

AdvancED[®] STEM Certification Review Report

Review Date: November 19-20, 2014



Logan High School
Logan-Hocking Local Schools
14470 SR 328
Logan, OH 43138

Mr. Jim Robinson – Principal



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Introduction

The purpose of establishing the AdvancED STEM Certification is to provide schools and programs within schools with a research-based framework and criteria for their awareness, continuous improvement, and assessment of the quality, rigor, and substance of the STEM educational program. AdvancED STEM Certification is a mark of STEM distinction and excellence for those institutions and programs that are granted the certification.

The STEM certification process is similar to the AdvancED External Review process, yet different in that the STEM certification process primarily focuses on the school or program's STEM education model. In addition to the completion of the STEM specific diagnostics, the STEM Certification Reviewer reviews evidence, conducts observations, interviews stakeholders and participates in the External Review Team's deliberations during the on-site phase of the process. The STEM Certification Reviewer rates the 11 STEM Indicators after considering all of data gathered during the review. The total average rating for all Indicators combined must be a minimum of 2.8 and no Indicator has a rating of "1." Additionally, the school or program must receive an Index of Education Quality™ (IEQ™) score that falls within the range of schools that earn accreditation status. A school cannot be STEM certified unless it is accredited.

The AdvancED STEM Certification is carried out by highly qualified reviewers who examine the school or program's adherence and commitment to the research aligned AdvancED STEM Standard and Indicators. The STEM Certification Reviewers use the AdvancED STEM Standard and Indicators and related criteria to guide the analysis, looking not only for adherence to the standard, but also for how STEM education is provided to the school's students and embodies the practices and characteristics of a quality, relevant, and age-appropriate STEM education.

STEM Certification Results

As a result of the STEM Certification Review conducted from November 19 – 20, 2014, Logan High School has earned the distinction of the AdvancED STEM Certification. The 11 Indicators were averaged to obtain the overall STEM Certification score: 3.18. This certification is valid for a five-year period if the school renews its application each year. At the end of the five year period, the school can reapply for a new STEM Certification.

STEM Standard and Indicators Ratings

Standard 6 STEM Standard

STEM students have the skills, knowledge, and thinking strategies that prepare them to be innovative, creative, and systematic problem-solvers in STEM fields of study and work.

Indicator	Description	School STEM Self Assessment Score	STEM Certification Score
6.1	The STEM school/program supports non-traditional student participation through outreach to groups often underrepresented in the STEM pipeline.	3	3
6.2	The interdisciplinary problem-based curriculum focuses on deeper learning with real world applications.	4	3
6.3	STEM educators collaborate as an interdisciplinary team to plan, implement, and improve integrated STEM learning experiences.	3	3
6.4	Students work independently and collaboratively in an inquiry-based learning environment that encourages finding creative solutions to authentic and complex problems.	4	4
6.5	Students personalize and self-direct their STEM learning experiences supported by STEM educators who facilitate their learning.	4	3
6.6	Students use technology resources to conduct research, demonstrate creative and critical thinking, and communicate and work collaboratively.	3	3
6.7	Students demonstrate their learning through performance-based assessments and express their conclusions through elaborated explanations of their thinking.	4	4
6.8	Community, post-secondary, business/industry partners and/or families actively support and are engaged with teachers and students in the STEM program.	3	3
6.9	Students are supported in their STEM learning through adult-world connections and extended day opportunities.	3	3
6.10	STEM learning outcomes demonstrate students' STEM literacy necessary for the next level of STEM learning and for post- secondary and workforce readiness.	3	3
6.11	STEM teachers and leaders participate in a continuous program of STEM-specific professional learning.	4	3



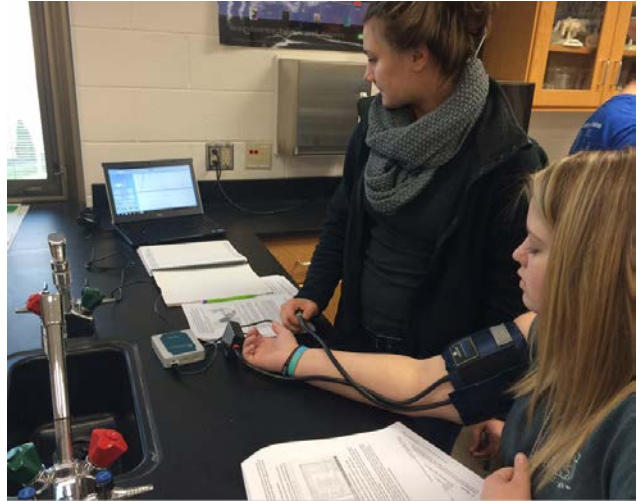
Powerful Practices

Statement

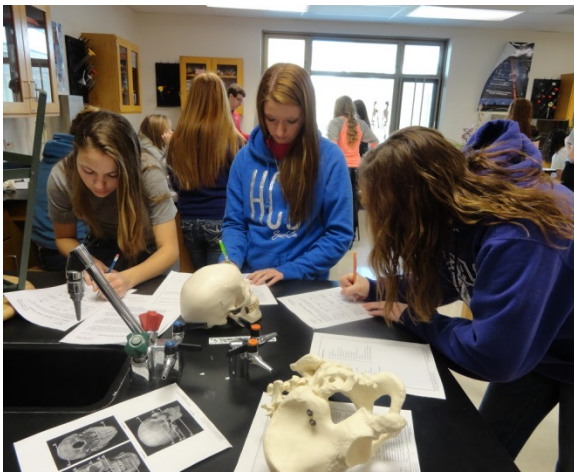
Students have numerous opportunities in both the Biomedical and Engineering programs to work independently and collaboratively in an inquiry-based learning environment that encourages finding creative solutions to authentic and complex problems. (6.4)

Description of Findings

Introductory Biomedical Science courses allow students to participate in activities and projects introducing them to human physiology, medicine, and research processes while also allowing students to design their own studies and experiments to solve problems. More advanced Biomedical Science classes allow students to explore science in action, take on the role of biomedical professionals, and investigate real-world medical problems. In classroom observations, students were observed studying the effects of outside stimuli on the body's blood pressure. Students worked collaboratively using modern data acquisition software to monitor body functions, including respiration and blood pressure, in a variety of settings.



Engineering students develop skills in problem solving, research and design, collaboration, and project presentation. Students have access to modern equipment and computer software throughout their coursework, allowing for both independent and collaborative inquiry-based learning. During one classroom observation, students were using math, science, and standard engineering practices in the final stages of a 3D design project.



Statement

Logan High Students demonstrate their learning through performance-based assessments and express their conclusions through elaborated explanations of their thinking. (6.7)

Description of Findings

Students in the STEM program were afforded multiple opportunities to demonstrate their learning through performance-based assessments. Classroom observations and a review of artifacts revealed a clear expectation of the STEM program was providing students with opportunities to clarify, demonstrate, and defend their learning, thinking, and conclusions through multiple means. In addition to performance-based classroom assessments, students are expected to participate in the Biomedical and Engineering showcase of student work at the state Project Lead the Way Conference.

Opportunity for Improvement

Statement

Develop and implement a systematic outreach plan that establishes goals and activities to increase enrollment and retain underrepresented groups of students. The plan should include activities to introduce the tenants of STEM education to students at an earlier age to promote interest in the program. (6.1)

Description of Findings

All Logan High School students have been exposed to and given the opportunity to participate in the STEM program, as well as classes that provide integrated STEM activities. Some efforts have been made to promote the STEM education program to feeder elementary and middle school students, including the use of a video recruitment tool to encourage female participation in the Engineering STEM program. The school has established significant business and higher education partnerships to promote the STEM program. STEM activities and competitions have also increased community awareness of school's STEM emphasis. However, interviews with staff and parents did not reveal the existence of a systematic outreach plan to recruit and retain underrepresent groups of students and generate STEM interest in younger students.

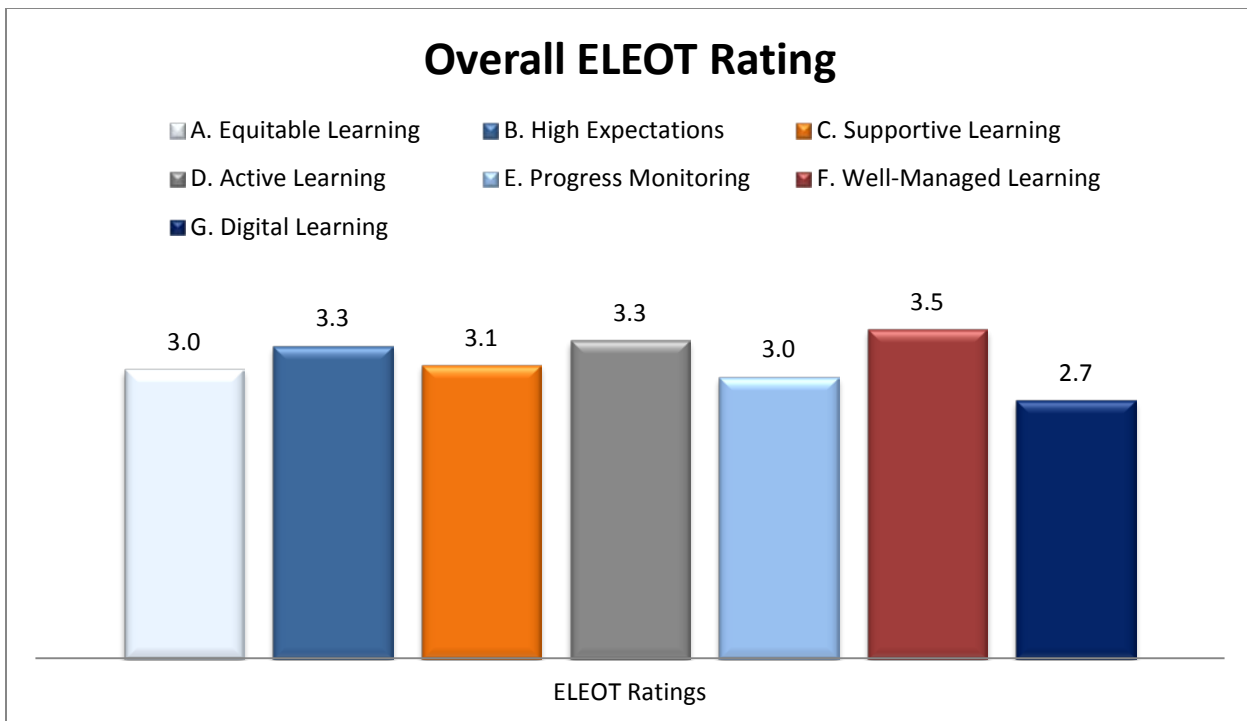
The development of such a plan will provide an intentional and proactive system to recruit and retain new students to the STEM program, thereby giving a broader range of students the opportunity to attend the school and participate in the STEM opportunities.

Effective Learning Environments Observation Tool™ (eleot™) Results

Every learner should have access to an effective learning environment in which she/he has multiple opportunities to be successful. The eleot measures the extent to which learners are in an environment that is equitable, supportive, and well-managed. An environment where high expectations are the norm and active learning takes place. It measures whether learners' progress is monitored and feedback is provided and the extent to which technology is leveraged for learning.

Observations of classrooms or other learning venues are conducted for a minimum of 20 minutes per observation. The STEM Certification Reviewer is required to be trained and pass a certification assessment to be qualified to use eleot for observations. During the review, the STEM Reviewers conducted eleot observations in eight classrooms.

The following graph provides the aggregate average score for each of the seven learning environments included in eleot across the eight observations.



Classrooms observed in the STEM program and related AP courses received very high ratings on each environment’s specific items. All overall environment ratings were above the AdvancED Network Averages (AEN). Two items in the High Expectations Learning Environment scored well above the AEN. Item B1 in which the student “knows and strives to meet the high expectations established by the teacher,” was found to be evident/very evident in 100% of classroom observed. Likewise, item B2 in which students are “tasked with activities and learning that are challenging but attainable,” was observed as evident/very evident in 98% of classrooms attesting to the consistent level of high expectations throughout the STEM program and Logan High School.

The Active Learning Environment and Well-Managed Learning Environment also scored well above the AEN with scores of 3.3 and 3.5, respectively. In these environments, students were actively engaged by making connections from content to real-life experiences with ample opportunities to engage in discussions with teacher and other students. There was a clear connection between the high level of expectations observed in the STEM program and the scores of the Well-Managed and Active Learning Environments.

The Digital Learning Environment received the lowest score on the eleot™ observations with a score of 2.7. Although this environment was the lowest for Logan High School, it was still significantly above the AEN average of 1.88. The Digital Learning Environment in one in which students use digital tools/technology to:

- gather, evaluate, and/or use information for learning
- conduct research, solve problems, and/or create original works for learning
- communicate and work collaboratively for learning

Although these items were observed at higher levels in the STEM classrooms, students were not engaged at the same high levels in the STEM related and core academic classrooms.

STEM Stakeholder Interviews

Stakeholder	Number Interviewed
Administrators	3
STEM Teachers	3
Students	9
Parents	6

Summary of STEM Certification Process

The STEM Certification Reviewer met virtually on October 13, 2014 and again on November 14, 2014 with the school’s principal to begin a preliminary examination of Logan High School’s STEM Self Assessment, discuss the schedule for the interview sessions, and gain a greater understanding of the overall STEM educational program. During this session, the STEM Certification Reviewer and the coordinator also discussed specific classrooms and programs that would be observed during the review.

In a separate virtual meeting, the STEM Certification Reviewer and the External Review Lead Evaluator shared information and discussed External Review Team schedules, eleot™ observation schedules, and general expectations for the review.

The STEM Certification Reviewer provided the External Review Team with an overview of the process, schedule, and evidence relative to the STEM Standard and Indicators. During this first on-site meeting, the External Review Team also shared evidence on Wednesday, November 19, 2014 and engaged in dialogue about the school and its educational program. The STEM Certification Reviewer and External Review Team members met each evening to provide updates on their respective findings and observations so that all evidence and observations, where appropriate, were used to determine the ratings for the STEM Indicators and ultimately the final outcome for the STEM Certification. The STEM staff of Logan High School did an excellent job in preparing for the review.

The STEM portion of the Accreditation Report was completed with a reflective and self-evaluative perspective with supporting evidence/artifacts. Interviews with administrative staff, teachers, parents, and students consistently revealed administrative support of the STEM program. Strong community support was a common thread among all stakeholders and a commitment to student learning and success. The STEM Indicators were rated on the last evening by the STEM Certification Reviewer, but with a comprehensive and specific understanding of the school and its STEM educational program.

The STEM Reviewer conducted interviews with 21 stakeholders, observed in eight classrooms, and reviewed artifacts and documents to determine the school’s level of performance for each STEM Indicator. The complete schedule of the STEM Certification Review is included as an addendum to this report.



Logan High School students are provided two opportunities to participate in the school's STEM program through the implementation of the Project Lead the Way (PLTW) Engineering and Biomedical Science programs. Logan High School currently holds a National Certification status through PLTW for its implementation of both programs. Additionally, the Lead Teacher for Logan High School's Biomedical Science program was recently recognized a National Teacher of Excellence by Project Lead the Way.

Through the use of local funding and the allocation of grant funding, Logan High school is providing a state of the art facility for its STEM program by providing equipment such as laser cutter, CNC machines, and plasma-cutting table. The school also offers activities that immerse the students in robotics and video production to enhance their educational experience.

The Biomedical Science program allows students to investigate the roles of biomedical professionals as they study the concepts of human medicine, genetics, microbiology, and public health. Students work independently and collaboratively in an inquiry-based learning environment that encourages finding creative solutions to authentic and complex problems. They are actively engaged in real-world investigations as part of the rigorous course work in the Biomedical Science program.

The Engineering program offered by Logan High School uses an open-ended problem solving process designed to assist students as they learn and apply the engineering design process. Students use industry-leading technology and software to investigate topics such as aerodynamics and astronautics, biological engineering and sustainability, and digital electronics and circuit design all of which provide students with numerous opportunities to explore different engineering disciplines and demonstrate their learning through performance-based assessments.

Logan High School currently offers eight Advanced Placement (AP) courses including Chemistry, Calculus, English Literature, English Language, Physics, Biology, Government, and Art. STEM program teachers work collaboratively with AP course instructors to coordinate course work between the STEM classes and each student's core academic classes.

Logan High School has taken a broad approach to strengthen STEM education for all students. Some teachers are working to incorporate STEM-related instructional practices into lessons and units. However, continuing to improve upon the integration of inquiry-based and project-based learning experiences across the curriculum will increase student engagement and involve students in higher levels of learning. Additionally, the introduction of the tenants of STEM education at an earlier age and in a more concentrated effort will further enhance the success of the STEM program at Logan High School.

Final Thoughts

The AdvancED STEM Reviewer thoroughly enjoyed the experiences at Logan High School; the STEM staff, students, and parents were positive, pleasant, accommodating, and inspiring. The STEM Reviewer sincerely appreciates the school's willingness to participate during this pilot phase of the certification and permitting AdvancED to learn from Logan High School's STEM educators, program, and students. It will be advantageous to AdvancED's STEM program to remain connected to this excellent team of educators, engage in professional dialogues, and share resources and research about this rapidly changing and evolving STEM educational model.

About AdvancED

AdvancED is the world leader in providing improvement and accreditation services to education providers of all types in their pursuit of excellence in serving students. Our mission is to lead and empower the education community to ensure that all learners realize their full potential.

We have been experts in accreditation and school improvement since 1895 and bring this 100+ years of experience and expertise through three US-based regional accreditation agencies — the North Central Association Commission on Accreditation and School Improvement (NCA CASI), the Northwest Accreditation Commission (NWAC) and the Southern Association of Colleges and Schools Council on Accreditation and School Improvement (SACS CASI). AdvancED serves as a trusted partner to more than 32,000 schools and school systems—enrolling more than 20 million students—across the United States and 70 countries.

AdvancED's Performance Accreditation, a protocol embraced around the world, is a clear and comprehensive program of evaluation and external review, supported by research-based Standards and dedicated to helping schools, systems and education providers continuously improve.

AdvancED's position as a leader in education continues to expand as we provide a national and international voice to inform and influence policy and practice on issues related to education quality.

Addenda

eleot™ - STEM Certification Worksheet

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Please use this worksheet to input the item ratings for each observation conducted during the STEM Review. Pre-set formulas automatically will calculate the mean score for each environment. These scores automatically will be labeled and displayed at the top of the spreadsheet.



	A. Equitable Learning 3.0					B. High Expectations 3.3					C. Supportive Learning 3.1					D. Active Learning 3.3			E. Progress Monitoring 3.0					F. Well-Managed Learning 3.5					G. Digital Learning 2.7			
	2.9	3.6	3.8	1.8	3.4	3.5	3.9	2.6	3.6	3.0	3.5	3.4	3.1	3.1	2.3	3.4	3.3	3.4	2.9	2.9	3.0	2.8	3.3	3.8	3.5	3.0	3.3	3.8	2.8	2.6	2.6	
	A.1	A.2	A.3	A.4	B.1	B.2	B.3	B.4	B.5	C.1	C.2	C.3	C.4	C.5	D.1	D.2	D.3	E.1	E.2	E.3	E.4	E.5	F.1	F.2	F.3	F.4	F.5	G.1	G.2	G.3		
Class room #1	2	3	3	1	3	2	3	2	2	3	3	3	3	3	2	2	4	3	3	2	3	2	2	4	3	2	3	3	2	2	2	1
Class room #2	3	4	4	2	3	4	2	4	3	3	4	3	4	2	4	3	4	3	4	3	3	4	4	4	4	4	3	4	3	2	2	2
Class room #3	2	4	4	2	4	4	3	4	3	4	4	4	3	2	3	3	3	3	2	2	3	3	2	4	4	2	2	4	2	3	3	3
Class room #4	3	4	4	2	4	4	3	3	3	4	4	4	4	2	4	4	4	3	3	4	3	4	4	4	4	4	4	4	4	4	4	4
Class room #5	2	3	3	1	3	4	3	4	4	2	2	2	2	3	3	2	2	2	3	3	2	2	2	3	3	2	2	3	2	2	2	2
Class room #6	4	4	4	2	4	3	3	4	3	4	3	3	3	2	4	4	4	3	3	3	3	3	4	4	3	4	4	4	4	3	4	4
Class room #7	4	3	4	2	3	4	3	4	3	4	4	3	3	2	4	3	3	3	3	3	3	3	4	4	3	3	4	4	3	3	3	3
Class room #8	3	4	4	2	3	3	3	4	3	4	3	4	3	2	4	3	4	3	3	3	3	3	4	3	4	3	4	4	2	2	2	2

A. Equitable Learning Environment

Indicators	Average	Description	Not Observed	Partially Observed	Evident	Very Evident
A.1	2.9	Has differentiated learning opportunities and activities that meet her/his needs	0%	38%	38%	25%
A.2	3.6	Has equal access to classroom discussions, activities, resources, technology, and support	0%	0%	38%	63%
A.3	3.8	Knows that rules and consequences are fair, clear, and consistently applied	0%	0%	25%	75%
A.4	1.8	Has ongoing opportunities to learn about their own and other's backgrounds/cultures/differences	25%	75%	0%	0%

Overall rating on a 4 point scale:

3.0

B. High Expectations

Indicators	Average	Description	Not Observed	Partially Observed	Evident	Very Evident
B.1	3.4	Knows and strives to meet the high expectations established by the teacher	0%	0%	63%	38%
B.2	3.5	Is tasked with activities and learning that are challenging but attainable	0%	13%	25%	63%
B.3	2.9	Is provided exemplars of high quality work	0%	13%	88%	0%
B.4	3.6	Is engaged in rigorous coursework, discussions, and/or tasks	0%	13%	13%	75%
B.5	3.0	Is asked and responds to questions that require higher order thinking (e.g., applying, evaluating, synthesizing)	0%	13%	75%	13%

Overall rating on a 4 point scale:

3.3

C. Supporting Learning						
Indicators	Average	Description	Not Observed	Partially Observed	Evident	Very Evident
C.1	3.5	Demonstrates or expresses that learning experiences are positive	0%	13%	25%	63%
C.2	3.4	Demonstrates positive attitude about the classroom and learning	0%	13%	38%	50%
C.3	3.1	Takes risks in learning (without fear of negative feedback)	0%	13%	63%	25%
C.4	3.1	Is provided support and assistance to understand content and accomplish tasks	0%	13%	63%	25%
C.5	2.3	Is provided additional/alternative instruction and feedback at the appropriate level of challenge for her/his needs	0%	75%	25%	0%
Overall rating on a 4 point scale:		3.1				

D. Active Learning						
Indicators	Average	Description	Not Observed	Partially Observed	Evident	Very Evident
D.1	3.4	Has several opportunities to engage in discussions with teacher and other students	0%	25%	13%	63%
D.2	3.3	Makes connections from content to real-life experiences	0%	13%	50%	38%
D.3	3.4	Is actively engaged in the learning activities	0%	13%	38%	50%
Overall rating on a 4 point scale:		3.3				

E. Progress Monitoring

Indicators	Average	Description	Not Observed	Partially Observed	Evident	Very Evident
E.1	2.9	Is asked and/or quizzed about individual progress/learning	0%	13%	88%	0%
E.2	2.9	Responds to teacher feedback to improve understanding	0%	25%	63%	13%
E.3	3.0	Demonstrates or verbalizes understanding of the lesson/content	0%	13%	75%	13%
E.4	2.8	Understands how her/his work is assessed	0%	25%	75%	0%
E.5	3.3	Has opportunities to revise/improve work based on feedback	0%	38%	0%	63%

Overall rating on a 4 point scale:

3.0

F. Well-Managed Learning						
Indicators	Average	Description	Not Observed	Partially Observed	Evident	Very Evident
F.1	3.8	Speaks and interacts respectfully with teacher(s) and peers	0%	0%	25%	75%
F.2	3.5	Follows classroom rules and works well with others	0%	0%	50%	50%
F.3	3.0	Transitions smoothly and efficiently to activities	0%	38%	25%	38%
F.4	3.3	Collaborates with other students during student-centered activities	0%	25%	25%	50%
F.5	3.8	Knows classroom routines, behavioral expectations and consequences	0%	0%	25%	75%
Overall rating on a 4 point scale:		3.5				

G. Digital Learning						
Indicators	Average	Description	Not Observed	Partially Observed	Evident	Very Evident
G.1	2.8	Uses digital tools/technology to gather, evaluate, and/or use information for learning	0%	50%	25%	25%
G.2	2.6	Uses digital tools/technology to conduct research, solve problems, and/or create original works for learning	0%	50%	38%	13%
G.3	2.6	Uses digital tools/technology to communicate and work collaboratively for learning	13%	38%	25%	25%
Overall rating on a 4 point scale:		2.7				

Logan HS Schedule

November 19, 2014, Wednesday Day 1

November 18, 2014, Tuesday

5:00 pm – 9:00pm

External Review Team Arrives

Team Work Session and Dinner

Baymont Inn & Suites

November 19, 2014, Wednesday Day 1

Time	Event	Who
6:45 a.m.	Arrival at School	External Review Team
7:00 – 7:45 a.m.	Principal's Overview and Facility Tour	External Review Team Principal / Leadership or School Improvement Team
8:00 – 11:45 a.m.	Effective Learning Environment Observations (20 minutes per classroom – use the eleot (Effective Learning Environment Observation Tool. You may also speak briefly with students, teachers and other staff members.)	External Review Team
11:45– 12:15 p.m.	Lunch/Working	External Review Team
12:15 -12:45	Effective Learning Environment Observations	External Review Team External
12:45 – 1:15 p.m.	Stakeholders Interviews: Parent Meeting Stakeholders	Review Team A External Review
1:45 -2:15 p.m.	Interviews: Student Meeting Effective Learning	Team B External Review Team
12:45 – 2:15pm	Environment Observations (Use this time when your not in an A or B interview. 20 minutes per classroom – use the eleot (Effective Learning Environment Observation Tool. You may also speak briefly with students, teachers and other staff members.)	
2:15 – 2:45 p.m.	Team Debriefing and artifact review	External Review Team
2:45 – 3:30 p.m. (after the end of the instructional day)	Stakeholder Interviews (Teachers)	Stakeholder Interviews (Support Staff if available)
3:30 p.m.	Return to Hotel Work Room	External Review Team
4:00 – 9:00 p.m.	Team Work Session / Dinner	External Review Team

November 20, 2014, Thursday, Day 2

Time	Event	Who
7:00 a.m.	Breakfast, Check out of hotel and Departure for school	External Review Team
7:45 a.m.	Arrival at school	External Review Team
8:00 a.m.– 10:00 a.m.	Additional eleot observations; Follow-up interviews to verify Standards, Stakeholder Feedback, and Student Performance; artifact review	External Review Team Principal / Leadership Team or School Improvement Team
10:00 a.m.– 11:30 a.m.	Team Work Session #3	External Review Team
11:30 – Noon	Lunch/Working	External Review Team
Noon – 1:00 p.m.	Final Team Work Session Finalize ratings, discussions, deliberations, completion of Exit Report	External Review Team
1:00 – 1:30 p.m.	Final Team Meeting	External Review Team Lead Evaluator Principal
1:30 – 2:00 p.m.	Final meeting with Principal	External Review Team
2:30 – 3:00 p.m. (after the end of the instructional day)	Exit Report given by External Review Lead Evaluator	External Review Team School Stakeholders
3:00 p.m.	Conclusion of External Review	

*** All times are suggested, actual times will depend upon the school's instructional day. Final schedule will be determined by Lead Evaluator and Principal*

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