

Department of Health
and Human Services

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Making It Better, Together.

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12/11/2017

Berlin Community School
215 South Franklin Avenue
Berlin, NJ 08009

RE: Indoor Air Quality Investigation
Berlin Community School
215 South Franklin Avenue
Berlin, New Jersey 08009

Dear Cande Kristoff:

An indoor air quality investigation of your facility was conducted on December 05, 2017. The investigation was conducted at your request to ensure the results of an evaluation conducted by Environmental Design Inc. on September 29, 2017. A Q- Trak 7575-X was used to evaluate levels of carbon monoxide, carbon dioxide, relative humidity, and temperature throughout the school. A Zefon Z-lite-IAQ pump was used to collect non-viable fungal samples that were taken to EMLab P&K, located at 3000 Lincoln Drive East, Suite A, Marlton, NJ 08035, to be analyzed. The samples were taken using Air-O-Cell cassettes which collect both viable and non-viable fungal spores. A Protimeter Survey Master BLD2000 was also used to evaluate materials for possible water damage.

The New Jersey Public Employees Occupational Safety and Health Indoor Air Quality Standard and the New Jersey Department of Health Indoor Bioaerosols document shall apply to matters relating to indoor air quality within the Berlin Community School. These two documents recommend the following:

- Relative humidity levels within an occupied space should be maintained below 60 percent throughout the year, and is recommended to remain between 30 to 60 percent
- Carbon dioxide levels are to remain below 1,000 parts per million in an occupied space
- Temperatures within the building should remain between 68 to 79 degrees Fahrenheit
- HVAC filters should have a 50-70 percent efficiency rating
- A preventative maintenance schedule must be followed

This standard also states that the employer shall control microbial contamination in the building by promptly repairing water intrusion that can promote the growth of biological agents.

Bioaerosols, such as fungi, are ubiquitous. Fungi produce spores that are released into the air and can cause adverse health effects when not kept within reasonable limits. These spores can be introduced to the indoor environment through HVAC systems, doors, windows, or brought in on

an individual's clothing or belongings. In some cases, the source of these contaminants can be found actively growing indoors if the conditions are favorable. Factors like water infiltration, humidity, temperature, and nutrient sources should be monitored to ensure that conditions that would promote fungal growth are addressed properly.

Indoor air quality readings for carbon monoxide, carbon dioxide, relative humidity, and temperature were taken in each room of the Berlin Community School. All readings for carbon monoxide, relative humidity, and temperature were within the recommended limits. The following areas were found to have slightly elevated levels of carbon dioxide (refer to attached chart for full readings):

Room 36: 1309 ppm, HVAC Unit On	Room 35: 1381 ppm, HVAC Unit Off
Room 33: 1402 ppm, HVAC Unit Off	Room 31: 1338 ppm, HVAC Unit Off
Room 30: 1224 ppm, HVAC Unit Off	Room 29: 1194 ppm, HVAC Unit On
Room 23: 1190 ppm, HVAC Unit Off	Room 17: 1223 ppm, HVAC Unit Off
Room 14: 1309 ppm, HVAC Unit On	Room 50: 1034 ppm, HVAC Unit On
Room 43: 1127 ppm, HVAC Unit On	Room 62: 1046 ppm, HVAC Unit On

In rooms that readings were recorded within the recommended limits for carbon dioxide, either the HVAC system was running or teachers had opened windows to allow for fresh air to enter the occupied space.

The following areas were found to have water damaged ceiling tiles. No visible fungal growth was observed at this time. It should be noted that water damaged tiles were just stained and were dried out at the time of inspection:

Room 82	Room 80
Girls Locker Room Bathroom	Room 78, Coach Barry's Office
Room 75 Conference Room	Room 75, Cuffari's Office

The plenum above these areas was inspected to attempt to identify the source of moisture intrusion. No roof leaks were suspected at the time of inspection. The source of moisture was suspected to be coming from condensation forming around piping.

Upon visual inspection, two other areas of concern were identified. Room 68 exhibited what seemed to be a dust buildup on the drywall located adjacent to room 70. The plenum was also inspected in this area, which resulted in no observation of moisture intrusion damage to the wall or surrounding areas. The other side of this wall, located in room 70, did not exhibit a similar buildup. Also, room 24 showed signs of paint peeling by the window of the classroom. The wall did not. This issue has been identified by the maintenance staff and is a priority to be addressed.

The non-viable fungal methodology was used to collect fungal samples within the Berlin Community School. This method was chosen since both viable and non-viable spores would be counted in each sample. This is imperative because with fungi both living (viable) and dead (non-viable) spores can cause adverse health effects. Samples were collected in rooms 70, 68, 28, 26, 14, 12, and one sample was taken outside as a control. Samples ran for 5 minutes each with the Zefon pump calibrated to 15 L/Min. Due to the accumulations found on the shared wall between room 68 and 70, it was determined that samples be taken in both areas. The other samples were taken due to previous complaints received.

The following recommendations should be followed to promote good indoor air quality practices within the building:

- Ensure that the HVAC systems are operating correctly in the rooms identified to have elevated carbon dioxide levels to ensure levels of carbon dioxide remain below 1,000 parts per million
 - In the identified elevated rooms, ensure that either the HVAC system be turned on or windows be opened to allow fresh air into the occupied space
 - Also, unit ventilators should be kept free of any materials that would block portions of the return vent or outlet
- Remove and replace the observed stained ceiling tiles and any affected pipe wrap; repeat this process until the source of moisture intrusion has been identified and fixed
- If visible fungal contamination is observed, follow the EPA guidelines for Mold Remediation in Schools and Commercial Buildings
 - These guidelines should also be followed for the surface cleaning of the wall located in room 68
- The HVAC preventative maintenance schedule should include: checking and/or changing air filters, checking and/or changing belts, lubrication of equipment parts, checking the functioning of motors, ensuring dampers are set to allow the necessary amount of fresh air to each occupied space, and confirming that all equipment is in operating order
- Damaged or inoperable components of the HVAC system replaced or repaired as appropriate
- Parts of the HVAC system with standing water checked visually for microbial growth
- When the temperature is outside of the range of 68 to 79 degrees Fahrenheit, the HVAC system should be checked and repaired as necessary to ensure the system is operating properly
- Remediate damp or wet materials by drying, replacing, removing, or cleaning within 48 hours of discovery and continue remediation until water intrusion is eliminated
- The maintenance staff has already implemented a plan to address the peeling paint in room 24

This inspection did not yield any results that would prompt this Department to require further sampling. The Berlin Community School was very well kept, all areas inspected were maintained well, all maintenance logs were up to date, and all sample results were within reasonable limits that did not suggest any remediation is needed.

This inspection should be considered a “snapshot” of what the conditions were like within the Berlin Community School at the time of inspection. With air quality, conditions change over time and it is imperative to ensure that all environmental controls are operating as they should to reduce the risk of fungal contamination.

If you have any questions concerning the attached report, contact this Department at 856-374-6049.

Very truly yours,

Christopher Costa
Environmental Health Specialist
Certified Microbial Consultant, 1610021



Report for:

Chris Costa
Camden County Dept of Health
512 Lakeland Rd. Suite 301
Blackwood, NJ 08012

Regarding: Project: Berlin Community School; IAQ Sampling
EML ID: 1843580

Approved by:

Dates of Analysis:
Spore trap analysis: 12-07-2017

Technical Manager
Ariunaa Jalsrai

Service SOPs: Spore trap analysis (EM-MY-S-1038)
AIHA-LAP, LLC accredited service, Lab ID #103005

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the items tested.

EMLab P&K ("the Company") shall have no liability to the client or the client's customer with respect to decisions or recommendations made, actions taken or courses of conduct implemented by either the client or the client's customer as a result of or based upon the Test Results. In no event shall the Company be liable to the client with respect to the Test Results except for the Company's own willful misconduct or gross negligence nor shall the Company be liable for incidental or consequential damages or lost profits or revenues to the fullest extent such liability may be disclaimed by law, even if the Company has been advised of the possibility of such damages, lost profits or lost revenues. In no event shall the Company's liability with respect to the Test Results exceed the amount paid to the Company by the client therefor.

EMLab P&K's LabServe® reporting system includes automated fail-safes to ensure that all AIHA-LAP, LLC quality requirements are met and notifications are added to reports when any quality steps remain pending.

Client: Camden County Dept of Health
 C/O: Chris Costa
 Re: Berlin Community School; IAQ Sampling

Date of Sampling: 12-05-2017
 Date of Receipt: 12-05-2017
 Date of Report: 12-07-2017

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	1: Outside			2: Room 70		
Comments (see below)	None			None		
Lab ID-Version‡:	8636304-1			8636305-1		
Analysis Date:	12/07/2017			12/07/2017		
	raw ct.	% read	spores/m3	raw ct.	% read	spores/m3
Alternaria						
Ascospores						
Basidiospores	39	25	2,100	1	25	53
Chaetomium						
Cladosporium	7	25	370	2	25	110
Epicoccum				1	100	13
Fusarium						
Myrothecium						
Nigrospora						
Other brown						
Other colorless						
Penicillium/Aspergillus types†				1	25	53
Pithomyces						
Rusts						
Smuts, Periconia, Myxomycetes				1	100	13
Stachybotrys						
Stemphylium						
Torula						
Ulocladium						
Zygomycetes						
Background debris (1-4+)††	2+			1+		
Hyphal fragments/m3	< 13			< 13		
Pollen/m3	< 13			< 13		
Skin cells (1-4+)	< 1+			2+		
Sample volume (liters)	75			75		
§ TOTAL SPORES/m3			2,500			240

Comments:

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample, indicating a raw count of <1 spore.

† The spores of *Aspergillus* and *Penicillium* (and others such as *Acremonium*, *Paecilomyces*) are small and round with very few distinguishing characteristics. They cannot be differentiated by non-viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.

†† Background debris indicates the amount of non-biological particulate matter present on the trace (dust in the air) and the resulting visibility for the analyst. It is rated from 1+ (low) to 4+ (high). Counts from areas with 4+ background debris should be regarded as minimal counts and may be higher than reported. It is important to account for samples volumes when evaluating dust levels.

The analytical sensitivity is the spores/m³ divided by the raw count, expressed in spores/m³. The limit of detection is the analytical sensitivity (in spores/m³) multiplied by the sample volume (in liters) divided by 1000 liters.

For more information regarding analytical sensitivity, please contact QA by calling the laboratory.

‡ A "Version" indicated by "-x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

§ Total Spores/m³ has been rounded to two significant figures to reflect analytical precision.

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Date of Sampling: 12-05-2017
 Date of Receipt: 12-05-2017
 Date of Report: 12-07-2017

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	3: Room 68			4: Room 28		
Comments (see below)	None			None		
Lab ID-Version‡:	8636306-1			8636307-1		
Analysis Date:	12/07/2017			12/07/2017		
	raw ct.	% read	spores/m3	raw ct.	% read	spores/m3
Alternaria	3	100	40			
Ascospores	1	25	53	1	25	53
Basidiospores	3	25	160	5	25	270
Chaetomium						
Cladosporium	2	25	110	4	25	210
Epicoccum	2	100	27	1	100	13
Fusarium						
Myrothecium						
Nigrospora						
Other brown						
Other colorless						
Penicillium/Aspergillus types†	4	25	210	5	25	270
Pithomyces	1	100	13			
Rusts	2	100	27			
Smuts, Periconia, Myxomycetes	5	100	67	7	100	93
Stachybotrys						
Stemphylium						
Torula						
Ulocladium						
Zygomycetes						
Background debris (1-4+)††	3+			3+		
Hyphal fragments/m3	13			13		
Pollen/m3	< 13			< 13		
Skin cells (1-4+)	2+			2+		
Sample volume (liters)	75			75		
§ TOTAL SPORES/m3			710			910

Comments:

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Date of Sampling: 12-05-2017
 Date of Receipt: 12-05-2017
 Date of Report: 12-07-2017

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	5: Room 26			6: Room 14		
Comments (see below)	None			None		
Lab ID-Version‡:	8636308-1			8636309-1		
Analysis Date:	12/07/2017			12/07/2017		
	raw ct.	% read	spores/m3	raw ct.	% read	spores/m3
Alternaria	2	100	27			
Ascospores	1	25	53			
Basidiospores	6	25	320	4	25	210
Chaetomium						
Cladosporium	8	25	430			
Epicoccum						
Fusarium						
Myrothecium						
Nigrospora						
Other brown	1	100	13			
Other colorless						
Penicillium/Aspergillus types†	7	25	370	2	25	110
Pithomyces	2	100	27			
Rusts						
Smuts, Periconia, Myxomycetes	28	100	370	2	100	27
Stachybotrys						
Stemphylium						
Torula						
Ulocladium						
Zygomycetes						
Background debris (1-4+)††	3+			2+		
Hyphal fragments/m3	67			< 13		
Pollen/m3	< 13			< 13		
Skin cells (1-4+)	3+			2+		
Sample volume (liters)	75			75		
§ TOTAL SPORES/m3			1,600			350

Comments:

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample, indicating a raw count of <1 spore.

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 C/O: Chris Costa
 Re: Berlin Community School; IAQ Sampling

Date of Sampling: 12-05-2017
 Date of Receipt: 12-05-2017
 Date of Report: 12-07-2017

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	7: Room 12		
Comments (see below)	None		
Lab ID-Version‡:	8636310-1		
Analysis Date:	12/07/2017		
	raw ct.	% read	spores/m3
Alternaria			
Ascospores	1	25	53
Basidiospores	2	25	110
Chaetomium			
Cladosporium	3	25	160
Epicoccum	1	100	13
Fusarium			
Myrothecium			
Nigrospora			
Other brown			
Other colorless			
Penicillium/Aspergillus types†	5	25	270
Pithomyces			
Rusts			
Smuts, Periconia, Myxomycetes	2	100	27
Stachybotrys			
Stemphylium			
Torula			
Ulocladium			
Zygomycetes			
Background debris (1-4+)††	2+		
Hypal fragments/m3	< 13		
Pollen/m3	< 13		
Skin cells (1-4+)	2+		
Sample volume (liters)	75		
§ TOTAL SPORES/m3			630

Comments:

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample, indicating a raw count of <1 spore.

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Indoor Air Quality Readings

Location	CO ₂ (ppm)	Temperature (°F)	Relative Humidity (%)	CO (ppm)	Comments
Outside	565	53.8	91.2	0	Overcast, S#1
Business Office Lobby	668	70.0	58.4	0	
Kristoff Office	590	70.1	45.0	0	
84	607	70.9	41.0	0	
E Wing Hallway	695	70.9	41.5	0	
82	849	71.1	42.7	0	Ceiling Tiles around vents dusty
80	608	70.9	39.4	0	Ceiling Tiles around vents dusty
Gym B	480	70.1	48.4	0	
Boy's Locker Room	477	69.8	47.8	0	
Gym Storage	548	71.0	45.1	0	
Coach's Office	537	70.5	45.6	0	
Girls Locker Room	464	70.0	47.4	0	Ceiling Tile stained in bathroom area
Coach Barry's Office	489	71.0	47.8	0	2 stained Ceiling Tiles
Coach Caruso's Office	557	70.9	47.5	0	
81	685	71.0	41.4	0	
79	902	71.5	42.7	0	
77	923	72.1	41.9	0	
75 Child Study Team	657	72.2	42.4	0	
75 Lindsey	627	72.1	42.4	0	
75 Edmunds	627	72.0	43.5	0	
75 conference Room	618	71.9	42.7	0	2 Ceiling Tiles stained
75 M. School office	653	72.1	43.9	0	
75 Locantora	678	71.8	43.0	0	
75 Cuffari	665	71.6	43.4	0	1 Ceiling Tile Stained
72	854	71.5	41.7	0	
E Wing Boys BR	741	71.2	41.5	0	
E Wing Girls BR	733	71.5	41.0	0	
71	877	72.5	40.5	0	
40	642	71.3	44.1	0	
70	837	72.9	40.1	0	6 Teachers, S#2
68	987	72.2	41.1	0	Dust accumulation on wall adj. W/70, S#3
69	933	72.8	41.0	0	
67	985	73.1	42.3	0	
63	922	73.3	40.2	0	
66	944	72.8	42.4	0	
64	938	73.9	42.1	0	
61	996	73.8	39.4	0	
D Wing Boys BR	940	73.4	39.4	0	
D Wing Girls BR	911	73.3	38.9	0	
39	570	71.0	45.2	0	
39A	559	72.4	50.7	0	
38	704	72.7	47.0	0	
C Wing Hallway	619	72.2	44.9	0	
36A	613	73.0	40.4	0	
37	734	72.9	48.3	0	
36	1309	73.6	49.2	0	HVAC On
35	1381	74.3	49.1	0	HVAC Off
34	949	74.0	47.1	0	

33	1402	74.0	47.7	0	HVAC Off
34	970	74.1	47.5	0	
31	1338	74.0	47.3	0	HVAC Off
30	1224	74.2	46.6	0	HVAC Off
29	1194	73.8	45.1	0	HVAC On
C Wing Boys BR	620	72.5	43.7	0	
C Wing Girls BR	636	72.4	43.4	0	
28	917	73.7	42.7	0	18 Students, 1 Teacher S#4
27	862	74.1	44.6	0	HVAC Off
26	885	73.6	48.5	0	HVAC Off, 20 Students, 1 Teacher, S#5
25	982	73.1	40.4	0	
23	1190	73.0	43.2	0	HVAC Off
24	1302	73.3	43.8	0	HVAC Off, Paint Peeling by window
C Wing	828	73.0	45.4	0	
22A	685	76.0	49.0	0	
22	657	73.0	41.7	0	
21	683	72.4	44.0	0	
20	528	72.0	48.4	0	
19	844	72.3	39.9	0	
18	683	71.5	43.9	0	
Upper B Wing	756	71.2	46.3	0	
17	1223	71.7	47.8	0	HVAC Off
B Wing Boys BR	812	71.9	45.6	0	
B Wing Girls BR	793	71.7	45.4	0	
16	1394	72.8	49.9	0	HVAC On
49A	681	74.1	49.1	0	
14	1309	73.6	48.3	0	HVAC On, Classroom Empty S#6
15	990	72.9	48.5	0	HVAC Off
13	855	72.4	48.1	0	
10	943	72.5	49.1	0	HVAC Off, Table in front of Unit Ventilator
11	973	73.2	47.6	0	
9	886	73.2	48.0	0	
8	586	72.6	48.8	0	
7	607	72.7	49.0	0	
6	634	72.8	49.0	0	
5	643	72.8	48.9	0	
4	509	72.1	51.2	0	
3	645	72.3	49.0	0	
2	879	72.2	46.5	0	
1	893	72.7	47.5	0	
48	805	71.2	43.6	0	
51	765	71.0	48.1	0	
50	1034	71.7	54.6	0	
Elementary Office	780	71.5	46.2	0	
53B	768	71.6	46.2	0	
53A	765	71.6	47.0	0	
52A	797	71.4	47.7	0	
52	796	71.0	45.2	0	
54	707	70.0	54.8	0	
47	739	70.3	48.4	0	
46	928	70.9	52.9	0	

44	871	70.6	52.1	0	
45	748	70.5	47.9	0	
42	740	70.7	55.3	0	
43	1127	71.2	50.6	0	HVAC On
D Wing	649	71.5	48.3	0	
A Wing	661	71.3	46.3	0	
56	849	71.3	49.7	0	
58	928	71.7	49.2	0	
60	941	71.7	46.6	0	
62	1046	72.0	46.5	0	
Cafeteria	822	72.6	47.5	0	
Kitchen	835	72.6	48.3	0	
12	987	72.0	45.2	0	HVAC Off, Classroom Empty, S#7

