percent of you – and so about a third of you who say yes, you are ready to implement an IAQ management program. Another quarter of you, who already have IAQ management programs in place. And I will remind you that that put many of you in a place where Dave Hill was when they started. It's not as though they didn't have an IAQ management program. It's not as though they were doing this component. They were. But like he said, this program allowed him to put a framework in place that, as he says, wrapped around the work that they were already doing and gave it a foundation and help with the direction for that.

And I'll also say, because here's the other thing, really, 100 percent of you have an IAQ management program in place. Everyone is doing these things. The question is, how well are you doing them? How systematically are you doing them? And are you doing them in a way that allows you to recognize your successes, promote them, and get the kinds of resources and support that Dave talks about? So that's what the program is, what having a system can help you do.

Eighteen percent of you say you're ready to start a part of it and grow it from there. That's terrific. 25 percent of you still a little unsure and needing more information. Well, let me show you where you go for some of that information.

IAQ Tools for Schools Resources

- *IAQ Tools for Schools* Connector e-Newsletters and Emails:
 - Send an email to: IAQTfsConnector@cadmusgroup.com
 - View archives at: [EPA Schools Bulletins Webpage](#)
- Schools IAQ Connector Email Discussion List:
 - Send a blank e-mail message to schools_iaq_connector_subscribe@lists.epa.gov. Then, check your email inbox for your confirmation and membership details.
- *IAQ Tools for Schools* Website: [EPA Schools Website Link](#)
 - Access the Action Kit, Framework documents, Case Studies, Map of IAQ Champions and Mentors, and much more!



Indoor Air Quality (IAQ)

Tracy Enger: For wherever you are in the process, we have resources to help you move to the next step.

First of all, everyone who is part of the webinar today will be invited into the connector network. However, if you are – if you do not see things from us, you can contact us to make sure that you are part of our connector. You can send an e-mail to the address that you see there, IAQTfsconnector@cadmusgroup.com. If you don't see anything coming soon that shows that you are a member of connector community, receiving e-mails, receiving our e-newsletters, please reach out to us.

Also, once you are there, you can view all of our archives at <http://www.epa.gov/iaq/schools/bulletin> – you see the address there, www.epa.gov/iaq/schools/bulletin. And that will get you to all of the things that you've missed and in the many hours as you're curling up your bed, you can peruse all of the things that you or may have missed in the past but will get you up to speed.

In addition to that, we also have our discussion list. So you can send a blank e-mail message, Tools for School IAQ connector, subscribe at [list.epa.gov](mailto:schools_iaq_connector_subscribe@lists.epa.gov). And then check your e-mail inbox for your confirmation and membership details. And that will continue to allow you to be a part of the discussion groups that are going on there as well.

IAQ Tools for Schools Webinar Archive:

[EPA Schools Web Conferences
Webpage Link](#)



Indoor Air Quality (IAQ)

Tracy Enger: And, all of these slides will – along with access, all of our other information, access to our action kit, to the framework, the case studies, champions, and mentors, and more, you can find at our website at EPA, www.epa.gov/iaq/school and direct with that IAQ being pivotal to getting you right to the place you want to be to access this information.

Upcoming CEFPI Events

Check out CEFPI's Calendar of Events:

- [CEFPI's Calendar of Events Webpage Link.](#)



Indoor Air Quality (IAQ)

Tracy Enger: In addition to what we hear that EPA put out, we also have a number of very active partners in the non-profit world. We introduced earlier, Barbara Worth from CEFPI. Barbara, and it was Barbara's partnership with us and with and Dave, Dave is a member of the CEFPI as well. So this created a wonderful little triad. It has brought us all kinds of terrific resources into the program.

But Barbara, if you could please bring us up-to-date with some of those things that are coming up for CEFPI.

Barbara Worth: Absolutely. It's my pleasure.

First of all, as all of you know, and safety for school children certainly has the nation's attention. Every aspect of educational safety and scrutiny is under review and many school districts are now contemplating the best practices that they can employ to safeguard both students and staff.

To that end, we are doing a series of symposia around the country based on our Safe School Summit that we convened in Washington DC, in February. The result of which was a document, Safe Schools: A Best Practices Guide.

Additionally, we also do a series of symposia highlighting our MacConnell

Award Schools. And one of those, certainly was Rosa Parks School in Portland, Oregon, a truly fantastic story of a public-private partnership that really changed the whole face of an entire, more than a neighborhood, in Portland.

And for other events, we have events in every region, we have events all over the country. Just go to that link and check our calendar and give us a call if you have any questions.

Thanks Tracy. And thank you Dave.

Dave Hill: My pleasure.

Tracy Enger: And thank you, Barbara. We really appreciate everything you did today, as well as, if you can see, the full range of services that are available for our network through our partners at CEFPI.

Questions and Answers

Please refer to the webinar Questions and Answers document: [EPA School's Webinar Questions and Answers document webpage Link.](#)



Indoor Air Quality (IAQ)

Tracy Enger: So during the course of our time here, we've had a couple of questions that have come up from participants.

And so Dave, one of the things – and this comes up a lot – one of the things that has come up here is, questions that are revolving around the way that you assess your facilities in order to be able to act as promptly as you do and act as well as you do to see the kinds of results that you do.

And so we have folks that are asking about how often you assess. They'd like to know, you know, what do they need, what kinds of tools do they need, what do you recommend when it comes to completing your observations and your assessments? So if you can just like, you know, share a little bit about what your assessment, what it looks like when you're going through the assessment process at the Blue Valley?

Dave Hill: Sure. I'll answer that in a number of different ways.

First of all, we're constantly assessing some components of our system including air temperature, humidity levels, carbon dioxide levels, and ventilation rates, everyday, 24 hours a day, seven days a week, with our Engineering Management System. So we're able to see how the air is in every one of our learning environments.

That is obviously not enough though. And we do occasionally have issues, either with smell, maybe it's a moldy smell, or water infiltration that's causing a concern that might be a bigger problem later on, a whole host of different concerns or issues that are brought to our attention. We typically tried to respond to those issues within 24 hours, if not the same day, usually the same day.

In addition to that, we've developed the baseline of information for every one of our schools with the carbon dioxide levels and temperatures and things like that. So that we know when we go out there what normal is. We obviously have guidelines for temperature, humidity and particulate matters and carbon dioxide levels. But each school also has its own kind of tendencies and signatures. So we want to make sure we are operating from a known baseline of data.

But I would recommend, if you were interested in obtaining a kit or starting out with air sensing equipment, that you use the – EPA has a link, and Tracy I'd like you to help me with this. But Rich Prill and Dave – can't remember his last name, Dave.

Tracy Enger: Dave Blake.

Dave Hill: Yes. Dave Blake, over in Washington, City of Washington.

Each year, I know multiple times here, maybe even, do an excellent, excellent presentation further than I can do on getting started and what you want in your toolkit and your bag of goodies. And a lot of these are very, very affordable. They're – you know, maybe a couple of hundred dollars. And in a lot of cases, the state may have money to assist you in obtaining those pieces of equipment to help you evaluate air and collect data in your school district.

So I know that Tracy could provide you guys with the link to Dave and Rich's presentation. But I would just – rather than tell you and give you advice – I would just refer you to that presentation because it's so good.

Tracy Enger: That's an excellent recommendation, Dave. You're absolutely right. And that is one of the – both the videos that they have about – that that can walk through. But those – you know, for that 25 percent of you who were still sort of unsure stage about that – that's one of the places I would recommend you go and take a look.

We also have archived other webinars like this that we have done with Dave Blake and Rich Prill around the walkthrough information. And they are some of the most highly attended and well-responded to webinars and the work that we do. And so you can certainly access all of that at our website at www.epa.gov/iaq/schools.

But also, a number of questions have come up from people about getting their hands on this information in hard copy, or, will the audio be made available. All of that will be made available. Because you registered today, we have your e-mail and contact information. So continue to watch your e-mail. As soon as we have posted the PDF of this webinar, you'll be able to access it, download it, copy it, you know, share it with people. There will be also be an audio portion of it as well that you can access. So you will have full access to all of this information.

And then I would definitely encourage you, as we come to the bottom of our time here, I would also really encourage you to go and see the dancing dot video. You can tell from what Dave shared with you about the dancing dot, when he said about where they started from in terms of academic performance, being a place that many school districts are striving to get to, that was their starting point. But the speed, the dramatic change that happened over the course of that time as they implemented their strategic plan and the results that happened there.

And I guess, as we close today, you know, we have the dancing dot video connection information out there for people. But if you could just, you know, share a little bit about – I tell you, I get really excited when I see that video. And one of the things I get really excited about is the fact that you have this Superintendent who is leading this program. They've identified the facilities, component of it as an important part of this strategic plan, and connect that to the academic outcome.

And that's not something that just kind of like happened overnight by having this dance. And so if you want – as we close this, talk a little bit about how the – about dancing dots and how it is that the work that you have done, what you've done to help people in the district sort of recognize that facilities-academic performance connection so that it can shine through in something like that. So talk a little bit about that process.

Dave Hill: Sure.

But I first want to recognize our dedicated teaching staff, our Board of

Education, our administration. Those folks are really the ones who make this happen. We clearly see that we have a support role and a background role in making this happen. But to the extent that we can make a difference on the facilities and operations side of the district, we're going to do everything we can to ensure that those students are successful.

We know that great indoor air quality and great learning environment are absolutely the right thing for us to do to help make those dots move up into the upper left-hand corner. And we appreciate that the Board recognizes the support role and the very important role that we play in doing that. We have a tremendously supportive community that gives us the resources that we need to create those and maintain those excellent learning environment. And our strategic planning gives us the focus we need to make those dots move where they need to go.

Tracy Enger: That's excellent Dave. Thanks so much.

And, you know, as we close here, I just want to thank you and Barbara for the time that you spent today. And everything that you said today, you know, reminds me of one of things that I heard from one of our educational leaders when he was talking about, the charge that he gives to the people and his school and his school district. And he said, you know, "If your job is not directly teaching or educating our students, then your job is making sure that they arrive in the classroom in the best conditions for learning."

And so that's it. That covers the health angle, that covers the facilities angle that everyone who's in the school or school district has the contribution to that learner, and to the staff to make sure that everyone there is in their best condition to do what it is that they need to do to make the best educational environment.

And so, thank you Dave for everything you do there in Blue Valley. Thank you Barbara for everything you did to support that. I thank all of you on the call today for being a part of this in trying to find out how it is. And whatever role you play, you are making the best, healthiest, most productive environment for staff and students and schools across the country. And we invite you to continue to in that conversation and within that action with us here at EPA.

Please join us at our website. Please join the Connector so that we can continue in this effort together.

Thank you so much for your time today. We hope that it was useful. And we

look forward to hearing from all of you. Have a great rest of your day.