Environmental & Instructional Strategies for Safer Lab Activities During the COVID Pandemic

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Agenda

Labs During COVID Pandemic
Reducing Health Risks
Goals
Social Distancing
Building
Clean First, Disinfect if Needed
Lab Activities
Extra Thoughts
Question and Answers

Labs During COVID Pandemic

With the advent of the COVID-19 Pandemic, life has dramatically changed. As we move forward, academic settings including science/STEM laboratories need to address and embrace precautionary health and safety protocols.

Reducing Health Risks!

- Consistent and correct use of masks
- Social distancing to the largest extent possible
- Hand hygiene and respiratory etiquette
- Cleaning and disinfection
- Contact tracing in collaboration with school nurses’ office and/or local health department
- Appropriate filtered ventilation
- Stay home if sick!

Goal

To gather credible information and provide examples of how this information can be used. Understand that this is not a be-all-end-all guide. It is based on the best available information that addresses the challenges of this unprecedented situation.

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Questions

1. What are the safest strategies for schools, not just in terms of social distancing and PPE, but also in terms of facilities?
2. What teaching/learning strategies can be used to make the most out of a social-distanced classroom/laboratory in Science/STEM?

Social Distance (r=3 ft)

- Provides 6 feet between all students.
- Do not forget the teacher and any other staff members that are in your room/during class.
- Keep this in mind when observing.
- Area = 28.3 ft²
- NJDOE = 113 ft²
- Round circles in a quadrilateral

Engineering Controls Considerations

- Check the following engineering controls periodically:
  - Emergency Eye Wash Stations (Flush weekly)
  - Emergency Showers (Flush weekly)
  - Goggle Cabinet Sanitizers
    - UV-C shown to be effective against COVID-19 by sanitizing the surface that it is exposed to, based on recent scientific research
  - Gas line shutoff systems
  - Fume Hoods (Annual inspection by Certified Technician meeting NFPA 45 standard)
  - Fire Extinguishers (Annual inspection)

Ventilation

- Masks and Social Distancing are the first lines of defense (Note - If using face shields, still require masks!)
- Need for air ventilation must be balanced by those with allergies vs. open windows
- HVAC
  - Conventional air filters, by themselves, are not effective against the spread of Covid-19
  - HVAC with HEPA filters and UV light and/or ionic air purifier neutralize airborne and surface-borne viruses.
  - NFPA 45 - Science/STEM labs to have 100% fresh air - should not circulate air back into facility. (State must have adopted NFPA 45)

Required PPE

- CDC notes - face mask required if working in classroom or laboratory!
- However - there is the proviso that cloth face coverings [masks] should not be worn by anyone who has trouble breathing, is unconscious, incapacitated, or otherwise unable to remove the mask without assistance. Problem with just using a face shield is the open areas on the sides of the face (cheek areas) and lower portion (chin) are wide open. This provides an avenue for droplets and particles to gain entrance to the mouth and nose. The nose is the primary entrance portal for the virus, based on current research.
- Bottomline is - both cloth face cover/mask and safety goggles need to be worn, save instances where there are health related breathing issues. In those cases, safety goggles and face shields must be worn, though again there is considerably less defense against exposure to the virus.

Note: Ventilation for Industrial Settings during the COVID-19 Pandemic - https://www.acgih.org/docs/default-source/vent-committee/iv_position-test.pdf?sfvrsn=4b10ba0d_2
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Clean First, Disinfect (if needed) Second

- This also applies to the Goggle Cabinet
- The Coronavirus can survive from a few hours to a few days on a surface.
  - It has to get from the surface to your mouth or nose
- Defense
  - Wash hands regularly (Soap & Water preferred)
  - Don’t share unless cleaned after each person’s use
  - Clean common surfaces
  - Wipe In/Wipe Out

Some Common Surfaces

- Tables
- Doorknobs
- Light switches
- Countertops
- Handles
- Desks
- Phones
- Keyboards
- Toilets,
- Faucets and sinks,
- Lab equipment
- Touch screens
- Erasers, markers, pens, pencils
- Laboratory supplies/equipment
- Laboratory engineering controls
- There are more!!!

WARNING!!!

- Do not use hand sanitizer by Eskbiochem!!!
  - Made in Mexico with Methanol, AKA Wood Alcohol
  - Substantial methanol exposure can result in nausea, vomiting, headache, blurred vision, permanent blindness, seizures, coma, permanent damage to the nervous system, or death.
  - SDS sheets for all hand sanitizers in the building
  - Washing hands with Soap and Water is preferred over Hand Sanitizers (as per CDC)

Labs/Studios in School

- In a Socially-Distanced Lab...
  - Face masks?
  - Sharing of Equipment/Materials?
  - Cleaning and Disinfecting of all Equipment after use?
  - Sanitizing PPE - Goggles, gloves, aprons, etc. after use?

Labs in School

- Discourage sharing of these common materials unless sanitized after each use. Always wash hands with soap and water after use.
- Clean all common areas at the beginning and at the end of each period where students change rooms.
- Though staying in one room may be a possibility in elementary and even middle schools, it is impossible in most high school scenarios without limiting student course offerings.
- In science/STEM labs, do not schedule multiple groups to use the same lab station in periods unless the entire lab station, and equipment can be cleaned and disinfected between periods or near the end of the lab period by students wearing PPE under direct teacher visual supervision.

Labs in School

- Paper Use - Tests, lab reports, etc.
The length of time varies for COVID viability. Some strains of coronavirus live for only a few minutes on paper, while others live for up to 5 days.*
- Discourage sharing of paper use. Safer to have students and teacher use electronic means – e.g. laptops, computers, tablets, etc.
- If paper is used, be sure to wash hands with soap and water or hand sanitizer after use!
Science Lab Instructional Strategies:

- A. Teacher-led demonstration labs (virtual, video, or face to face), students observe only, discussion and/or lab report after demonstration
- B. Single Student-led demonstration labs, balance of class observers
- C. Solo labs – each individual student conducts lab activity – one student per lab table. If not possible, split ½ in lab, ½ at desks with alternative work
- D. Make use of computer/tablets in class for on-line lessons, demonstrations and/or lab activity programs that demonstrate correct safety protocols, and discuss safety with activity
- E. Remote or Virtual Labs – home instruction

Labs at Home

- Questionable – Liability!
- Unprecedented times do not exclude the following:
  - Duty or Standard of Care
  - Teacher liability if an accident occurs
  - District liability if an accident occurs
- Always provide safety procedures and safety acknowledgment form – student and parent signatures (https://www.nsta.org/topics/safety)
- “NSTA COVID-19 Pandemic Safer Science/STEM Online and Face-to-Face Learning Environments Instruction Disclaimer Statement”. This disclaimer statement is recommended for instructors to include with their course outline and all online or at home science/STEM lab activities. https://www.nsta.org/covid-19-pandemic-safer-science

*A Few Extra Thoughts*

- You can only observe a symptom. Having a symptom does not mean the student or staff has COVID-19.
  - FERPA & HIPAA rights of the student or staff member
  - Schools required to have isolation room per CDC (potential ventilation issue – must be non-recirculating to other locations)
- Do not get complacent too early
  - It can take up to 14 days for COVID-19 to affect your body.
  - You, or others, may have it and be asymptomatic
  - The highest percentage of the airborne germs are shared by the infected a few days before they show symptoms.

Resources

1. “Safety Recommendations for Opening the New School Year” – NSTA July 2020 Safety Blog Commentary. Critical information that science teachers and supervisors/administrators need to address in planning use of lab this coming new school year:
   (https://www.nsta.org/blog/safety-recommendations-opening-new-school-year)
   (https://www.nsta.org/blog/safety-hands-science-home-instruction)