ONE YEAR STEM PLAN

Program Year:

July 1, 2018 – June 2019

DEPARTMENT of CURRICULUM & INSTRUCTION

Mission Statement

Executive Summary

The One Year STEM Plan outlines the activities which will be undertaken during the program year beginning July 1, 2018 and ending June 30, 2019 using district funds granted for use during the 2018-2019 school year. Programs and activities in this plan are intended to provide support and direction to schools in alignment to the Orange Public School district's vision, the Office of Mathematics and Science philosophy for STEM education, and the district-wide goals for SY2018-2019.

Objective: Provide a fully integrated STEM education model where engineering design, mathematical analysis and scientific investigations will be leveraged to expose the natural connections between STEM subjects to inspire creativity, innovation and encouragement to adopt STEM-related careers.

GOAL I: CURRICULUM

Provide all students with equitable access to rigorous curriculum with aligned instructional materials and assessments in all grade levels.
Provide opportunities reflective of research and best practices for K-12 students to engage with phenomena through implementation of innovative curriculum programming that fosters learning, deep understanding, and application of core science content, conceptual understandings, science and engineering practices and cross cutting concepts.

GOAL 2: EXTENDED LEARNING EXPERIENCES

Facilitate the implementation of STEM-focused instructional models; extended and structured learning experiences that promote the necessary 21st skills to effectively engage all learners, support their unique needs and adequately prepare students for college and careers (e.g. critical thinking, problem solving, collaboration, oral, written and multimedia communication, etc.)

GOAL 3: ASSESSMENT

Support and advance the development and use of assessments (diagnostic, formative, summative, authentic) that measure student achievement based on the Next Generation Science and Engineering Practices, Technological Literacy, Mathematics, National Health Science and English Language Arts Standards and use the data resulting from these assessments to enhance teaching and learning.

GOAL 4: PROFESSIONAL DEVELOPMENT

Initiate, build, and sustain collaborations and partnerships to provide specific and focused professional development to support the teaching and learning of core science content, conceptual understandings, inculcate science and engineering habits of mind and cross cutting concepts for grades K-12.

GOAL 5: ESTABLISH A STEM ADVISORY BOARD AND IDENTIFY INDUSTRY PARTNERS

Build the capacity to enhance engineering and computer sciences education and career readiness by establishing STEM stakeholder partnerships and alliances between school districts, institutions of higher education, STEM education professional organizations, business and industry, informal education organizations, government agencies, and the larger learning communities: local, regional, state, national, and international arenas.

GOAL I: CURRICULUM

Provide all students with equitable access to rigorous curriculum with aligned instructional materials and assessments in all grade levels.
Provide opportunities reflective of research and best practices for K-12 students to engage with phenomena through implementation of innovative curriculum programming that fosters learning, deep understanding, and application of core science content, conceptual understandings, science and engineering practices and cross cutting concepts.

Actions	AFG Standard	Person(s) Responsible	Timelines for Implementation/ Completion	Resources Needed	Evaluation/ Evidence/Indicators of Attainment
Objective 1: Adopt rigorous and relevant curriculum and plan for implementation.					
1. Plan for implementation of approved and anticipated PLTW programs for: STEM Academy: Computer Science, Introduction to Engineering, Principles of Engineering, Computer Integrated Manufacturing, Digital Electronics, Principles of Biomedical Science and Human Body. Orange High School: Introduction to Engineering, Principles of Engineering and Digital Electronics Rosa Parks Community School: Grade 4 Launch: Collisions, Conversions, Computer Systems and Human Brain Grade 5 Launch: Robotics and Automation, Infection Detection. Park Avenue: Gateway Design and Modeling and App Creators. Heywood Avenue: Gateway Green Architecture and App Creators.		Director STEM Supervisor Science Teachers Administrators	Summer 2018	Funding, curriculum materials and resources, training, scheduling, time	Purchase Orders Presentations School visits
2. Continue to update curricula and equipment for SMART Labs at OPA, OHS, Scholars and STEM		Director STEM Supervisor Administrators	SY2018-2019	Budget Scheduling	Requisitions Invoices Purchase Orders

3. Develop student interest in SMART Labs/PLTW Engineering programs by highlighting student project presentations and career fairs at least twice per year.		Director STEM Supervisor Administrators Teachers	SY2018-2019	Scheduling	Presentations Career Fairs
4. Apply for funding opportunities that support the PLTW program, start new PLTW programs and expand our existing programs.		Director STEM Supervisor Administrators Science Teachers	SY2018-2019	Scheduling Time	Subscription to email resources. Fall application
5. Liaise with schools to determine new STEM-related course offerings: FIRST Lego League Jr., AP Computer Science, Launch 3, Gateway To Technology, Learn To Code and Maker Ed		Director STEM Supervisor Administrators	SY2018-2019	Budget Scheduling	Requisitions Invoices Purchase Orders
6. Engage teachers and involve teacher leaders in developing paced unit plans aligned to the PLTW program objectives, delineating essential questions, student misconceptions, standards and assessments for daily instruction.		Director STEM Supervisor Administrators Teachers	SY2018-2019	Scheduling Time	Completed unit plans
7. Identify self-monitoring protocol for STEM/Engineering students.		Director STEM Supervisor Administrators Teachers	SY2018-2019	Scheduling Time	Student trackers
8. Support the development of the Gifted Program at the STEM Academy.		Director STEM Supervisor Administrators Teachers	SY2018-2019	Scheduling Time	Meetings Requisitions Invoices Purchase Orders
9. Extend Project Lead The Way (PLTW) programs Gateway to Technology, and Launch to additional K-7 schools.		Administrators STEM Supervisor Science Teachers	SY2018-2019	Budget	PLTW Registration

Objective 2: Infuse 21st Century skills through projects aligned to curricula.					
1. Develop and implement at least one (1) engineering design PBL per content area for grades K-12 that allows students to develop a solution to a real-world problem and incorporating interdisciplinary connections.		Director Administrators STEM Supervisor Science Faculty	SY2018-2019	Materials and resources, scheduling, time; BIE Planning template	CPT Professional Development PBL documents uploaded to Google Drive
2. Establish an online platform to archive PBL documents.		STEM Supervisor Science Faculty	SY2018-2019	Materials and resources; scheduling; time; PBL reflection template	Dropbox Google Drive
3. Infuse the integration of cross-cutting concepts in all learning and teaching practices through professional development and coaching, to help students understand core ideas and practices in science and engineering.		Director Administrators STEM Supervisor Including Science Teachers	SY2018-2019	Scheduling Time PD	Professional Development Lesson Plans Projects
4. Design, identify and implement STEM challenges aligned to units/topics of study that encourage the development of problem-solving skills, critical thinking and creative and innovative reasoning.		Administrators STEM Supervisor Teachers	SY2018-2019	Budget Time Scheduling	Team/Student participation
5. Implement activity and problem-based (APB) instructional design centers on hands-on, real-world activities, projects, and problems.		STEM Supervisor Administrators Teachers	SY2018-2019	Budget Time Scheduling	Structured activities and projects
6. Blend the technology of our SMARTLab programs into science classes and after school activities.		STEM Supervisor Administrators Teachers	SY2018-2019	Budget Time Scheduling PD	Structured activities and projects
7. Incorporate an Infosys Foundation USA project into elementary schools.		STEM Supervisor Administrators Teachers	SY2018-2019	Budget Time Scheduling PD	Structured activities and projects

Objective 3: Support strategic intervention for targeted groups of students.					
1. Enlist parents in supporting the goals/outcomes for the strategic intervention.		Director Administrators Community Engagement personnel Counselors Supervisor Teachers	SY2018-2019	Funding materials time	Pacing Calendar, Lesson Plans, Unit Plans, Purchase Orders
2. Enlist teacher leaders to engage in data analysis through triangulation.		Administrators Supervisor Teachers	SY2018-2019	Curriculum materials and resources, training, scheduling, time	Pacing Calendar, Lesson Plans, Unit Plans
3. Provide support for teachers/administration in facilitating intervention strategies.		Director Administrators Supervisor Teachers	SY2018-2019	Curriculum materials and resources, training, scheduling, time	Pacing Calendar, Lesson Plans, Unit Plans
4. Support teacher facilitators in chunking/sequencing content materials.		Administrators Supervisor Teachers	SY2018-2019	Curriculum materials and resources, training, scheduling, time	Pacing Calendar, Lesson Plans, Unit Plans
5. Develop a template with teacher leaders to monitor the implementation of strategic intervention plan.		Administrators Supervisor Teachers	SY2018-2019	Materials and resources, scheduling, time	Template

Objective 4: Plan for PLTW engineering/biomedical sciences tracks, training and acquisition of curricula material.					
1. Plan sequence for all PLTW courses at the STEM Academy. a. Biomedical Science: Principles of Biomedical Science; Human Body Systems; Medical Interventions b. Engineering: Introduction to Engineering; Computer Integrated Manufacturing; Principles of Engineering.		Director STEM Supervisor Administrators	SY2018-2019	Budget Scheduling	Course selection guide (including pre-requisites)
2. Plan sequence for all PLTW courses at Orange High School. a. Engineering: Introduction to Engineering; Principles of Engineering; Digital Electronics.		Director STEM Supervisor Administrators	SY2018-2019	Budget Scheduling	Course selection guide
3. Determine training locations for new adoptions that are cost-effective for schools.		Administrators Supervisor Teachers	SY2018-2019	Funding, training, scheduling, time	Correspondence Costs Board approvals Stipends Travel
4. Support teachers registration for course training		Supervisor Teachers	SY2018-2019	Funding, curriculum materials and resources, training, scheduling, time	Correspondence Costs Board approvals Stipends
5. Provide invoices to schools to support administration in obtaining Board approvals, and uploading purchase orders.		Administrators Supervisor Teachers	SY2018-2019	Funding scheduling, time	Invoices Correspondence Board approvals
6. Secure PLTW program materials for the program of studies at all schools and provide invoices for curricula material to upload to the SMART system.		Administrators Supervisor	SY2018-2019	Funding, scheduling, time	Requisitions Purchase orders

GOAL 2: EXTENDED LEARNING EXPERIENCES

Facilitate the implementation of STEM-focused instructional models; extended and structured learning experiences that promote the necessary 21st skills to effectively engage all learners, support their unique needs and adequately prepare students for college and careers (e.g. critical thinking, problem solving, collaboration, oral, written and multimedia communication, etc.)

Actions	AFG Standard	Person(s) Responsible	Timelines for Implementation/ Completion	Resources Needed	Evaluation/ Evidence/Indicators of Attainment
Objective 1: Expand, develop and support innovative opportunities for students to engage in science instruction in an extended day setting through STEM Fair Challenges, STEM nights, Robotics Clubs, and Summer Partnerships					
1. Update the summer opportunities handbook, and disseminate to all principals, counselors, teachers and upload to district website by October 2018 a. Issue phone blasts from October-March to solicit parent interest in summer programs. b. Support counselors in hosting information sessions and displaying posters to advertise programs. c. Support schools at back-to-school nights to highlight programs. d. Communicate the district policy on 10% parent contribution to the full cost of the program. e. Submit field-trip approvals and obtain Board approvals. f. Communicate busing information to students and school administration.		STEM Supervisor	SY2018-2019	Funding, Transportation	Phone blasts Information sessions Approvals Applications Responses
2. Continue and improve school readiness in robotics through FIRST Lego League (FLL) and FIRST Robotics Competition (FRC)		Administrators STEM Supervisor Robotics coaches	SY2018-2019	Budget Scheduling Time	Competitions Robotics Plan

3. Continue school and student participation in a variety of structured STEM experiences through Summer Partnerships with NJIT. • Women in Engineering & Technology (FEMME) • Introduction to Chemical Industry in Engineering (IChIME) • Explore Careers in Technology and Engineering (ExCITE) • Chemical Engineering (CHEM-ENG) • Fundamentals of Physical Sciences (FPS) • Fundamentals of Physical Sciences (FPS) – UNITE • Environmental Science and Engineering (ESEP) • Pre-Engineering Program (PrEP) • Aeronautical Engineering Program (AEP) • ExxonMobil Bernard Harris Summer Science Camp		Administrators STEM Supervisor Science Teachers NJIT Pre-College Programs	SY2018-2019	Budget Scheduling Time	Summer participation Registrations Acceptance Letters
4. Offer the Real World Connections Cyber Security Camp to students in grades 8 – 12 .		Director STEM Supervisor NJIT Office of Computing Science	SY2018-2019	Funding, Transportation	Schedules Logs Student portfolios
5. Continue school and student participation in a variety of structured STEM experiences through Summer Partnerships with Montclair State University: • Young Science Explorers and Eco-Explorers program to students who are interested in engaging in the use of engineering design process to solve real environmental problems in the Orange community.		Administrators STEM Supervisor MSU		Funding	Schedules Logs Registrations Acceptance Letters
6. Offer two 9 – 12 week cohorts of the Real World Connections (RWC) program to students in grades 7 – 12.		Director STEM Supervisor NJIT Office of Computing Science	SY2018-2019	Funding, Transportation	Schedules Logs Student portfolios

7. Expose students to scientific research/mentoring opportunities through: • Department of Defence, Science and Engineering Apprentice Program (SEAP) • Lockheed Martin K-12 Mentoring Program • The United States Army's Gains in the Education of Mathematics and Science (GEMS) • The Public Health Research Institute (PHRI) Summer Research for High School students • Uninitiates Introduction to Engineering (UNITE) Program		STEM Supervisor Administrators	SY2018-2019	Funding, Transportation	Applications Responses
8. Develop and integrate the district Greenhouses at Orange High School and Forest Street as viable economic entities, and grow-spaces at the STEM Innovation Academy of the Oranges as sustainable learning laboratories. • Facilitate the establishment of a Green Cafeteria at STEM Innovation Academy of the Oranges and Orange High School.		STEM Supervisor Teachers Administrators Food Corps/ Green Team	SY2018-2019	Budget Time	Invoices Purchasing agreements
9. Implement STEM challenges to increase student interest in STEM. • Technology Student Association (TSA) Challenge for Scholars at STEM, and at least two additional schools. • eCYBERMISSION- a web-based science, math and technology competition for grades 6-8 aimed at solving a real problem in the local community.		Administrators STEM Supervisor Teachers	SY2018-2019	Budget Time Scheduling	Team/Student participation
10. Continue to facilitate the focus of the STEM Advisory Board, working with industry, community partners, and Board members to enhance mentor/job opportunities and increase the number of graduates pursuing STEM careers.		Director Administrators STEM Supervisor Teachers	SY2018-2019	Budget Time Scheduling	Letters of Interest Meeting schedule and minutes
11. Create a maker-space at Cleveland and through a buy-in process that encourages the development of problem-solving skills, critical thinking and creative and innovative reasoning.		Director Administrators STEM Supervisor Teachers	SY2018-2019	Budget Time Scheduling	Maker-spaces Webinar registration Requisitions

a. Initiate coding K-5 using Dash and Dot robots curricula: https://store.makewonder.com/#/education b. Explore STEM Fuse curricula grades K-5 with 3D printers: http://stemfuse.com/shop/stemit-elementary					Purchase orders
12. Promote the importance of engineering education by hosting National Engineers Week in March 2019		Director Administrators STEM Supervisor	SY2018-2019	Budget Time Scheduling	School schedule Flyers

GOAL 3: ASSESSMENT

Support and advance the development and use of assessments (diagnostic, formative, summative, authentic) that measures student achievement based on the Next Generation Science, National Health Science and English Language Arts Standards and use the data resulting from these assessments to enhance teaching and learning.

Actions	AFG Standard	Person(s) Responsible	Timelines for Implementation/ Completion	Resources Needed	Evaluation/ Evidence/Indicators of Attainment
Objective 1: Implement integrated, Standards based common assessments that evaluate student growth; conceptual understanding; science and engineering skills; Reading/Writing/Speaking skills, and to improve school/student performance at PLTW EoC.					
1. Engage teachers and involve teacher leaders in developing paced unit plans for all courses aligned to the PLTW program objectives, delineating essential questions, student misconceptions, standards and assessments for daily instruction.		Director STEM Supervisor Administrators Teachers	SY2018-2019	Scheduling Time	Completed unit plans
2. Administer PLTW performance-based formative assessments in al courses that provide immediate feedback for students and teachers.		Director Administrator STEM Supervisor Teacher	SY2018-2019	Materials Resources Curricula	Student Projects
3. Collect and analyze assessment data using trackers to identify trends and patterns of individual student performance and needs.		Director Administrator STEM Supervisor Teacher	SY2018-2019	Materials Resources Time	SGO Trackers
4. Use the results of data analysis to develop Individualized Student Plans aimed at improving student performance.		Director Administrator STEM Supervisor Teacher	SY2018-2019	Materials Resources Time	Data analysis Individual Student Plans
5. Use assessment data/student work samples to identify teacher strategies and determine professional development needs and/or technical assistance.		Director Administrator STEM Supervisor Teacher	SY2018-2019	Budget Materials Resources Time	Data Analysis PD
6. Collect multiple means of authentically assessing student understanding including oral, written, and		Administrator STEM Supervisor Teacher Teacher leaders	SY2018-2019	Advisory Materials Resources Time	Unit plans Genesis gradebook

constructed models.					
7. Standardize in Genesis descriptive expectations for assignments.		Administrator STEM Supervisor Teacher	SY2018-2019	Advisory Materials Resources Time	Unit plans CPT minutes Genesis
8. Develop checkpoints and monitor student progress in developing knowledge and skills to identify students on track to be successful at the year-end EoC for Introduction to Engineering; Principles of Biomedical Science; Human Body Systems and Computer Integrated Manufacturing.		Administrator STEM Supervisor Teacher Teacher Leaders	SY2018-2019	Advisory Materials Resources Time	Unit plans SGO tracker
9. Establish PLTW-EoC testing window for the first two weeks in June.		Director Administrator STEM Supervisor Teachers	SY2018-2019	Materials Resources Curricula	Syllabi
10. Assess SMARTLab progress using engagement tracker, monitoring student e-portfolios and presentations.		Director Administrator STEM Supervisor Teacher	SY2018-2019	Materials Resources Curricula	Student Projects

GOAL IV: PROFESSIONAL DEVELOPMENT

Initiate, build, and sustain collaborations and partnerships to provide specific and focused professional development to support the teaching and learning of core science content, conceptual understandings, inculcate science and engineering habits of mind and cross cutting concepts for grades K-12.

Actions	AFG Standard	Person(s) Responsible	Timelines for Implementation/ Completion	Resources Needed	Evaluation/ Evidence/Indicators of Attainment
Objective 1: Develop teacher capacity for building science content and pedagogical knowledge, translating standards to practice, practicing teaching, and reflecting.					
1. Provide ongoing training and support for PLTW and SMART Lab programs.		Director Administrator STEM Supervisor Teacher	SY2018-2019	Budget Scheduling	Requisitions Purchase Orders PD
2. Immerse teachers in training to develop familiarity with content, pedagogy and skill development through PLTW's Professional Development link at Lynda.com.		Director Administrator STEM Supervisor Teacher	SY2018-2019	Funding, curriculum materials and resources, training, scheduling, time	Completion certificates
3. Establish a team drive for instructors implementing PLTW curricula to engage in professional discourse, and maintain contact with master teachers/colleagues		STEM Supervisor Teacher	SY2018-2019	Scheduling Time	Team drive
4. Establish a model to support and develop newly hired teachers and staff through coaching, peer collaboration, and mentorship.		Director Administrator STEM Supervisor Teacher Mentors	SY2018-2019	Budget Scheduling	Coaching notes

Actions	AFG Standard	Person(s) Responsible	Timelines for Implementation/ Completion	Resources Needed	Evaluation/ Evidence/Indicators of Attainment
5. Establish/maintain lines of communication and with tertiary institutions that provide STEM related professional development opportunities. • The College of New Jersey's Center for Excellence in STEM Education • New Jersey Institute of Technology Education and Training Institute • Merck Institute for Science Education (MISE)		Director Administrator STEM Supervisor Teacher Universities	SY2018-2019	Scheduling Time	MOU's Schedules Workshop/MLP registration
6. Subscribe to an institutional NSTA membership to support teacher science content knowledge and practice.		Director Administrator STEM Supervisor Teacher	SY2018-2019	Scheduling Time	Intuitional membership
7. Offer the opportunity for engineering teachers to participate in NASA's Authentic Technology & Engineering Experiences (Wallops Island, VA).		Director Administrator STEM Supervisor Teacher NASA	SY2018-2019	Scholarship	Action Plan Schedules Logs Lesson Plans
8. Establish a group of teacher leaders to be involved in district professional development opportunities that support the implementation of standards-based curricula.		Director Administrator STEM Supervisor Teacher	SY2018-2019	Time Scheduling	PD minutes PD agenda

GOAL 5: ESTABLISH A STEM ADVISORY BOARD AND IDENTIFY INDUSTRY PARTNERS

Build the capacity to enhance science education and ensure career readiness by involving STEM stakeholder partnerships and alliances between school districts, institutions of higher education, science education professional organizations, business and industry, informal education organizations, government agencies, and the larger learning communities: local, regional, state, national, and international arenas.

Actions	AFG Standard	Person(s) Responsible	Timelines for Implementation / Completion	Resources Needed	Evaluation/ Evidence/Indicators of Attainment
Objective 1: Engage Administrators, family and community members in strong relationships and meaningful opportunities to increase participation, trust, and shared responsibility for student success in STEM-related careers.					
1. Facilitate, expand and extend partnerships with business and community members through the STEM Advisory Board.		Director Principal Industry Engagement personnel Science Team	SY2018-2019	Scheduling Time	Invitations MOU's
2. Build stakeholders knowledge, understanding and communicate the vision for STEM education through program invitations to SAIO, OHS, Heywood and Rosa Parks.		Director Principals Science Team Teachers	SY2018-2019	Scheduling Time	Program invitations Sign-in sheets
3. Solicit business and industry field visits using District resources or on the suggestion of the Advisory Board, in order to provide extended experiences for students to liaise with professionals in STEM related careers.		Director Principal Industry Engagement personnel Science Team Teachers	SY2018-2019	Budget Scheduling Time	Invitations Visits MLP
4. Continue to enhance website and community-wide use of digital technology to improve all facets of communication internally and externally.		Director Principals Science Team Teachers IT Department	SY2018-2019	Scheduling Time	Community involvement

APPENDIX A

ROBOTICS ONE-YEAR PLAN

GOAL I: SECURE MATERIALS AND EQUIPMENT FOR FIRST LEGO TEAMS			
Actions Secure challenge sets for FLL competition	**Person(s) Responsible**	**Timelines for Implementation/ Completion**	**Evaluation/ Evidence/Indicators of Attainment**
1. Register teams for FLL challenge	STEM Supervisor	May-June	Quote
2. Secure and submit purchase order	Director STEM Supervisor	June	Purchase order number
3. Provide posting for coaches position to schools	STEM Supervisor	May-August	Mailing
4. Select coaches	STEM Supervisor Department personnel	May-August	Notification
GOAL 2: PREPARE TEAMS FOR COMPETITION			
Actions	**Person(s) Responsible**	**Timelines for Implementation/ Completion**	**Evaluation/ Evidence/Indicators of Attainment**
1. Request budget	Director	May-August	Monies
2. Secure facilities approval for Orange Qualifier	STEM Supervisor Principal	June-August	Approved facilities request
3. Develop and submit posting for coach positions	STEM Supervisor	June-August	Board approval
4. Create spreadsheet of schools/team members/coaching days/times	STEM Supervisor Coaches	September	Completed spreadsheet
5. Obtain programming training access to new coaches	STEM Supervisor	May-June	PO Teacher Certificate

6. Secure devices for coaches and load MINDSTORMS NXT program to devices	STEM Supervisor Instructional Technology Coaches	September	Program installed
7. Host a kick-off for all teams	STEM Supervisor Facilities personnel	September	Facilities request
8. Obtain mentor support from experienced FLL teams, and FIRST website.	STEM Supervisor Coaches	September	Documentation
9. Register coaches for State scrimmages	Director STEM Supervisor	September-December	PO/Facilities
10. Secure administrator to oversee Saturday scrimmages/meetings	Director STEM Supervisor	September	Attendance rosters

APPENDIX B

2018 -2019 STEM Professional Development Plan

	September 5 (Full Day)	**September 6** (Full Day)	**October 23** (Half Day)	**January 30** (Half Day)	**March 19** (Half Day)
All PLTW schools	• One-Year plan rollout • Rostering • Curriculum access • Unit planning	• Unit planning	• Intervention Strategies for All Students • Possible visits to Buzz Aldrin MS, Montclair • Possible visit to Technology HS for PBS, HBS, CIM and CS • District PD activities to support science/computer literacy	• Data Analysis • Intervention • Unit Planning	• Data Analysis • Intervention • Unit Planning
SmartLab	• Creative Learning Systems	• Creative Learning Systems	• Intervention Strategies for All Students • Portfolios • District PD activities to support computer literacy		

Checklist for PLTW

The classroom (displayed):

- ✓ Essential questions.
- ✓ Science and engineering practices.
- ✓ Engineering habits of mind.
- ✓ Four C's.
- ✓ Lesson agenda
- ✓ Engineering notebooks with appropriate feedback.
- ✓ Physical projects displayed and computer-based projects archived.
- ✓ Appropriate tools, including power tools being used with proper safety measures in place.

Lesson Plan:

- ✓ Objective
- ✓ Misconceptions
- ✓ Essential questions
- ✓ Standards
- ✓ Materials
- ✓ PLTW PP slides
- ✓ Assessments
- ✓ Alignment between lesson and unit plan.

During Instruction:

- ✓ Access and activate prior knowledge of students
- ✓ Uncover and address student misconceptions
- ✓ Students working in groups on district-adopted curricula and using engineering notebooks and guidelines to record their progress.

During Instruction:

- ✓ Hands-on student engagement in authentic projects.
- ✓ Discussions should include reference to engineering habits of mind and the four C's.
- ✓ Formative assessments to evaluate student understanding
- ✓ Teacher circulating and using probing questions during frequent checks for understanding, and in response to student questions.
- ✓ Teacher challenging students to make the connection between the content and the essential questions.
- ✓ Students using appropriate technology.
- ✓ Displaying data appropriately and accurately.
- ✓ Following acceptable formats for writing assignments and professional presentations.
- ✓ Encourage the discovery of new interests.
- ✓ Increase students' awareness of the potential of ideas
- ✓ Promote deeper thinking about ideas, concepts, beliefs, and opinions.
- ✓ Create a safe climate for engaging in classroom discussions.

Closure:

- ✓ Writing responses to essential questions.
- ✓ Project presentations
- ✓ Explaining models
- ✓ Aligning collected data and conclusions.

Checklist for SmartLab

The classroom (displayed):

- ✓ Creative Learning Systems Score
- ✓ Science and engineering practices
- ✓ Engineering habits of mind
- ✓ Four C's
- ✓ Lesson agenda
- ✓ Physical projects displayed and computer-based projects archived

Lesson Plan:

- ✓ Objective
- ✓ Misconceptions
- ✓ Essential questions
- ✓ Standards
- ✓ Materials
- ✓ Assessments
- ✓ Display connections to core academic content and alignment to standards
- ✓ Provide extension activities for advanced learners to explore topics in even greater depth

During Instruction:

- ✓ Access and activate prior knowledge of students
- ✓ Uncover and address student misconceptions
- ✓ Engaging in hands-on, minds on, project-based activities in STEM, digital communications and related topics
- ✓ Applying technology to reinforce academics and build next generation skills

During Instruction:

- ✓ Use the personalized learning system with multiple challenge levels, open-ended activities and opportunities to shape and expand learning around student interests, abilities and learning styles
- ✓ Formative assessments to evaluate student understanding
- ✓ Teacher circulating and using probing questions during frequent checks for understanding, and in response to student questions.
- ✓ Challenging students to make the connection between the content and the essential questions.
- ✓ Encourage the discovery of new interests.
- ✓ Increase students' awareness of the potential of ideas
- ✓ Promote deeper thinking about ideas, concepts, beliefs, and opinions.
- ✓ Create a safe climate for engaging in classroom discussions.
- ✓ Enable connections between different science content using and emphasizing Cross Cutting Concepts
- ✓ Engage students in using Science and Engineering Practices

Closure:

- ✓ Writing responses to essential questions.
- ✓ Project presentations
- ✓ Explaining models
- ✓ Maintaining e-portfolios and archiving projects