

Internal
Audit
Report

*Division Of Curriculum and Instruction – Office of Science, Health,
and Physical Education*

**Science, Health & Physical Education:
Science Risk Mitigation Audit**

June 2024

Office of Science, Health, and Physical Education



Baltimore County Public Schools
Office of Internal Audit

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Executive Summary

June 2024

Division of Curriculum and Instruction – Office of Science, Health, and Physical Education

Science, Health & Physical Education: Science Risk Mitigation Audit

Background

The efforts of the BCPS Office of Science are directed toward one goal: enhancing achievement in science for all students. This includes providing a safe learning environment that mitigates science safety risks for students and staff.

Objective

The audit objective was to determine if the Office of Science has implemented effective controls to mitigate safety risks within the secondary science program.

Results in Brief

Our audit identified two findings:

1. School staff failed to provide the required documentation to confirm that safety training was completed.
2. Science safety equipment work orders are not resolved timely.

Potential Risks

- Science laboratory employees are not properly trained to mitigate science safety risks.
- Science laboratory safety equipment is not properly working to mitigate science safety risks.

Recommendations

1. The Office of Science director should collaborate with the necessary individuals who can address the failure of school staff to provide the required documentation to confirm that staff have been trained.
2. The Office of Science director should work with the Department of Facilities Management and Strategic Planning to develop and implement a process to prioritize critical science safety-related work orders and to ensure that all safety-related work orders are completed timely.

Response

1. Submission dates for school safety documents will be communicated to all department chairs and teachers. If the documents are not submitted on time, follow up will include:
 - a. Emails or team meeting communication to department chair
 - b. Email or team meeting communication to include department chair and principalAdditionally, time for safety training will be included during teacher preparation week and communication information about science safety training will be published in News Hub.
2. Science Office staff will communicate with the Physical Facilities staff to discuss and design a system to address the safety concerns in school buildings. Additionally, quarterly review dates will be established to address ongoing challenges.

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BACKGROUND

Organizational Status & Purpose

The Office of Science is part of the Office of Science, Health, and Physical Education under the Department of Teaching and Learning, and the Division of Curriculum and Instruction. Their mission is to "provide the vision, direction, and leadership for designing, implementing, and assessing the Science Education Program PreK-12 in Baltimore County Public Schools."

Science laboratory activities are an integral part of the secondary science curriculum. It is necessary for educators and students to understand the additional safety requirements and procedures that must be implemented to provide for a safe and meaningful experience for students. The Office of Science is responsible for establishing safety procedures, providing safety training opportunities, and monitoring to ensure that staff and students are trained.

Safety Procedures

The Office of Science has developed the Chemical Hygiene Plan (CHP) to promote the safe operation of school laboratories for students and staff. The CHP is a 20-page document that sets forth policies and operating procedures that are intended to meet the requirements of the Occupational Safety and Health Administration (OSHA). Additionally, the CHP provides guidance for a safe student experience in the laboratory. The CHP is reviewed annually and updated accordingly.

Staff Safety Training

The Office of Science staff currently provide access to science safety trainings and materials for:

- Chemical Hygiene Plan Review - Department chairs (aka Chemical Hygiene Officers) conduct and document safety training for all adults who prepare or participate in labs.
- SafeSchools Science Lab Safety - One-time training for all adults who prep or participate in labs.
- Laboratory Safety Course - One-time training through Flinn's Lab Safety website for department chairs and para educators.

School staff typically complete training at the start of the school year or when hired, if later in the year. The Office of Science requires documentation to support that training is complete. Reminders to provide the required documents are provided by the Office of Science through email, Schoology, and during department meetings.

Student Safety Training and Contracts

Teachers review the safety rules outlined in the Student Laboratory Safety Contract with students at the start of the school year. Students and their parents/guardians are required to review and sign a student lab safety contract prior to students engaging in hands-on laboratory activities.

Monitoring

Monitoring for safety risks in the school science areas is accomplished:

- during school visits by the director of science or the coordinator of secondary science.
- monthly by department chairs or science lab paraeducators.
- during bi-annual safety walks.

Safety Equipment Maintenance

The BCPS Maintenance Section of the Department of Facilities Management and Strategic Planning is responsible for equipment maintenance in response to work orders for the science education program. This includes safety equipment, such as eye wash stations, sinks, and fire extinguishers. The manager of facilities maintenance indicates that they strive to remedy work orders within 60 days. Issues deemed as emergencies are resolved within 24 hours.

Regulations

OSHA Lab Safety Standard [29 CFR 1910.1450]
Maryland Science Safety Manual K-12

COMMENDATIONS

<i>Communication</i>	The director of the Office of Science, Health & Physical Education and the coordinator of Secondary Science were very cooperative throughout the audit. Requested documentation and information were provided promptly.
<i>Procedures</i>	The Office of Science has developed a Chemical Hygiene Plan that details the responsibilities of various staff and students, standard operating procedures, and control measures. The plan was most recently updated on June 23, 2023.
<i>Safety Training</i>	The Office of Science provides multiple training opportunities related to mitigation of science safety risks for science teachers and science lab paraeducators.
<i>Student Contracts</i>	Science educators have a process in place to ensure that only students with a signed Student Safety Contract have hands-on participation in the labs. Students without a contract are provided other enrichment activities.
<i>Safety Monitoring</i>	During school visits ¹ , the director of science and the coordinator of secondary science check for various safety concerns in the lab and storage areas, including proper goggle usage by staff and students. Labs, classrooms, and chemical closets are also routinely checked by school staff throughout the year for safety risks. Furthermore, the Office of Science has recently implemented a mandatory bi-annual Safety Walk for school science departments. Department members tour the science areas together to identify safety concerns and to review the use of safety equipment to ensure all staff can use the equipment (e.g., eye wash stations, fire extinguishers) if an emergency occurs.

¹ In FY 2024, 37% of high schools and 31% of middle schools were monitored.

RESULTS

1. School staff failed to provide the required documentation to confirm that safety training was completed.

Criteria	<p>The science department chair is required to train science laboratory employees on the Chemical Hygiene Plan at the start of each school year. Completion of the training is documented on the Chemical Hygiene Plan Acknowledgement Form. The completed form is due to the Office of Science by September 18th.</p> <p>In addition, newly appointed science department chairs are required to complete the School Laboratory Safety Course and submit the completion certificate to the Office of Science by September 18th.</p>
Finding	<p>In FY 2024, the response rates by school personnel to document the completion of required safety trainings is low ²:</p> <ul style="list-style-type: none">a. Chemical Hygiene Plan Training - 52.7% respondedb. New Department Chair Training - 50.0% responded
Cause	<p>School staff did not provide the requested proof of training although they were given reminders. The Office of Science requested the required documentation at least five times this school year through email, Schoology, and at department chair meetings.</p>
Effect	<p>Due to the low response rate, BCPS cannot validate that science laboratory employees are properly trained to mitigate science safety risks.</p>
Recommendation	<p>The Office of Science director should collaborate with the necessary individuals who can address the failure of school staff to provide the required documentation to confirm that staff have been trained.</p>

Management's Corrective Action

Submission dates for school safety documents will be communicated to all department chairs and teachers. If the documents are not submitted on time, follow up will include:

- a. Emails or team meeting communication to department chair
- b. Email or team meeting communication to include department chair and principal

Additionally, time for safety training will be included during teacher preparation week and communication information about science safety training will be published in News Hub.

² The Office of Science director feels that the training has occurred even though the documentation has not been provided.

Responsible Person(s)

Director, Office of Science, Health, & Physical Education
Coordinators, Office of Science

Anticipated Completion Date

January 1, 2025

2. Science safety equipment work orders are not resolved timely.

Criteria

The Maryland Science Safety Manual K-12 indicates that a safe science laboratory must have properly maintained emergency laboratory equipment. This includes fire extinguishers, eyewash stations, safety showers and sinks.

Finding

For 79 safety-related work orders for science rooms created between January 1, 2023 and April 9, 2024, we determined the following:

- The number of days for work orders to be resolved ranged from 0 (same day) to more than 328.6 days, with an average of 50 days.
 - The average days for two of the most critical issues related to student safety; eye wash stations (with critical repairs needed) and sinks, exceeded the 50-day average. On average, it took 68.8 days and 52.5 days, respectively, to resolve these issues.
- As of May 22, 2024, three work orders remained unresolved:
 - One work order related to a sink had been open for 265 days.
 - One work order related to an eye washing station had been open 372 days.
 - One work order related to gas flow had been open 177 days.

Issue	# of Work Orders	Min Days to Resolve	Max Days to Resolve	Avg Days to Resolve
Chemical Disposal	8	0.0	100.7	24.8
Chemical Safety	4	0.0	12.9	3.5
Eye Wash Station	11	5.0	164.8	52.0
Eye Wash Station - Critical ³	27	1.0	328.6	68.8
Fire Extinguisher	1	2.8	2.8	2.8
Gas	3	2.0	133.6	55.2
Showers	3	0.2	43.3	15.4
Sink	20	0.8	240.0	52.5
Vent Hood	1	3.0	3.0	3.0
Water	1	14.0	14.0	14.0
Grand Total	79	0.0	328.6	49.7

³ The work orders for eye wash stations were separated between critical and non-critical repairs. Requests for eye wash station repairs do not always render the eye wash unusable, such as for the replacement of plastic hygiene caps or the repair of a minor leak. These work orders are not as urgent as the requests to repair equipment that is inoperable.

Cause	The BCPS Maintenance Section receives approximately 40,000 work orders during a year with about 1,000 work orders open at any point. There is currently no formal prioritization process for science safety equipment work orders and they are not considered to be emergency work orders.
Effect	Due to the delay in the completion of work orders, BCPS cannot ensure that science laboratory safety equipment is properly working to mitigate science safety risks.
Recommendation	The Office of Science director should work with the Department of Facilities Management and Strategic Planning to develop and implement a process to prioritize critical science safety-related work orders and to ensure that all safety- related work orders are completed timely.

Management's Corrective Action

Science Office staff will communicate with the Physical Facilities staff to discuss and design a system to address the safety concerns in school buildings. Additionally, quarterly review dates will be established to address ongoing challenges.

Responsible Person(s)

Director, Office of Science, Health, & Physical Education
Coordinators, Office of Science
Department of Facilities Management and Strategic Planning

Anticipated Completion Date

January 1, 2025

OBJECTIVE, SCOPE & METHODOLOGY

- Objective** The audit objective was to determine if the Office of Science has implemented effective controls to mitigate safety risks within the secondary science program.
- Scope** The audit period is FY 2023 – FY 2024.
- Methodology** To achieve the audit objectives, we performed the following:
- Interviewed the director of the Office of Science, Health & Physical Education and the coordinator of Secondary Science.
 - Interviewed the manager of the Maintenance Section of the Department of Facilities Management and Strategic Planning.
 - Identified the required lab safety trainings for staff and students.
 - Reviewed documentation to determine if all staff have completed the required training.
 - Determined the process used to notify employees/supervisors when training is not completed by the required deadline.
 - Determined the process to track receipt of student contracts and to ensure that only students with signed contracts participate in labs.
 - Determined the processes used to monitor safety risks in science classrooms and labs.
 - Determined the timeliness of completion for the science safety equipment related work orders.