Lisa Greenfield, CAFS

Midwest Regional Program Manager
with Center for Green Schools at USGBC

- **Bachelor's Degree, Drake University**
- **Indoor Air Quality Specialist**
- **CAFS-Certified Air Filtration Specialist-**
  National Air Filtration Association – NAFA
- **20+ years of experience in Education, PK-12**
- **Ambassador, Panelist, and Speaker World Filtration Institute**
- **GO AQS- Global Open Air Quality Standards- Educational Advisor**
- **Fellowship Coordinator-SAFE Indoors Campaign and**
  ASAP Council

Discovery Elementary School | Photo © Alan Karchmer

INDOOR AIR QUALITY IN OUR SCHOOLS

Center for **Green Schools**
at the U.S. Green Building Council

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LEARNING ENVIRONMENTS NEED CLEAN AIR

- IAQ FACTS AND HEALTH EFFECTS
- INDOOR AIR QUALITY IN SCHOOLS
- PROTECTING OUR MOST VULNERABLE
- CONSEQUENCES AND COSTS OF INACTION
- ROI FOR IMPROVEMENTS
- INTERVENTIONS AND SOLUTIONS

Why Indoor Air Quality Matters in Schools

PROTECTING THE HEALTH AND WELLBEING OF STUDENTS AND STAFF

FACTS:

Indoors we breathe in 3-5% of someone else's exhaled air

21,600 breaths per day

Breathe 3000 gallons of air a day

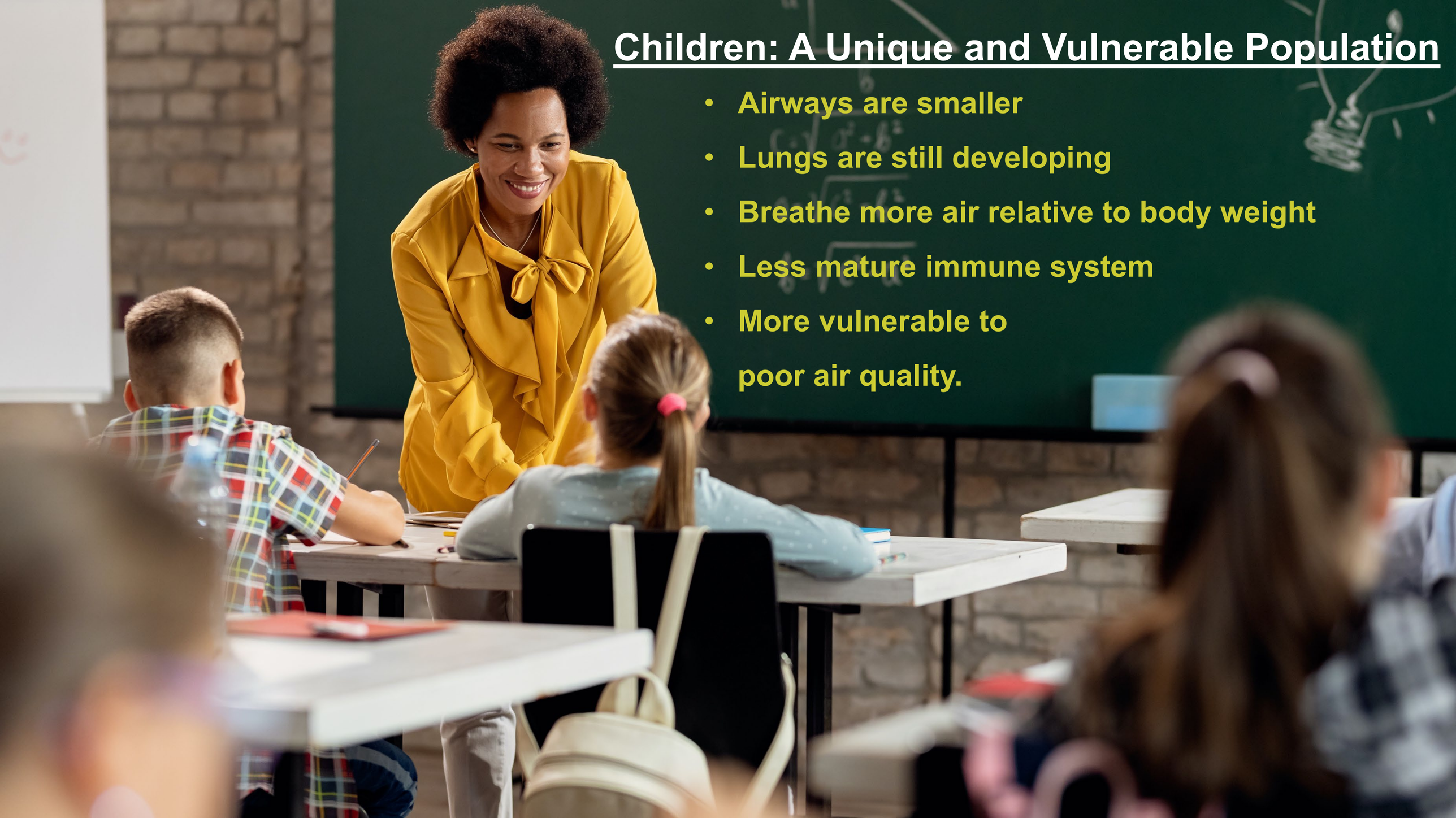
90%, or more, of our day is spent indoors

Indoor air 2 to 5 times more polluted

Higher particle load (pollution) higher the health consequences

IAQ top 5 environmental dangers

School IAQ Fact Sheets: Entire Series School IAQ Fact Sheets: Entire Series | U.S. Green Building Council



Children: A Unique and Vulnerable Population

- Airways are smaller
- Lungs are still developing
- Breathe more air relative to body weight
- Less mature immune system
- More vulnerable to poor air quality.

HEALTH IMPACTS- TEMPORARY, SHORT-TERM, LONG-TERM AND CHRONIC

FATIGUE

IRRITATION OF THE EYES, NOSE & THROAT

COUGHING & SNEEZING

HEADACHES & DIZZINESS

COGNITIVE IMPAIRMENT

DEVELOPMENTAL DELAYS

RESPIRATORY ILLNESS

ASTHMA & ALLERGIES

LUNG & HEART DISEASE

HEART ATTACK & STROKE

PREMATURE & LOW BIRTHWEIGHT

DEMENTIA

CANCER

Common IAQ Pollutants in Schools

Primary Sources of Poor IAQ

- PM 2.5
- Volatile Organic Compounds (VOCs)
- NO2
- Viruses
- Bacteria
- Allergens
- CO (Carbon Monoxide)
- CO2 (Carbon Dioxide)
- Ozone
- Lead
- Formaldehyde
- Radon

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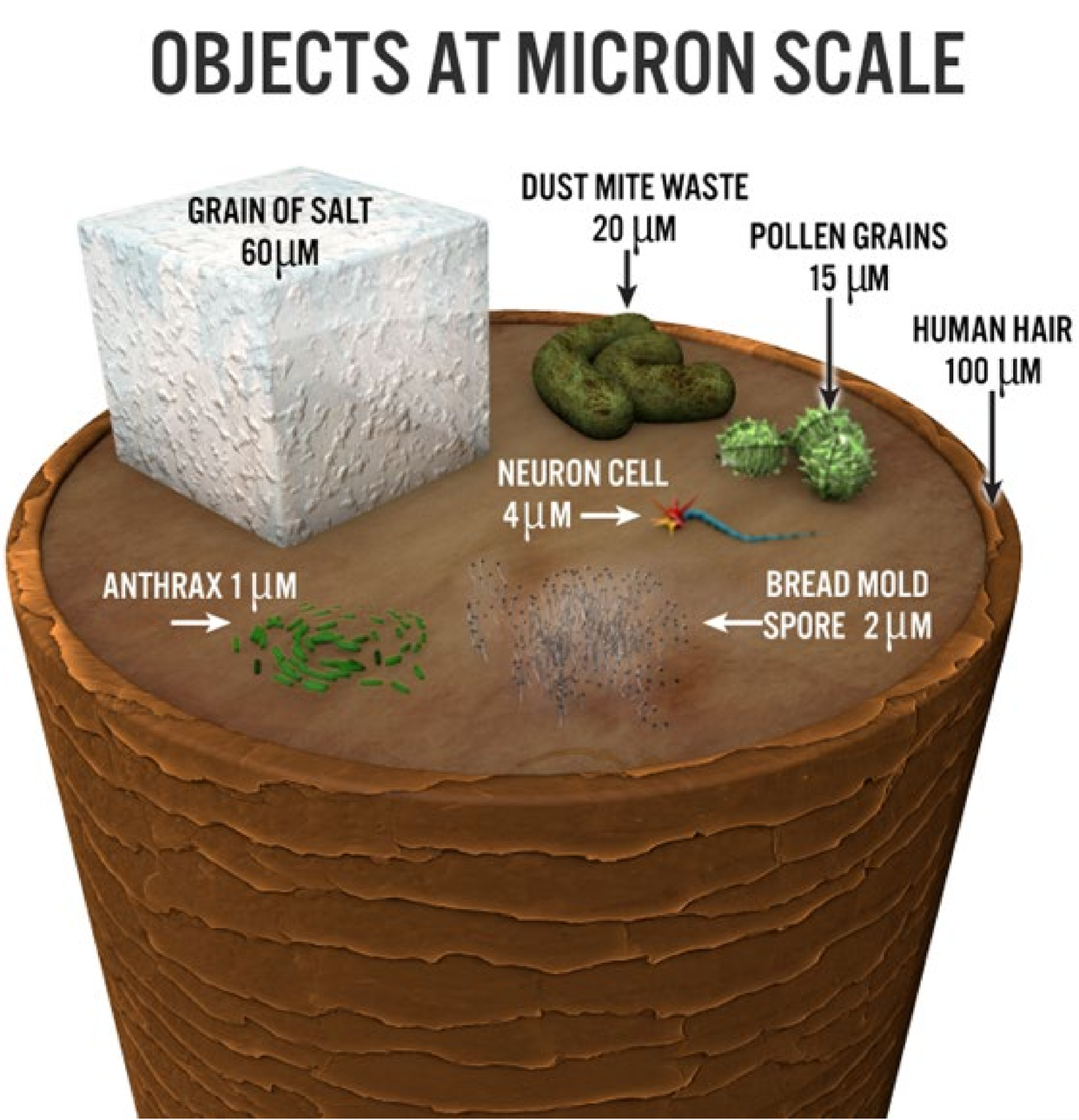
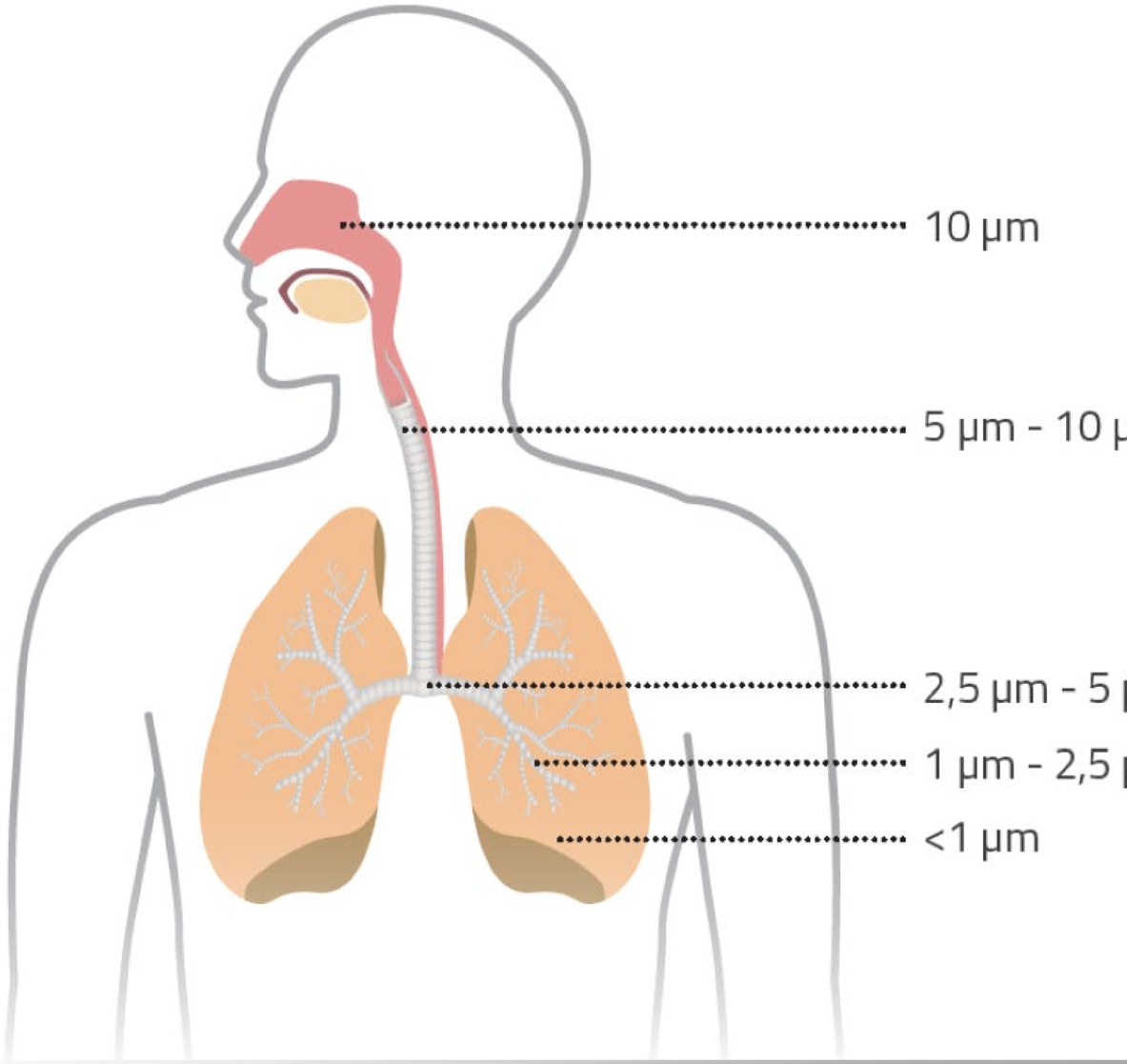


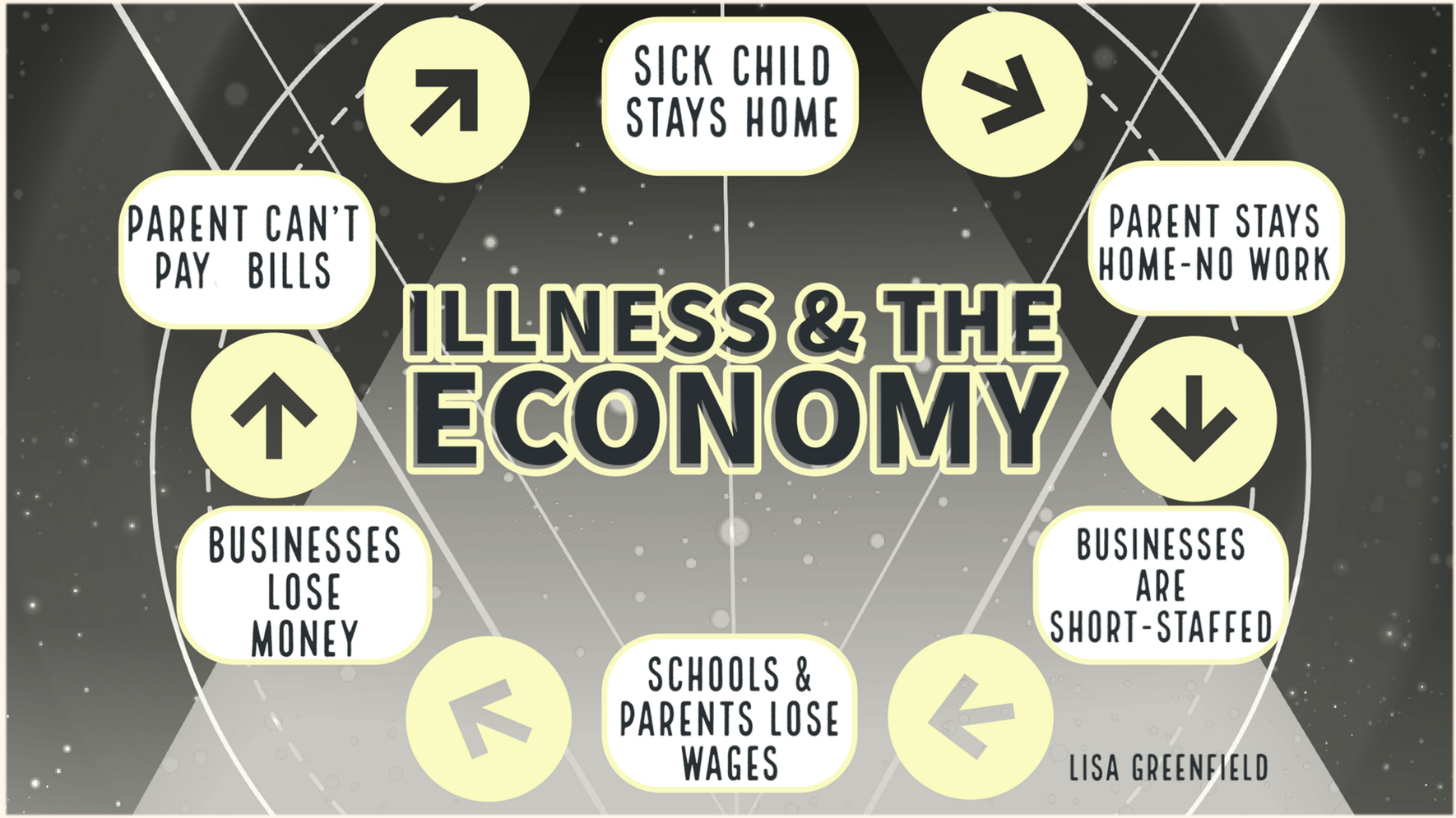


PARTICLE SIZES

THE COST OF ILLNESS

Key impacts include:

- Academic achievement and attainment
- Health burdens and costs
- Family economic impacts
- Equity and environmental justice
- School and district finances
- Community productivity and economy
- Teacher and staff impacts
- Psychosocial and behavioral effects
- Opportunity costs



AIRBORNE INFECTIOUS DISEASE, BIOLOGICAL CONTAMINANTS

- COVID-19
- RSV
- COLD-200+ VARIETIES
- TB-TUBERCULOSIS
- PNEUMONIA
- INFLUENZA
- BACTERIA
- STREP
- MEASLES
- MENINGITIS
- MUMPS
- CHICKEN POX
- MOLD
- FUNGUS

The Critical Link: IAQ and Asthma

IAQ and Asthma Exacerbation

Asthma in Schools:

Asthma affects nearly 1 in 13 school-aged children and is the leading cause of school absenteeism due to chronic illness.

Triggers in School:

Common indoor allergens and irritants act as powerful asthma triggers, including:

- Mold spores
- Pest allergens (e.g., mouse droppings)
- Dust mites
- Cleaning chemicals/scents

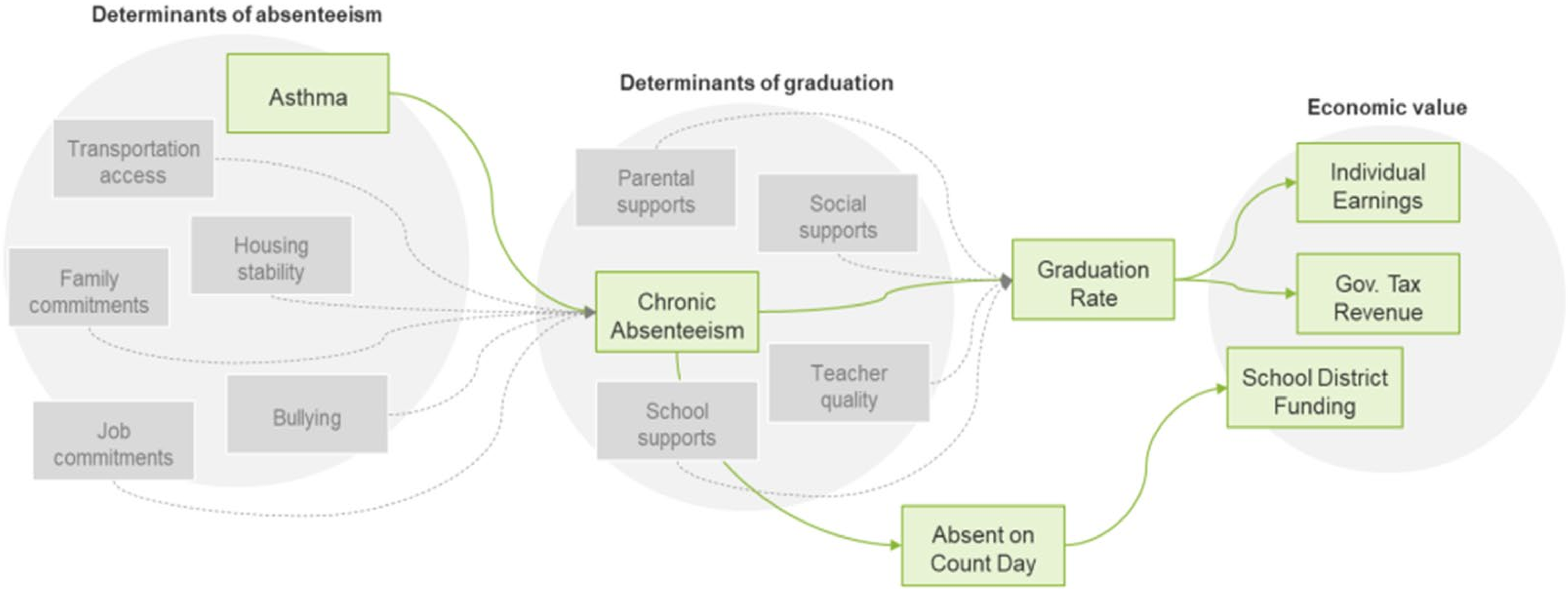
Consequences:

Increased severity and frequency of symptoms, leading to more missed school days, emergency room visits, and decreased performance.

ASTHMA & ABSENTEEISM

Figure 2

Asthma is one of many determinants of chronic absenteeism



Indoor Air Quality and Infectious Disease Spread

Airborne Disease, Respiratory Viruses and Long-COVID

- Student Susceptibility to Viruses and Bacteria
- Pathogen Accumulation
- Worsened Health Outcomes
- Academic Impact

Mitigation Strategies

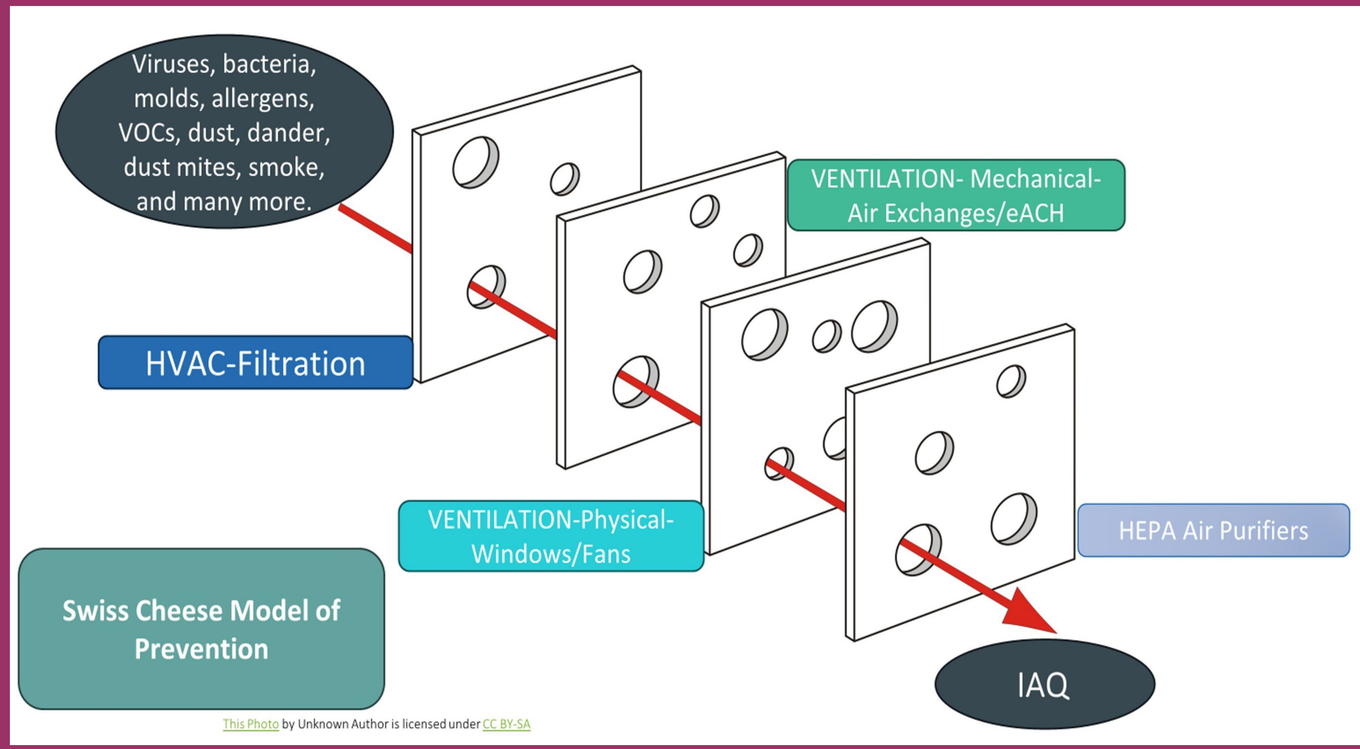
<u>Improved Outcomes with</u>

<u>Reduced Exposure</u>

Ventilation: ASHRAE 241 IRMM

(Infection Risk Management Mode)

Filtration: HVAC and HEPA



- ***Monitoring:*** Sustained Attention to
- IAQ Transmission Risk and Mitigative Strategies

You can find several of our resources around IAQ on our website HERE.

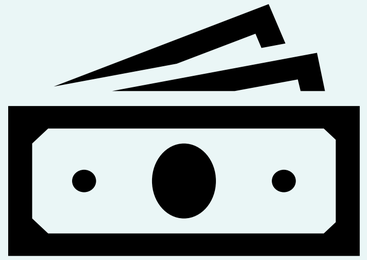
They include our School IAQ Fact Sheet Series and Energy Efficient IAQ Management Plan Toolkit.

KEY FACTS ABOUT IMPROVING IAQ

- Increased Productivity 
- Reduced Absenteeism 
- Energy Efficiency 
- Compliance and Liability 
- Health Benefits 
- Financial Savings 

The ROI for Clean Air:
Health, Attendance and Cost Savings

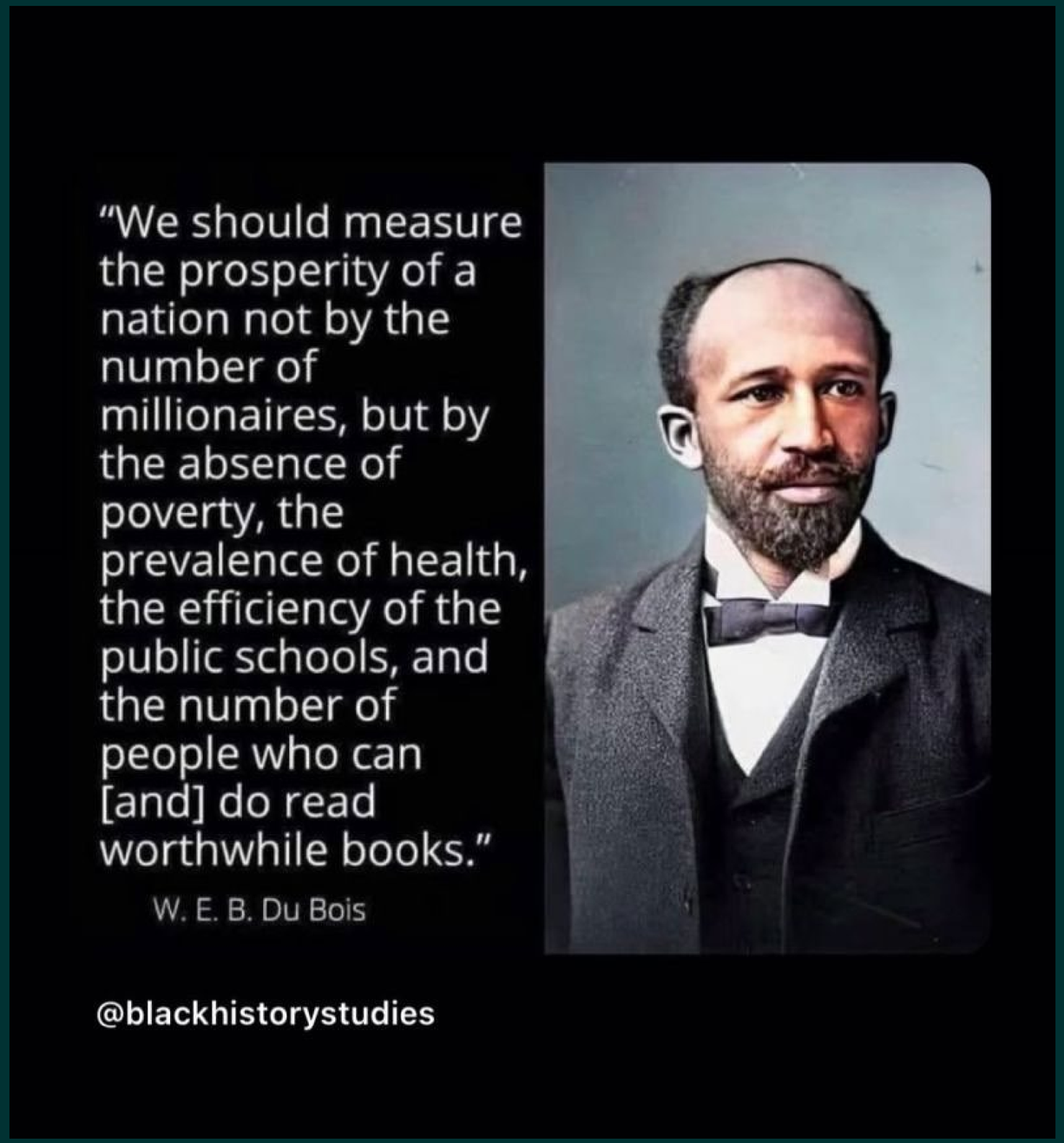
Non-Health-Related Cost Savings:



- Reduced Utility Bills
- Extended Equipment Life
- Reduced Litigation/Remediation

Health-Related Financial Benefits (The Biggest ROI):

- Increased Attendance Funding
- (Studies suggest a return of 3-6x the cost of increased ventilation, and up to 8x for improved filtration when factoring in reduced illness and improved performance).
- Improved Student Performance
- Reduced Staff Absenteeism



- Equity
- Health
- Prosperity

"Investing in schools is investing in our future, because our future is in our schools." ~LG

REVIEW AND QUESTIONS

- IAQ CAN HAVE A PROFOUND IMPACT ON HEALTH
- INVESTMENTS IN IMPROVING IAQ PAY DIVIDENDS
- ABSENTEEISM IS COSTING SCHOOLS SERIOUS MONEY
- REDUCING ABSENTEEISM CAN PUT SIGNIFIGANT AMOUNTS OF MONEY BACK INTO THE BUDGET
- SOLUTIONS FOR IMPROVING IAQ

Free support for your district

The Center for Green Schools at the U.S. Green Building Council is a global leader in advancing green schools and providing the resources needed to achieve greener, healthier K–12 schools. We provide professional development to over 700 school district staff across nearly 250 districts, collectively impacting more than 9 million students.

Phelps Elementary School | LEED Gold | Rockland, MA | Photo: Raj Das

To bring support and connections closer to home and ensure our programming is relevant to the specifics of a school system's local climate and politics, the Center offers FREE local education and peer-to-peer connections to districts around the country, with a particular emphasis on helping school system staff manage indoor air quality while also prioritizing energy efficiency (Energy Efficient IAQ).

Center for **Green Schools**
at the U.S. Green Building Council

Walkthrough video:

https://www.usgbc.org/education/sessions/walkthrough-video-school-district-energy-efficient-iaq-plan-toolkit-12860922

Connect with us!

Thank you!

LISA GREENFIELD
Regional Program Manager, Midwest
CAFS

usgbc.org

Local programs are designed for district-level staff in:

- Facilities
- Operations
- Environmental Health
- Finance
- Sustainability
- IAQ and Energy Management
- Any district staff interested in greener, healthier schools!

We offer FREE:

- Local in-person trainings
- Locally relevant virtual trainings and resources
- Fellowships and funding opportunities
- Local peer-to-peer connections
- Access to resources like our K-12 School Energy Efficient Indoor Air Quality Management Toolkit

Meet your regional manager

Lisa Greenfield
Program Manager, Midwest
lgreenfield@usgbc.org

Lisa is based in central Iowa and is an indoor air quality and certified air filtration specialist with 20 years of teaching experience in the field of K-12 and early childhood education. Reach out to her for your local programming needs!

Top photo: Golden Grove Media

Discovery Elementary School | Photo © Alan Karchmer

Center for Green Schools

IAQ Resources

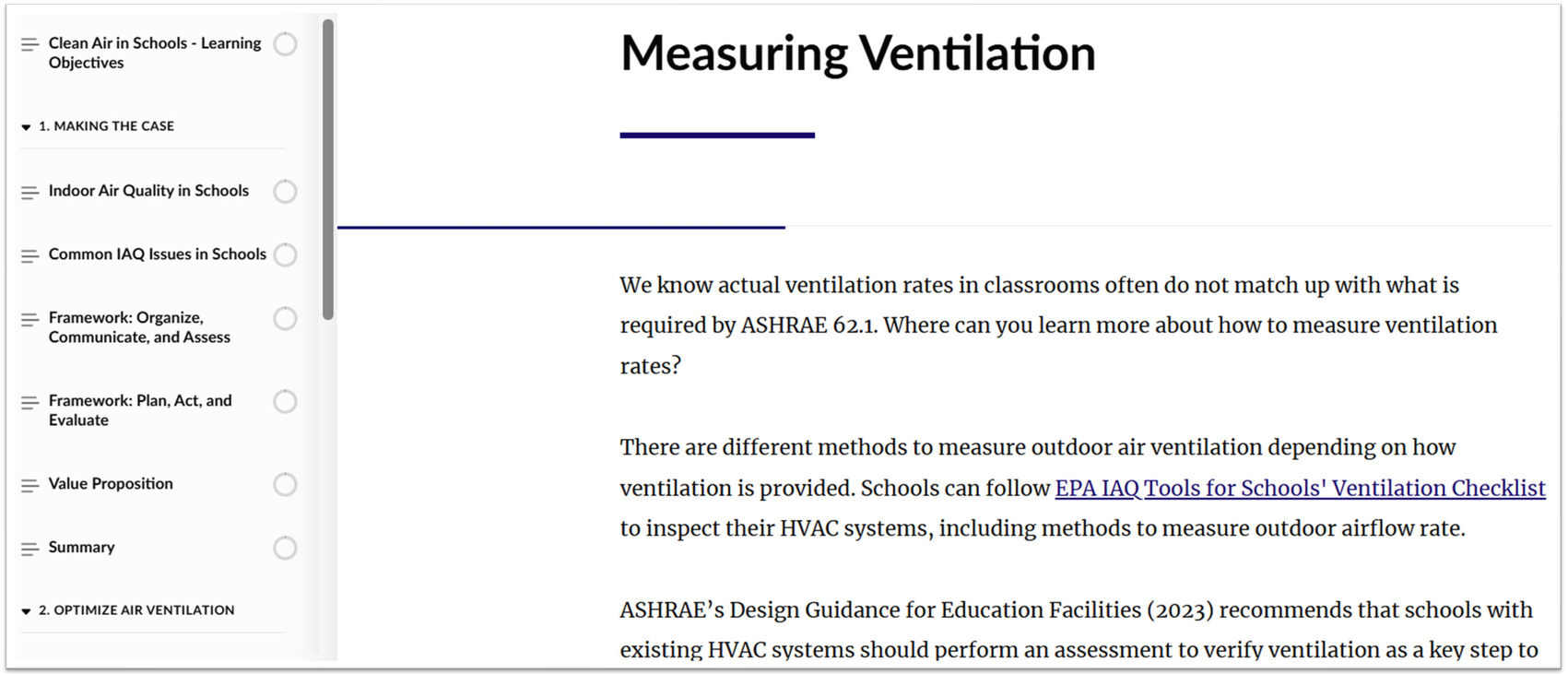
Join the network

- Free to join and participate!
- Network members: K-12 staff managing air quality
    - Environmental Health and Compliance
    - Facilities Operations and Maintenance
    - Risk Management
    - Sustainability and Energy Management
    - Health Services

Resources: Clean Air in Schools course

This free, self-guided course, co-developed with the EPA and U.S. Department of Energy, focuses on the technical aspects of assessing and improving ventilation, filtration, air cleaning, and monitoring IAQ in school buildings.

- Includes six interactive modules
- Takes approximately three hours to complete
- Receive a customized certificate of completion



Why a comprehensive, *written* IAQ management plan?

- Supports compliance with local, state, and federal regulations
- Maintain continuity in operations during staff turnover
- Save time on issue response and decision making
- Clearly define departmental and staff roles and responsibilities
- Consistent and transparent messaging to staff and the community
- Build leadership support through alignment with district goals and strategic plan.
- Advocate for resources to support healthy and efficient learning environments

High Impact Practices

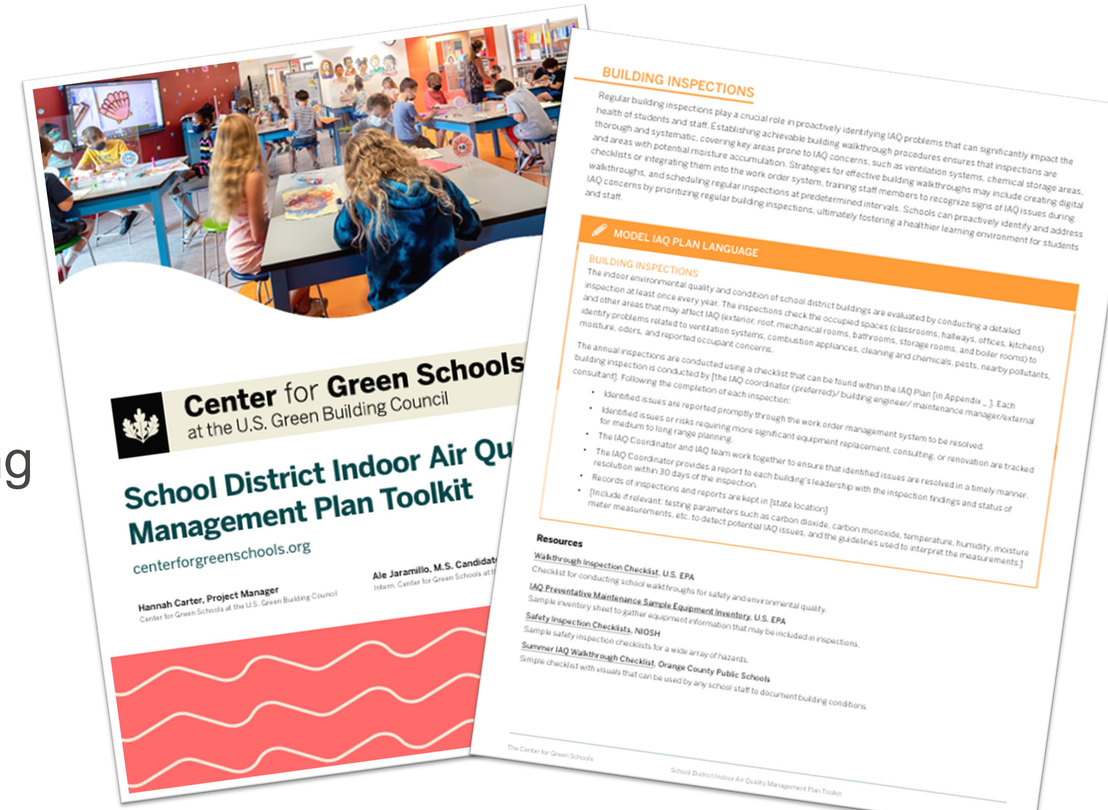
Priority areas to support school staff in their learning, collaboration, and action to improve air quality in their schools

Document existing buildings and systems	Collect and track feedback	Implement proven strategies	Plan for continuous improvement and communication
Assessing and benchmarking building conditions and equipment	Establishing a district IAQ team	Verifying ventilation performance	Developing an IAQ management plan
Preventative maintenance activities	Gathering continuous feedback and tracking issues	Determining the highest practical efficiency MERV filters for current systems	Updating project and equipment specifications for improved IAQ on future projects
Identifying indoor air pollutant sources	Annual building IAQ inspections	Continuous IAQ monitoring and alarm capabilities	Staff IAQ training and communicating with the community

Resources: School District Energy Efficient IAQ Management Plan Toolkit

This guide for creating a comprehensive, written IAQ management plan includes:

- Downloadable and customizable template plan
- Overview and case-making for 20 IAQ program components to document ranging from building assessments and chemical management to staff training and communications.
- Resources and school district examples
- School district case studies
- Coordinating IAQ and Energy Management: Key Questions



National Organizations for School Energy and IAQ Resources

IAQ

- EPA IAQ Tools for Schools
  - Find Local School IAQ Champions
- Efficient and Healthy Schools Program
- ASHRAE
- Healthy Green Schools and Colleges
- State Dept of Health School IAQ Programs (WA, MN, CT)

Energy Efficiency

- New Buildings Institute (decarbonization/electrification)
- DOE Better Buildings Solution Center

Sources:

1. EdResearch-Reducing-Student-Absenteeism-_22.pdf
2. Asthma and academic performance in urban children - Annals of Allergy, Asthma & Immunology
3. https://www.frontlineeducation.com/blog/the-cost-of-health-related-student-absences/
4. https://www.nctq.org/publications/Roll-Call-2020
5. The Ventilation Problem in Schools - Report Version_0.pdf
6. 14-16_241_bruns_sept23.pdf
7. https://pmc.ncbi.nlm.nih.gov/articles/PMC9159706/
8. The Value of IAQ: A Review of the Scientific Evidence Supporting the Benefits of Investing in Better Indoor Air Quality
9. K-12 and Special Education Funding - Education Commission of the States (ecs.org)
10. Ventilation in Schools and Childcare Programs | Ventilation | CDC
11. How indoor air quality in schools affects student learning and health
12. student_performance_findings.pdf
13. Standards and Calculations-Harvard-CU Boulder Portable Air Cleaner Calculator for Schools.v1.3 - Google Sheets
14. https://www.cdc.gov/asthma/pdfs/breathing_easier_brochure.pdf
15. The impact of indoor air pollution on children's health and well-being: the experts' consensus | Italian Journal of Pediatrics | Full Text
16. Indoor Air Quality (IAQ) | US EPA
17. ASHRAE Position Document on INDOOR AIR QUALITY
18. ASHRAE Approves Groundbreaking Standard to Reduce the Risk of Disease
19. https://www.orah.com/blog/reducing-absenteeism-navigating-ada-funding-for-schools-and-student-attendance
20. HALOhttps://6548208.fs1.hubspotusercontent-na1.net/hubfs/6548208/Jesse%20Files/NU%20Gen%20Chem/ASHRAE%20241%20executive%20summary_FINAL.pdf
21. https://6548208.fs1.hubspotusercontent-na1.net/hubfs/6548208/2021%20Product%20Brochures/2021_Technical_datasheet_Halo_EN.pdf