

LASD School Reopening: Health and Safety  
November 9, 2020 Board meeting

# Ventilation and Air Quality

# Coronavirus Preventive Measures

Recommendations from County Public Health and Other Sources

- First and foremost, wear face coverings and maintain adequate physical distancing; use good hand hygiene
- Hold classes outdoors whenever possible (in open air)
- If indoors, what are key preventive measures
  - Limit number of people in indoor spaces
  - Ensure adequate ventilation (air flow)
    - This can be done passively (open doors/windows) or actively through HVAC system
- Combining multiple measures reduces risk of transmission of coronavirus

# Reducing Risk indoors

- Indoor airborne particles can be removed in 3 ways:
  - Filtration – either through central HVAC system filters or portable air cleaners
  - Ventilation – bringing in outdoor air indoors while exhausting indoor air (either naturally through windows and doors or mechanically via HVAC system or fans); this dilutes particle concentrations
  - Cleaning – remove particles that have settled onto surfaces
- This presentation is focused on air quality (through filtration and ventilation)

# Areas of Focus

- Test existing HVAC systems and ensure they are operating properly
- Install MERV<sub>13</sub> or better filters in HVAC systems, where possible
  - Replace filters every 30 days initially, and extend up to 90 days if the filters remain clean
- Monitor indoor air quality
  - CO<sub>2</sub> sensors monitor ventilation by indicating CO<sub>2</sub> concentration relative to outside air (outside air is 400 ppm, a well-ventilated room is 800 ppm)
- HEPA air purifiers are only recommended in non-ventilated spaces

# Operation of Ventilation Systems

- Start system running 2 hours before school to flush out existing air and run 2 hours after school is done for the day
- Keep fans on all day
- Limiting number of students in a classroom provides both more space and more fresh air per person
  - State required ventilation is 15 CFM per student, which for 30 students is 450 CFM
  - 450 CFM is the standard for typical 960 SF classroom
  - Limiting to 15 students per classroom essentially doubles the rate of fresh air per person

# Monitoring and Upkeep

- CO<sub>2</sub> monitors track the amount of CO<sub>2</sub> in the air which is an indirect way to determine effectiveness of ventilation
  - We plan to install in all occupied rooms
  - Monitors cost roughly \$200 each
- Periodic routine maintenance and testing to ensure HVAC systems are functioning properly
- Routine filter replacement (every 30-90 days). May vary per site and HVAC unit type.

# Bringing in Outdoor Air

- Open doors and windows whenever possible
- OK to leave windows open with doors shut, but keeping doors open means less touching of doors during the day
- OK to have doors and windows shut if HVAC system is functioning properly as it constantly brings in fresh air, but having both HVAC system working and doors/windows open is recommended
- OK to leave doors/windows open during winter
  - HVAC system will warm the room, but of course this increases energy consumption
  - We will encourage staff and students to dress warmly
- **Key: keep fans running all day**

# What We Have Done (active systems)

- Inspected and tested every HVAC unit in every room in every school
  - Cleaned and disinfected all internal coils
  - Changed all HVAC filters
  - Checked controls to ensure fans operating correctly
- Set controls to ensure maximum outdoor air supply and to operate at least 2 hours before and after school
- Disconnected energy savings devices that prevent HVAC from operating when doors are open



# What We Have Done (passive systems)

- Some classrooms have passive ventilation provided by an air vent low on one wall with open windows high on opposite wall
- We have checked air vents and cleaned filters
- Disconnected energy savings devices that prevent HVAC from operating when doors are open
- Checked and repaired window operation
- Provided cranks and poles where missing for high windows

# What is Left to Do

- Replace MERV8 filters with MERV<sub>13</sub> or better where appropriate
- Install air flow measuring devices (CO<sub>2</sub> monitors) in classrooms
  - Product available approximately 3 weeks from now
- Install HEPA filters in spaces where there are few windows, such as some administrative spaces
  - Product available 6 – 8 weeks from now
- On-going monitoring and upkeep, including filter changing as needed (30-90 days)

# Resources

- UC Davis studies
- CDC and local public health guidelines
- ASHRAE has an Epidemic Task Force
  - ASHRAE = American Society of Heating, Refrigerating and Air-Conditioning Engineers
- CASH (Coalition for Adequate School Housing)
- Various webinars, workshops, and white papers