



FIRST Robotics Navigating the Implementation of High School Credit

By: FRC Team 453, Rockem Sockem Robotics Last Updated: January 24, 2019

Spring 2018: Ascertain Interest

Asked student membership and parents if there was interest in pursuing credit for robotics. Both parents and students were interested in said credit.

June 2018: Gather and Confirm School (Principals) Support

Met with Principal, Mr. John Haas, Frederick V. Pankow (hereinafter noted as "Pankow), to discuss possibility of initiating program for graded credit through Pankow. He was open to considering and supporting an initiative to offer this option to students and wanted more information.

Summer 2018: "Circle Your Wagons"

Fact gathering about grant money, regulations and legislation pertaining to offering credit were gathered by students and a parent mentor. A review of these materials went underway.

Fall 2018: Creation of "White Paper" - "Dot Your I's and Cross Your T's"

- Legal validity of credit initiative was vetted, established and documented in a draft "white paper" (available upon request) to L'Anse Creuse School District.
- District's authorization to establish criteria and to offer credit was established and documented.
- Introduced FIRST and FIRST in Michigan (FiM) as STEM authorities
- Clarified new FIRST badging system as a measure of the proficiency and sharing of students' knowledge, skills, and proficiencies.
 - Showed that the digital badging system is an independently administered system with set criteria to receive badges that translate into curriculum related topics.
 - The badges align to specific standards as established by FiM, map student target learning trajectories, are backed by numerous external business and community partners, are permanent, and recognize educator learning.
 - Verified and included a guidance document by the Michigan Department of Education about how the badges can be used to document student learning.
- We requested a grade for the credit(s) versus a "Pass/No Pass", "Pass/Fail", or "Credit/No Credit".
 - The reason for our pursuit of "graded credit" was to ensure that the students receive proper acknowledgement of their performance for purposes of transcripts to college.
 - Established that a graded credit option was critical for students via a survey of several instate colleges and universities and included portions of this documentation from postsecondary institutions as quotes in our white paper and the emails quoted as Appendices.

- Concluded that graded credit "must be designated in order to maintain control over how L'Anse Creuse District's transcripts are interpreted by post-secondary institutions and to eliminate random interpretation, and to ensure what GPA credit a student will receive for meeting the criteria for credit as laid out....for demonstrated proficiency and participation on the Robotics team so that implementing this credit does not harm, instead of help, participating students."
- We suggested the following curriculum requirements for credit:
 - Students receiving a single Level of badging in three (3) Domains for every year of participation on the team
 - Students must successfully log a minimum number of 60 hours at team meetings and events during one season
 - $\circ~$ Students must attend a minimum of two FIRST in Michigan District Competitions with Team 453
 - Students must personally acquire a documented minimum of ten (10) community service hours on behalf of the team; six (6) of these hours are to be completed as a part of team sponsored activities and related community events
- We proposed 0.5 credits per school year per student for a maximum of 2.0 credit available for four (4) years of participation and meeting requirements for credit.
- We proposed the following types of credits:
 - A graded Third Year Science credit for students who have fulfilled the Michigan Merit Curriculum and Michigan Science Standards; or
 - A CTE (Career/Technical Education) credit; or
 - $\circ \quad \text{An elective credit} \\$
- Addressed other concerns
 - Gave evidence that we had a high school qualified teacher that was willing to grade the Robotics students' performance on the team
 - Clarified that the credit program would not affect teacher Full Time Equivalent (FTE) as all work is performed after school, at an established program, and students still will participate in their six (6) classes, but would help keep students on track for graduation and get them back on track for graduation when they lag behind.

September/October 2018: Finalization of White Paper - "Share the Facts"

- Spoke with a representative of the L'Anse Creuse Curriculum Committee about how to proceed. He recommended forwarding our paper to him to share with and review by the committee upon completion. They were very excited and supportive of the proposal and felt that it would be an excellent opportunity for district students.
- Spoke with FiM to confirm some final details and information.
- We ran our white paper past *FIRST* badging expert, Julia Green, for input.
- Forwarded our draft white paper to members of the Michigan Department of Education and had a conference call to confer about anything we might have been missing pertaining to instituting a new graded credit policy in-district.
- Requested, received and included letters of support from all district Principals.

October 2018: "White Paper" Submitted to District Administration

- We sent the white paper to the Curriculum Committee via email for review.
- They stated that they did not anticipate a credit program requiring review by the Board of Education because we already had programs and curriculum(s) in place that directly coincided with our proposal.

November/December 2018: "White Paper" Internal Review by District Administration

- The Curriculum Committee reviewed our white paper proposal and ascertained that a graded credit program for robotics would fall under the same curriculum standards as an independent study program.
- Internal discussions occurred relating to process for grading, curriculum standards, credit offerings, and general program administration.

January 2019: Program Roll Out – "Celebrate Success"

- The District and Pankow accepted our criteria for 0.5 credits per school year per student with the exception of excluding events being used as a part of the hours that students must successfully log and required that the full 60 hours be logged at team meetings.
- The District and Pankow approved our credit offering suggestions and expanded them to include a:
 - Third Year Science credit
 - General Elective credit
 - \circ Health credit
 - Third Year Social Studies credit
 - Visual Performing Arts credit
 - Second Year Foreign Language credit
- On January 16, 2019, the team Coaches rolled out the credit program to parents and students offering graded or ungraded (pass/fail) credit.
- Students were given a form to complete (available upon request) to state their intention to accept:
 - o Graded Credit
 - \circ Ungraded Credit
 - Continue to participate on the team as an after school activity without a grading component
- The Coaches established an administrative grade book to document student(s) participation, grades, levels of completion, attendance, etc.
- Grades will be issued via the district "PowerSchool Unified Classroom", email notifications, and student transcripts as appropriate.







FIRST Robotics Team 453 Rock'em Sock'em Directed Study Credit Agreement

Student Name: ____

School Year: _____

	Put "x" next to the graduation requirement the .5 credit o Robotics will be applied:		
	General Elective	Visual Performing Art	
	Health	3 rd Yr Science	
	3 rd Yr Social Studies	2rd Yr Foreign Language	

Check the box for the credit pathway the student will follow:

I elect to earn a <u>.5 credit</u> for participating in Robotics. I understand the following criteria minimums will need to be fulfilled for credit to be issued by the team mentors.

- Student(s) have successfully logged a minimum number of 60 hours at team meetings during one season.
- Student(s) attends a minimum of two FIRST in Michigan district competitions with Team 453.
- Has personally acquired a documented minimum of ten (10) community service hours on behalf of the team; six
 (6) of these hours are to be completed as a part of team sponsored activities and related community events.

I elect to earn a <u>letter grade & .5 credit</u> for participating in Robotics. I understand the following criteria minimums will need to be fulfilled for a grade to be issued by the team mentors.

- Student(s) have successfully logged a minimum number of 60 hours at team meetings during one season.
- Student(s) attends a minimum of two FIRST in Michigan district competitions with Team 453.
- Has personally acquired a documented minimum of ten (10) community service hours on behalf of the team; six
 (6) of these hours are to be completed as a part of team sponsored activities and related community events.
- Student(s) achieving a passing level understanding of, and receiving a minimum of one single level of badging in three (3) Domains for every year of participation on the team.

Student Signature

Parent Signature



Mentor Signature

Pankow Administrator Signature

Rockem Sockem Robotics

FRC Team 453 Pankow Center 24600 F.V. Pankow Boulevard Clinton Township, MI 48036



Ms. Lisa Montpas Assistant Superintendent for Curriculum & Instruction L'Anse Creuse District Curriculum Committee 24076 F. V. Pankow Blvd. Clinton Township, MI 48036

October 11, 2018

RE: Legal Validity and Criteria for Students Receiving High School Credit(s) in LCPS for FIRST Robotics Participation and Achievement

Dear Ms. Montpas and Curriculum Committee,

We believe that acceptance of Michigan Department of Education (MDE) funds under Section 99h "FIRST Robotics Grants" in 2014 and from 2016 to date, constitutes an agreement with the State of Michigan to offer Robotics Team Members 0.5 credit per year of Third Year Science, CTE (Career/Technical Education) or elective school credits for students once a criteria for providing these credits has been established and implemented between the Robotics Team and the L'Anse Creuse School District. A criteria for graded credit is laid out below.

Due to the length of this proposal to receive credit for participation on the Robotics team, we have divided it into sections pertinent to topics anticipated to be of concern to the curriculum committee. We begin by formally addressing the validity of requesting the implementation of graded high school credit with documentation to follow and attached.

Legal Validity of Receiving High School Credit

With the passage of the Michigan Merit Curriculum (MMC) in 2006, credit for high school students has changed from being "seat based" to demonstrated proficiency. On page two (2) of the "Michigan Merit Curriculum High School Graduation Requirements Updated September 2017" (**Appendix A**) located at: <u>https://www.michigan.gov/documents/mde/Complete_MMC_FAQ_August_2014_467323_7.pdf</u>, it states,

"The MMC gives districts the flexibility to develop courses, curricula, and systems, which meet the individual needs and desires of each district. Local school boards, in collaboration district administration, have the responsibility to determine "how" to implement the graduation requirements outlined by the MMC and when students have earned the appropriate credits."

On pages four and five (4-5) this document asks "How can students earn credit?" and answers as follows:

"Students may earn credit if they successfully demonstrate mastery of the subject area content standards, expectations or guidelines for the credit. The assignment of credit must be based, at least in part, on student performance on assessments designed to measure the extent to which they meet the standards, expectations and guidelines. Assessments and criteria for success are determined by local districts. In addition to traditional course pathways, schools can also offer credit-bearing learning opportunities in a variety of ways, including:

- Integrated Content and Course Sequences;
- Project-based Learning;
- Independent Teacher-guided Study; or
- Testing out.

In addition, the district may allow students to satisfy credit requirements through:

- Career and Technical Education;
- Work-based Learning Programs;
- College Coursework;
- Early College;
- Advanced Placement Courses;
- International Baccalaureate Courses; or
- On-line classes."

We believe that participation on the Robotics Team qualifies many students under the law for earned and <u>graded</u> high school credit based on their activities including: Project-based Learning; Independent Teacher-guided Study; Career and Technical Education; and Work-based Learning Programs.

We are asking to offer a Third Year Science credit for students who have fulfilled the Michigan Merit Curriculum and Michigan Science Standards. On page thirteen (13), the "Michigan Merit Curriculum High School Graduation Requirements Updated September 2017" further addresses whether credit can be given as a Third Year Science credit or only as an elective when it asks, "Can a student take a CTE [Career/Technical Education] class for the 3rd Science credit?"

"Any course or program, including CTE, which integrates Science content may count as the 3rd science credit. If the 3rd Science credit is exchanged for a formal CTE program or curriculum then science content does not need to be integrated. However, districts are responsible for ensuring that students have an opportunity to learn the content as outlined in the Michigan Science Standards since these will be tested on the 11th grade Michigan Merit Exam."

This document further addresses CTE requirements on pages 17-18 in saying:

"Career/Technical Education (CTE) What the Michigan Merit Curriculum Law Says: Earning Credit 380.1278(b) (7) The board or board of directors may provide this curriculum by providing the credits specified in this Section and Section 1278a, by using alternative instructional delivery methods such as ... Career and Technical Education (CTE). Mathematics Sec 1278a (1)(a)(i) ...A pupil may partially or fully fulfill the algebra II requirement by completing a Departmentapproved formal CTE program or curriculum, that has appropriate embedded Mathematics content, such as a program or curriculum in Electronics, Machining, Construction, Welding, Engineering, Computer Science, or Renewable Energy, and in that program or curriculum successfully completing the same content as the Algebra II benchmarks assessed on the Department-prescribed state high school assessment, as determined by the Department. Science 380.1278b (1)(b) ...A student may fulfill the requirement for the 3rd Science credit by completing a Department- approved formal CTE program or curriculum...."

Finally, Mathematics credit can be substituted for a CTE for graduation requirement. Please note that we have highlighted the most pertinent sections on pages six and seven (6-7) of the "Michigan Merit Curriculum High School Graduation Requirements Updated September 2017", they state:

"Mathematics

What the Michigan Merit Curriculum Law Says:

Sec 1278a (1)(a)(i) At least 4 credits in Mathematics that are aligned with subject area content expectations developed by the Department and approved by the State Board under Section 1278b, including completion of at least Algebra I, Geometry, and Algebra II, or an integrated sequence of this course content that consists of 3 credits, and an additional Mathematics credit, such as Trigonometry, Statistics, Pre-Calculus, Calculus, Applied Math, Accounting, Business Math, a retake of Algebra II, or a course in Financial Literacy as described in Section 1165. A pupil may complete Algebra II over 2 years with 2 credits awarded or over 1.5 years with 1.5 credits awarded for the purposes of this Section and Section 1278b. A pupil also may partially or fully fulfill the algebra II requirement by completing a Departmentapproved formal Career and Technical Education (CTE) program or curriculum, that has appropriate embedded Mathematics content, such as a program or curriculum in Electronics, Machining, Construction, Welding, Engineering, Computer Science, or Renewable Energy and in that program or curriculum successfully completing the same content as the Algebra II benchmarks assessed on the Departmentprescribed state high school assessment, as determined by the Department. Each pupil must successfully complete at least 1 Mathematics course during his or her final year of high school enrollment. This subparagraph does not require completion of Mathematics courses in any particular sequence. Sec. 1278b 5(g) The Mathematics credit requirements of Section 1278a (1)(a)(i) may be modified as part of a personal curriculum if the pupil successfully completes at least 3-1/2 total credits of the Mathematics credits required under that section before completing high school, including Algebra I and Geometry, and successfully completes at least 1 Mathematics credit during his or her final 2 years of high school. The Algebra II credit required under that section may be modified as part of a personal curriculum under this subsection if the pupil meets 1 or more of the following: (i) Successfully completes the same content as 1 semester of Algebra II, as determined by the Department. (ii) Elects to complete the same content as Algebra II over 2 years, with a credit awarded for each of those 2 years, and successfully completes that content. (iii) Enrolls in a formal CTE program or curriculum and in that program or curriculum successfully completes the same content as 1 semester of the Algebra II benchmarks assessed on the Departmentprescribed state high school assessment, as determined by the Department. (iv) Successfully completes 1 semester of Statistics, or Functions and Data Analysis, or Technical Mathematics."

To clarify regarding mathematics and CTE requirements, on page nine (9), the "Michigan Merit Curriculum High School Graduation Requirements Updated September 2017" asks and answers,

"In order to replace a mathematics credit with Department-approved formal Career and Technical Education (CTE) program or curriculum, how do districts determine what mathematics content needs to be embedded so that the content is the same as the 'Algebra II benchmarks assessed on the Department-prescribed state high school assessment?"

And answers this question by saying,

"There are no specified "Algebra II benchmarks" on the state high school assessment. The current Department-prescribed state high school assessment is the SAT, administered in the spring of students' junior year, which does not specify the standards assessed by courses. Because of the specificity in the legislation regarding the exchange of Algebra II with a formal CTE program, there is no difference between exchanging the Algebra II credit and earning Algebra II credit through the integration of the Mathematics into a CTE program or class. Districts are encouraged to use the Mathematics Credit Guidelines to ensure that students have the opportunity to learn all of the Mathematics standards before they graduate whether they are enrolled in a formal CTE program or not."

In summary, although a mathematics credit is plausible, <u>for ease of administration, we recommend</u> <u>offering either a CTE (Career/Technical Education) credit, a Third Year Science requirement, or as an</u> <u>alternative at the students own choice and election, an elective credit, for successful completion of the</u> <u>criteria recommended further below and for participation on the Robotics Team.</u>

District Authorization to Establish Criteria & Offer Credit

In a memorandum (<u>https://www.michigan.gov/documents/mde/Digital_Badges_552658_7.pdf</u>) by the State of Michigan's Department of Education that was issued on February 23, 2017 (**Appendix B**) they state that Districts are responsible for determining proficiency measures (copy attached). It also states,

"Furthermore, districts have the flexibility to decide how students' knowledge and skills are shared with postsecondary institutions and potential employers (i.e. transcripts)."

It talks about the new FIRST badging system as a measure of the proficiency and sharing of said data. Summing up by saying, that:

"The badge presents an opportunity to thoughtfully personalize learning for each student by allowing educators to see what demonstrated competencies students already bring to the learning environment. It also encourages more defined relationships and communication between out-of-school time world and the formal system. An example of digital badging and credit issuance is taking place through section 99h FIRST Robotics Grants, a grant program managed by MDE. Grantees agreed to:

- Be willing to offer elective high school credits for students who have successfully logged 60 hours, provided the team attends a minimum of two FIRST in Michigan district competitions.
- Be willing to participate in the digital badging program established by the statewide FIRST Robotics team of coaches."

As a result, this memorandum clarifies that Districts who have accepted 99h funds, such as ours have in 2014, 2016 and every year thereafter, have already agreed to offer credit and need only establish the criteria by which to judge the work efforts of the applicant for credit.

By way of background, FIRST is an internationally recognized, non-profit, Science, Technology. Engineering, and Math (STEM) leader. Their website is <u>https://www.firstinspires.org/</u>. According to their vision and mission page (<u>https://www.firstinspires.org/about/vision-and-mission</u>):

"FIRST (For Inspiration and Recognition of Science and Technology) was founded in 1989 to inspire young people's interest and participation in science and technology. Based in Manchester, NH, the 501(c)(3) not-for-profit public charity designs accessible, innovative programs that motivate young people to pursue

education and career opportunities in science, technology, engineering, and math, while building selfconfidence, knowledge, and life skills.

FIRST is More Than Robots. FIRST participation is proven to encourage students to pursue education and careers in STEM-related fields, inspire them to become leaders and innovators, and enhance their 21st century work-life skills. "

FIRST Robotics Competition, or FRC, teams are the high school aged students' division of the FIRST organization within the United States. The ages may vary slightly internationally. Per Gail Alpert, President and Sectary of FIRST in Michigan (gail.alpert@gmail.com), in the 2017-18 season, there were 3,288 FRC (high school level) teams in internationally, with 506 of these being from Michigan and approximately 82,200 students participated on these teams. "FIRST in Michigan" (https://www.firstinmichigan.org/board_of_directors.php) is the in-state organization that operates as a part of the National FIRST structure.

The digital badging system is an independently administered system with set criteria to receive badges and is found at this website: <u>https://www.firstbadges.com/</u>. FIRST Badges describe themselves best in saying:

"FIRST Badges is a system of digital "open" badges which provides visual recognition and evidence of learning and accomplishment for students participating on a FIRST Robotics Competition team. Open Badges are secure, web-enabled credentials that contain granular, verified information.

A group of Michigan FRC team mentors develop and administer the FIRST badges website and badge content. The FIRST in Michigan organization and the Michigan Department of Education provide support and guidance

The badge system has domains and levels. Domains represent a range of knowledge in a topic. Levels in the domain include tasks with active learning components which progress in difficulty. The student/participant **learns** about a task or function, **demonstrates competency** and **extends** his/her learning. Task completion is assessed through a rubric. When a level is awarded, student/participant place the digital icon in personal digital backpacks and control where they wish to display the icon. These icons contain information about the tasks and activities needed to earn the badge.

Participants (adults and students) can display badges electronically through Credly. Credly is free for badge participants to manage and display their open badges. Any system that uses the OBI (Open Badges Infrastructure), like Credly will allow a participant to collect all OBI badges into a single site.

Level 1 and Level 2 badges are knowledge and skill-based requirements.

Level 3 and Level 4 badges extend into analysis and synthesis activities. Mentors and industry professionals evaluate the student/participants portfolio submission. Level 4 badges are the culmination of the domain set."

Attached is a copy of the FIRST Badges as presented visually in **Appendix C** and the set Badge Criteria can be found in **Appendix D**.

This system was established specifically by FIRST in Michigan to support teams, districts and coaches. The MDE even has a guidance document about how the badges can be used to document student learning that we have attached for your convenience as **Appendix E**. Some of the highlights of the MDE's "Digital Badges: Principles and Standards of Quality for Recognizing Learning" document include:

"With Michigan's current focus on preparing all students to be career- and college-ready and the need to meet the increasing demand for a skilled workforce, the "any's" [1 "Any time, any place, any way, any pace"] have helped focus instructional improvement efforts on personalized learning and multiple learning pathways. There is also a recognition that increased learning time, particularly through quality after-school and other informal educational experiences, provides opportunities to engage and empower students to learn outside the formal education arena. This flexibility in learning options presents a challenge to traditional student transcripting processes. However, technology, in particularly local and regional data systems, supports documentation of student learning in a digital, portable format, i.e. digital badges....

.... In short, digital badges are credentials that can be obtained in numerous ways from a performance, product, or other assessment proficiency...."

Please note that following text has been taken directly from the MDE's "Digital Badges: Principles and Standards of Quality for Recognizing Learning" document (**Appendix E**) starting on page two (2) where they highlight the nine principles. However, out of deference to space and your time, some principals have been abbreviated/shortened; the complete document is attached in its entirety as noted above:

- 1. <u>Use badges to map learning trajectories</u>. Levels of badges can be linked with various levels of student accomplishments and aligned with standards or competencies.
- 2. <u>Align badges to standards</u>. National or International learning standards serve to increase the credibility and external value of the badges. Alignment of the standards to the badges provides transparency within 3 the credential and improves communication. Further, this badge-standards relationship formalizes the credibility of the assessments (any number of types) and the related badge.
- 3. <u>Have experts issue badges</u>. Expert authorities issuing badges builds the credibility of the badge and likely influences the usefulness to the external community (employers and postsecondary program leaders). It was noted that if the issuing authority also held an external (certified program) or community recognized credential, that may build legitimacy and credibility to the badge being issued.
- 4. <u>Seek external backing</u>. External backing of the business and industry community partners is important to the perception of the stakeholders.
- 5. <u>Recognize diverse learning</u>. Individual student progress is a personal and individual experience that cannot be expected to follow a production line learning pace. Recognizing these personal differences is important and also builds credibility to those who understand human development. Credentialing badge options that meet a broad spectrum (specific and numerous) of student learning needs is the utility of badging.
- 6. <u>Use badges as a means of external communication of knowledge and/or skills.</u> Communicating how badges can be shared with other individuals and organizations is important as this conveys the importance to the student as well as the individuals and organizations who seek candidates to fill programs or employment positions.
- 7. <u>Make badges permanent</u>. Technologies and processes change and both standards and assessments will change in time. Although badge expiration policies are a specific and legitimate decision by the authorizing entity, it seems important to preserve the individual's historical record. This information should be important to both the person as a part of his or her learning development (I obtained certifications in the past; therefore, I can accomplish additional competencies to achieve another badge.) as well as to the employer or postsecondary program leader who may value the individuals past accomplishments as an indicator of his or her future prospective accomplishments.
- 8. <u>Recognize educator learning as well</u>. Allowing the educator to obtain badges either from individual professional development endeavors or along with the students while progressing through a project

builds value towards badges. Professional development that leads to badges allows educators to brandish their accomplishments among their colleagues as well as other stakeholders in the world of work. Students who see their teachers with credible badges would likely identify their teachers as role models to follow. Students who see their teachers obtain badges in projects along with the students will likely view their teachers as partners in the learning process.

9. <u>Award formal academic credit for badges</u>. A summative or high level badge that is obtained from completing an educational program's competency that results in their academic credit would likely make all the students feel empowered. This empowerment is built via transference from achieving lower level badges, which the allotted accumulation could result in academic credit. Students can focus on the next badge as a goal, while learning that multiple milestones sum to a greater product of a more recognized badge or credit.

There are eight (8) possible Domains in FIRST Badges with four (4) levels of achievement possible within each Domain. Domains are as follows:

- 1. Communication
- 2. Machining
- 3. Participation & Leadership
- 4. Programming
- 5. Safety
- 6. Engineering Design
- 7. Electronics
- 8. CAD

We anticipate students receiving a single Level of badging in three (3) Domains on average for every year of participation on the team as a part of receiving academic credit. Again, the set badge criteria can be found in **Appendix D**. As noted above, FIRST in Michigan is the external expert organization that is issuing the badges. The badges align to specific standards as established by FIRST in Michigan, map student target learning trajectories, are backed by numerous external business and community partners, are permanent, and recognize educator learning. We are asking you to award formal graded academic credit in part due to use of the Badging system and under the additional criteria noted below.

Our Head Coach, Ian Heritier is a high school qualified teacher that is willing to grade the Robotics students' performance on the team. We will be supported by two other Coaches who are also high school qualified teachers, Christian Siefen and Michael Hintze. Our current Coaching team has a combined teaching background experience of over 26 years. Additionally, this will not affect teacher Full Time Equivalent (FTE) as all work is performed after school, at an established program, and students still will participate in their six (6) classes, but this will help keep students on track for graduation and get them back on track for graduation when they lag behind.

We have shared this proposal with, and have the support of the following applicable "heads of schools":

- John Haas, Director, Frederick V. Pankow Center (Appendix F1)
- Stephen Czapski, Principal, L'Anse Creuse High School (Appendix F2)
- Kimberly Rawski L'Anse Creuse High School North (Appendix F3)

Please see letters of support attached from each of these individuals attached as Appendix F1, F2, and F3.

With high school qualified teachers as Coaches, we are asking to <u>provide a grade for the credit(s)</u> versus a "Pass/No Pass", "Pass/Fail", or "Credit/No Credit". The reason for our interest in "grading" the credit is to ensure that the students receive proper acknowledgement of their performance for purposes of transcripts to college.

According to Ms. Julia Green, Project Lead at FIRST Badges (<u>jsciteach@gmail.com</u>; phone 248/343-1570), many Universities and colleges, such as the in-state examples enumerated below, will ONLY acknowledge "Pass/No Pass", Pass/Fail", or "Credit/No Credit" entered grades by either assigning a 0.0% or will not assign any numeric/GPA acknowledging grade. This amounts to a net sum of zero credit for the hard work and applied learning of our students who have demonstrated proficiency under the criteria we establish (please see below).

The University of Michigan provided an email (**Appendix G1**) from Mr. Zach Marentay, Admissions Counselor (zahama@umich.edu; phone number 734-647-8290) which clarifies the University's policy of NOT providing graded credit to an in-coming student's GPA for "Pass/No Pass" credentials wherein he states,

"....it is strongly encouraged that students elect to take courses for a letter grade in order to be considered a more competitive candidate for admission."

Oakland University clarified their policy in an email (**Appendix G2**) by Shane Lewis (splewis@oakland.edu), Associate Director of Undergraduate Admissions, which states,

"Here at Oakland University we do not typically recalculate a student's grade point average for admission or scholarship purposes. If the school has not already done so, we will add weight to a student's GPA if they have taken Advanced Placement (AP) or International Baccalaureate (IB) courses. Otherwise, we utilize the cumulative GPA as provided by the school. If the school does not factor this pass/fail course into the student's cumulative GPA, this will have no impact on their admission decision or scholarship consideration at OU."

And finally, please take particular note of the highlighted section below, that according to an email (**Appendix G3**) from Terence Brown, M.A., who is the Assistant Director in the Office of Admissions at Michigan State University:

"For the purposes of our review process, in general, opting to take classes as pass/fail is not recommended. Such courses are not assigned a grade or included in our recalculation process. There have been prior instances (separate from our current review process) in which a "pass" grade was treated similar to a school or district's lowest passing grade but, even in those instances, pursuing pas/fail options often did not work to a student's advantage."

The highlighted quote above shows that ungraded credit could actually work to disadvantage our students in the postsecondary application and admissions arena by entering the District's lowest passing grade or the equivalent of a "D" in their transcripts which is clearly not the intent of offering a credit.

To sum up, acknowledge "Pass/No Pass", Pass/Fail", or "Credit/No Credit" entered credentials would actually either hurt most of our students' GPAs or provide a zero net sum outcome if we are not proactive and assigning our own graded credits. The goal is to acknowledge their applied learning, mastery of subject manner, and demonstrated proficiency as well as hard work as member of the Robotics team. We also aspire to offer them earned credit to accentuate their GPA, improve their

transcript, offer a replacement credit option, help keep students on track for graduation or to get them back on track for graduation when they lag behind, etc. In cases of individualized education programs (IEP) where a pass/fail may be of benefit to a student, counselors will work on a case by case basis based on that student's IEP as they do at this time for other credit concerns and considerations.

As a result, **graded** credit must be designated in order to maintain control over how L'Anse Creuse District's transcripts are interpreted by post-secondary institutions and to eliminate random interpretation, and to ensure what GPA credit a student will receive for meeting the criteria for credit as laid out below for demonstrated proficiency and participation on the Robotics team so that implementing this credit does not harm, instead of help, participating students.

Criteria for Credit

With the validity of providing graded credit having been established, we move on to establishing the criteria for said credit.

We propose the following criteria in order to receive one of the following types of credits:

- 1. A graded Third Year Science credit for students who have fulfilled the Michigan Merit Curriculum and Michigan Science Standards; or
- 2. A CTE (Career/Technical Education) credit; or
- 3. An elective credit

The type of credit (choices noted above) would be for 0.5 per year, with a 2.0 credit high school maximum number of credits, in L'Anse Creuse School District for participation on FIRST Robotics Competition Team 453, Rockem Sockem Robotics. We additionally propose leaving the choice of a graded Third Year Science credit for students who have fulfilled the Michigan Merit Curriculum and Michigan Science, or a CTE (Career/Technical Education) credit, or elective credit to the student(s) discretion, choice and election provided that they meet all criteria for said credit.

First, as noted in the memorandum issued on February 23, 2017 by the State of Michigan's Department of Education, we propose to offer graded high school credit for students who have successfully logged a minimum number of 60 hours at team meetings and events during one season. For our purposes, a season is defined as May 1- April 30. As example, in the case of our current season, it runs from May 1, 2018 until April 30, 2019. Attendance will be logged electronically, where possible or as a paper sign in at other times as validated by the Coach, for team meetings and other activities. Students may receive "logged hours" credit for hours spent outside the scheduled meeting times, but these must be approved by a supervising adult mentor or coach. Students must have full attendance at all mandatory meetings and the yearly FIRST and Team Kickoff event unless otherwise excused by the Team Coaches. In the case of this first year of implementation, known as "Season 2018-19", students will have a shortened time period, from implementation of this proposal through April 30, 2019, during which to receive the hours required unless they have logged their hours to date and a Coach has supervised said activities and will validate the number of hours that they have acquired prior to the formal implementation of the credit program, but within the 2018-19 season as defined above.

Second, to qualify for graded credit, student(s) must attend a minimum of two FIRST in Michigan District Competitions with Team 453 unless otherwise excused by the Team Coaches and be logged/noted on the "Student Roster" as required to be turned in at these events.

Third, to qualify for graded high school credit, student(s) must achieve a passing level understanding of, and receiving a minimum of one single Level of electronic Badging in three (3) Domains for every year of participation on the team. These badges will be logged by FIRST in Michigan as administered by their statewide FIRST Robotics team of coaches via Credly (<u>www.credly.com</u>) as outlined on the <u>https://www.firstbadges.com/</u> website and noted above.

Finally, to receive graded credit for Robotics team participation, student(s) must personally acquire a documented minimum of ten (10) community service hours on behalf of the team; six (6) of these hours are to be completed as a part of team sponsored activities and related community events.

Summary

In summary, we propose the following criteria in order to receive a graded Third Year Science credit, a CTE (Career/Technical Education) credit, or an elective credit of 0.5 per year, with a 2.0 credit high school maximum number of credits, in L'Anse Creuse School District for participation on FIRST Robotics Competition Team 453, Rockem Sockem Robotics. We propose leaving the choice of a graded Third Year Science credit, a CTE (Career/Technical Education) credit, or an elective credit to the student(s) discretion, choice and election provided that they meet all criteria for said credit as summarized below and formalized above:

- 1. Student(s) achieving a passing level understanding of, and receiving a minimum of one single Level of badging in three (3) Domains for every year of participation on the team.
- 2. Student(s) have successfully logged a minimum number of 60 hours at team meetings and events during one season.
- 3. Student(s) attends a minimum of two FIRST in Michigan district competitions with Team 453.
- 4. Has personally acquired a documented minimum of ten (10) community service hours on behalf of the team; six (6) of these hours are to be completed as a part of team sponsored activities and related community events.

We would like to implement said graded credit for the current FRC season. As a result, time is of the essence. Please let us know your decision as soon as possible. Thank you again for your consideration! Please help us with our goal! We appreciate your support!

Sincerely,

Gretchen Bates Business Mentor, FIRST Robotics Competition Team 453 Rockem Sockem Robotics 586/206-5556



Michigan Merit Curriculum High School Graduation Requirements Updated September 2017

Michigan Merit Curriculum High School Graduation Requirements

Updated September 2017





This document is intended to provide general guidance. Due to the complexity of the law, policies and guidance will continue to evolve. For specific information regarding the law, please refer to <u>MCL 380.1278a</u> and <u>MCL 380.1278b</u>.

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Introduction

The Michigan Merit Curriculum (MMC) is crafted around the philosophical belief that all students will need post-secondary learning opportunities beyond high school. It is not a curriculum in the traditional sense in that it doesn't describe instructional materials and approaches. Instead it specifies that all students who earn a diploma, at a minimum, have demonstrated proficiency with the content outlined by the state academic standards or guidelines. Since districts are responsible for awarding diplomas so too are they responsible for providing all students the opportunity to learn the content outlined by the standards. As the learning skills for college and the workplace have merged, the MMC, if properly implemented, will prepare students with the skills and knowledge needed to be successful in our global economy and an emerging workforce. The MMC supports the need for personalization, acceleration, and innovation in an atmosphere of high expectations and high support for students earning a diploma in Michigan.

Michigan High School Graduation Requirements (18 Credits)

ENGLISH LANGUAGE ARTS (ELA) - 4 Credits

• Proficiency in State Content Standards for ELA (4 credits)

MATHEMATICS – 4 Credits

- Proficiency in State Content Standards for Mathematics (3 credits); and
- Proficiency in district approved 4th Mathematics credit options (1 credit) (Student MUST have a Math experience in their final year of high school.)

ONLINE LEARNING EXPERIENCE

• Course, Learning, or Integrated Learning Experience.

PHYSICAL EDUCATION & HEALTH – 1 Credit

- Proficiency in State Content Standards for Physical Education and Health (1 credit); or
- Proficiency with State Content Standards for Health (1/2 credit) and district approved extracurricular activities involving physical activities (1/2 credit).

SCIENCE – 3 Credits

- Proficiency in State Content Standards for Science (3 credits); or
- Beginning with the Class of 2015: Proficiency in some State Content Standards for Science (2 credits) and completion of a Department approved formal Career and Technical Education (CTE) program (1 credit).

SOCIAL STUDIES – 3 Credits

• Proficiency in State Content Standards for Social Studies (3 credits).

VISUAL, PERFORMING, AND APPLIED ARTS - 1 Credit

• Proficiency in State Content Standards for Visual, Performing, and Applied Arts (1 credit).

WORLD LANGUAGE – 2 Credits (Effective with students entering 3rd Grade in 2006)

- Formal coursework or an equivalent learning experience in Grades K-12 (2 credits); or
- Formal coursework or an equivalent learning experience in Grades K-12 (1 credit) and completion of a Department approved formal Career and Technical Education program or an additional visual, performing, and applied arts credit (1 credit).

General Overview

1. How does the Michigan Merit Curriculum impact local school district decisions?

The MMC gives districts the flexibility to develop courses, curricula, and systems, which meet the individual needs and desires of each district. Local school boards, in collaboration district administration, have the responsibility to determine "how" to implement the graduation requirements outlined by the MMC and when students have earned the appropriate credits.

Local boards of education can establish additional graduation requirements beyond those in the MMC and the total number of credits required for graduation. However, a district cannot establish lesser requirements. [See also <u>Earning Credit</u>]

2. Which students must meet the requirements of the MMC to receive a diploma?

Districts must ensure that any student who entered 8th Grade in 2006 year and wishes to receive a high school diploma from a public school must meet the requirements of the MMC. This includes alternative and adult education students. Modifications can be made to the MMC based on student needs (see Personal Curriculum Options).

Students seeking a General Educational Development (GED) are not subject to the MMC requirements since the GED is an equivalency diploma issued by the U. S. government and is subject to its own criteria. Except for the one semester credit requirement in Civics/Government, non-public and home schools can set their own graduation criteria and are not required to ensure that students have met the requirements of the MMC.

3. What is an Educational Development Plan (EDP)?

The Michigan Merit Curriculum legislation 380.1278b (11) states:

The board of a school district or board of directors of a public school academy shall provide the opportunity for each pupil to develop an educational development plan during 7th Grade, and shall ensure that each pupil reviews his or her educational development plan during 8th Grade and revises it as appropriate before he or she begins high school. An educational development plan shall be developed, reviewed, and revised by the pupil under the supervision of the pupil's school counselor or another designee qualified to act in a counseling role under Section 1233 or 1233a selected by the school principal and shall be based on high school readiness scores and a career pathways program or similar career exploration program. An

educational development plan shall be designed to assist pupils to identify career development goals as they relate to academic requirements. During the process of developing and reviewing a pupil's educational development plan, the pupil shall be advised that many of the curricular requirements of this Section and Section 1278a may be fulfilled through **Career and Technical Education (CTE)**.

It is up to the district to determine processes and timelines for implementing this requirement. The Department has developed guidelines for the use of EDPs at the following link: <u>http://bit.ly/2xLVgnH</u> [See also <u>Personal Curriculum Options</u>]

Earning Credit

What the Michigan Merit Curriculum Law Says

380.1278(a) (4)(a) A pupil is considered to have completed a credit if the pupil successfully completes the subject area content expectations or guidelines developed by the Department that apply to the credit. For a Career and Technical Education (CTE) credit, a school district or public school academy may supplement those content expectations and guidelines with additional guidelines developed by the school district or public school academy.

380.1278(a) (4)(b) A school district or public school academy shall base its determination of whether a student has successfully completed the subject area content expectations or guidelines developed by the Department that apply to a credit at least in part on the student's performance on the assessments developed or selected by the Department or on one or more assessments developed or selected by the school district or public school academy that measure a student's understanding of the subject area content expectations or guidelines that apply to the credit.

380.1278(a) (4)(c) A school district or public school academy shall also grant a pupil a credit if the pupil earns a qualifying score, as determined by the Department, on the assessments developed or selected for the subject area by the Department under Section 1278b or the pupil earns a qualifying score, as determined by the school district or public school academy, on 1 or more assessments developed or selected by the school district or public school academy that measure a pupil's understanding of the subject area content expectations or guidelines that apply to the credit.

380.1278(b) (2) If a pupil successfully completes one or more of the high school credits required under Subsection (1) or under Section 1278a(1) before entering high school, the pupil shall be given high school credit for that credit.

380.1278(b) (7) The board of a school district or board of directors of a public school academy that operates a high school shall ensure that each pupil is offered the curriculum

necessary for the pupil to meet the curricular requirements of this Section and Section 1278a. The board or board of directors may provide this curriculum by providing the credits specified in this Section and Section 1278a, by using alternative instructional delivery methods such as alternative course work, humanities course sequences, CTE, industrial technology courses, or vocational education, or by a combination of these. School districts and public school academies that operate CTE programs are encouraged to integrate the credit requirements of this Section and Section 1278a into those programs.

380.1278(b) (14) This Section and Section 1278a do not prohibit a pupil from satisfying or exceeding the credit requirements of the Michigan merit standard under this Section and Section 1278a through advanced studies such as accelerated course placement, advanced placement, dual enrollment in a postsecondary institution, or participation in the international baccalaureate program or an early college/middle college program.

1. What counts as a credit under the Michigan Merit Curriculum?

The MMC requires that credit be awarded based on a student's demonstration that he or she has successfully met the content expectations for the credit area, not by the commonly used Carnegie unit, which is based on seat time. The <u>subject area</u> <u>standards</u>, <u>expectations or guidelines</u> outline the content required for earning the total credit in each content area as specified in the legislation. Districts determine the credit pathway options. A district may choose to assign a full subject area credit to a course; or they may choose to design courses and learning experiences for students that provide opportunities for students to earn partial credit in one or more content areas.

2. How can students earn credit?

Students may earn credit if they successfully demonstrate mastery of the <u>subject</u> <u>area content standards, expectations or guidelines</u> for the credit. The assignment of credit must be based, at least in part, on student performance on assessments designed to measure the extent to which they meet the standards, expectations and guidelines. Assessments and criteria for success are determined by local districts. In addition to traditional course pathways, schools can also offer credit-bearing learning opportunities in a variety of ways, including:

- Integrated Content and Course Sequences;
- Project-based Learning;
- Independent Teacher-guided Study; or
- Testing out.

In addition, the district may allow students to satisfy credit requirements through:

• Career and Technical Education;

- Work-based Learning Programs;
- <u>College Coursework;</u>
- Early College;
- <u>Advanced Placement Courses;</u>
- International Baccalaureate Courses; or
- On-line classes.

How do the NCAA rules impact district-level course decisions?

Because courses utilizing flexible learning options are designed and delivered locally, the NCAA suggests that those considering such visit the NCAA Eligibility Center and read the <u>Non-traditional Course FAQ</u>. If districts feel that the non-traditional course being offered students meets the requirements listed, districts may call (877) 622-2321 for review.

3. Will colleges accept students who earn credit through non-traditional classes, such as integrated Mathematics or project-based learning?

Colleges and universities see a variety of transcripts from multiple states and countries that vary in course name and format of reporting. Individual institutes of higher education make the ultimate determination in accepting students. Districts may want to contact the institutes for clarification on their application requirements. More information regarding transcripts can be found <u>here</u>.

4. Do we have to worry about "double-dipping"; in other words, can a course count towards credit in more than one content area?

Yes, courses can be used to grant more than one credit. Since credit is based on student proficiency with the content, how and where they learn the content has no bearing on credit as long as students satisfactorily demonstrate proficiency on district-determined measures. For instance, a student who takes a class that addresses both physics and mathematics concepts should be able to earn partial, or full, credit in both subjects once they demonstrate knowledge of the content.

Content Standards and Guidelines

English Language Arts (ELA) What the Michigan Merit Curriculum Law Says:

Sec. 1278b (1) Except as otherwise provided in this Section or Section 1278a, beginning with pupils entering 8th Grade in 2006, as part of the requirements under Section 1278a the board of a school district or board of directors of a public school academy shall not award a high school diploma to a pupil unless the pupil has successfully completed all of the following credit requirements of the Michigan merit standard before graduating from high school:

(a) At least 4 credits in English Language Arts that are aligned with subject area content expectations developed by the Department and approved by the State Board under this Section.

Sec. 1278b (5)(f) The English Language Arts credit requirements of Subsection (1)(a) and the Science credit requirements of Subsection (1)(b) are not subject to modification as part of a personal curriculum under this Subsection.

1. What are the required courses for ELA?

There are no required courses. Students must earn at least 4 credits in ELA that are aligned with subject area standards for the English Language Arts. Students may earn this credit in traditional reading and writing courses, but they may also earn credit through courses that integrate in the ELA standards. For more information see the ELA Credit Guidelines. ELA credit requirements cannot be modified with a personal curriculum.

Mathematics

What the Michigan Merit Curriculum Law Says:

Sec 1278a (1)(a)(i) At least 4 credits in Mathematics that are aligned with subject area content expectations developed by the Department and approved by the State Board under Section 1278b, including completion of at least Algebra I, Geometry, and Algebra II, or an integrated sequence of this course content that consists of 3 credits, and an additional Mathematics credit, such as Trigonometry, Statistics, Pre-Calculus, Calculus, Applied Math, Accounting, Business Math, a retake of Algebra II, or a course in Financial Literacy as described in Section 1165. A pupil may complete Algebra II over 2 years with 2 credits awarded or over 1.5 years with 1.5 credits awarded for the purposes of this Section and Section 1278b. A pupil also may partially or fully fulfill the algebra II requirement by completing a Department-approved formal Career and Technical Education (CTE) program or curriculum, that has appropriate embedded Mathematics content, such as a program or

curriculum in Electronics, Machining, Construction, Welding, Engineering, Computer Science, or Renewable Energy and in that program or curriculum successfully completing the same content as the Algebra II benchmarks assessed on the Department-prescribed state high school assessment, as determined by the Department. Each pupil must successfully complete at least 1 Mathematics course during his or her final year of high school enrollment. This subparagraph does not require completion of Mathematics courses in any particular sequence.

Sec. 1278b 5(g) The Mathematics credit requirements of Section 1278a (1)(a)(i) may be modified as part of a <u>personal curriculum</u> if the pupil successfully completes at least 3-1/2 total credits of the Mathematics credits required under that section before completing high school, including Algebra I and Geometry, and successfully completes at least 1 Mathematics credit during his or her final 2 years of high school. The Algebra II credit required under that section may be modified as part of a personal curriculum under this subsection if the pupil meets 1 or more of the following:

- (i) Successfully completes the same content as 1 semester of Algebra II, as determined by the Department.
- (ii) Elects to complete the same content as Algebra II over 2 years, with a credit awarded for each of those 2 years, and successfully completes that content.
- (iii) Enrolls in a formal CTE program or curriculum and in that program or curriculum successfully completes the same content as 1 semester of the Algebra II benchmarks assessed on the Department- prescribed state high school assessment, as determined by the Department.
- (iv) Successfully completes 1 semester of Statistics, or Functions and Data Analysis, or Technical Mathematics.

1. What are the required courses for mathematics?

There are no required courses. Students must earn at least 3 credits in mathematics that are aligned with <u>subject area standards approved by the State</u> <u>Board</u>. Each pupil must successfully complete at least one mathematics or mathematics-related credit during his or her final year of high school enrollment. This credit can be earned through any course or experience where students are applying mathematics. For more information see the <u>Mathematics Credit Guidelines</u>.

2. Does mathematics have to be taught in a traditional course sequence?

No. The law specifically states that the standards can be taught in an integrated sequence (see legislation cited above). Furthermore, <u>380.1278(b) (7)</u> states "The board of a school district or board of directors of a public school academy that

operates a high school ... may provide this curriculum by providing the credits specified in this section and Section 1278a, by using alternative instructional delivery methods such as alternative course work, Humanities course sequences, Career and Technical Education (CTE), Industrial Technology courses, or Vocational Education, or by a combination of these. School districts and public school academies that operate CTE programs are encouraged to integrate the credit requirements of this Section and Section 1278a into those programs."

3. What is the difference between the 4th mathematics credit and the final year mathematics course requirement?

In many cases the 4th mathematics credit and the final year mathematics requirement are one and the same. For instance, students who complete the required mathematics content standards by the end of their junior year will probably complete their 4th credit in their senior year. Similarly, traditional course-taking students electing to take Algebra II over 2 years for 2 credits will probably take the 2nd year of Algebra II in their senior year.

However, the 4th mathematics credit is not necessarily synonymous with the final year math credit. The intent of the final year math credit is that students are doing some sort of mathematics in their senior year regardless of whether they have already met the 4 credit requirement.

4. Does the 4th credit/final year mathematics course need to be an actual mathematics course?

No. The law provides local districts with the flexibility to determine what counts for the 4th/final year mathematics credit, including the content and duration. It does not need to be aligned with the mathematics standards because those are covered in the other 3 credits. The credit could be in a basic or an applied math area, such as Business Math, Accounting, Pre-algebra, etc. The course could also be an advanced mathematics course such as Pre-calculus, or college-level courses through dual enrollment or early middle college programs. Non-mathematics courses or experiences where students apply mathematics can also counts as the 4th credit/Senior year mathematics course such as computer programming, science or art courses; Career and Technical Education (CTE), work study program, or practicum where the students are using the mathematics they have already learned.

5. What is considered the "final year" in the context of the mathematics credit for students in Early Middle College?

Early middle college students must take a mathematics or math-related course in their 5th year.

6. What is technical mathematics?

Districts determine content, structure, and delivery of mathematics courses. In addition, districts are responsible for ensuring that students demonstrate proficiency in Michigan's Mathematics Standards. Therefore, districts decide what mathematics to include in a technical mathematics course, just as they do with any other mathematics course.

7. In order to replace a mathematics credit with Department-approved formal Career and Technical Education (CTE) program or curriculum, how do districts determine what mathematics content needs to be embedded so that the content is the same as the "Algebra II benchmarks assessed on the Department-prescribed state high school assessment?"

There are no specified "Algebra II benchmarks" on the state high school assessment. The current Department-prescribed state high school assessment is the SAT, administered in the spring of students' junior year, which does not specify the standards assessed by courses.

Because of the specificity in the legislation regarding the exchange of Algebra II with a formal CTE program, there is no difference between exchanging the Algebra II credit and earning Algebra II credit through the integration of the Mathematics into a CTE program or class. Districts are encouraged to use the <u>Mathematics Credit</u> <u>Guidelines</u> to ensure that students have the opportunity to learn all of the Mathematics standards before they graduate whether they are enrolled in a formal CTE program or not.

Online Learning Experience What the Michigan Merit Curriculum Law Says:

1278b (1)(b) Meets the online course or learning experience requirement of this Subsection. A school district or public school academy shall provide the basic level of technology and internet access required by the State Board to complete the online course or learning experience. For a pupil to meet this requirement, the pupil shall meet either of the following, as determined by the school district or public school academy:

- (i) Has successfully completed at least 1 course or learning experience that is presented online, as defined by the Department.
- (ii) The pupil's school district or public school academy has integrated an online experience throughout the high school curriculum by ensuring that each teacher of each course that provides the required credits of the Michigan merit curriculum has integrated an online experience into the course.

This document is intended to provide general guidance. Due to the complexity of the law, policies and guidance will continue to evolve. For specific information regarding the law, please refer to MCL 380.1278a and MCL 380.1278b.

1. What are the specific requirements for online learning and courses?

Students must successfully complete at least 1 online course or learning experience. The Michigan Department of Education has developed <u>Online Learning Guidelines</u> that describe in more detail the options for fulfilling this requirement.

2. Can the online learning requirement be met prior to 9th Grade?

Yes, the requirement may be satisfied by an online experience at the middle school level, but students are encouraged to continue with online learning throughout high school.

3. Does the online learning experience need to go on a transcript?

While districts will need to assure students complete this requirement, the law does not mandate that a student be given credit for this experience or this experience be recorded on a transcript.

4. Can a student taking a class, which the district has determined meets the online learning requirements, test out of both the class and the online requirement?

No. While a student may test out of a subject or course required by the Michigan High School Graduation Requirements, the law does not mention testing out of the online requirement. The online requirement is unlike the other graduation requirements in that it is more about process than content. It is about the process of pursuing learning in an online environment and not about computer skills or additional content. It is unlikely that any kind of testing-out assessment (like an end-of-course exam) could truly "test" the process that occurs when a student engages with content, other students, and a teacher online.

Physical Education and Health What the Michigan Merit Curriculum Law Says:

MCL 380.1278a (iii) At least 1 credit in subject matter that includes both Health and Physical Education aligned with guidelines developed by the Department and approved by the State Board under Section 1278b [or at least 1/2 credit in Health aligned with guidelines developed by the Department and approved by the State Board under Section 1278b and at least 1/2 credit awarded by the school district or public school academy for approved participation in extracurricular athletics or other extracurricular activities involving physical activity].

MCL 380.1278b (5)(i) The Health and Physical Education credit requirement under Section 1278a (1)(a)(iii) may be modified as part of a <u>personal curriculum</u> only if the modification

requires the pupil to complete 1 additional credit in English Language Arts, Mathematics, or Science or 1 additional credit in a language other than English, or requires the pupil to complete a formal Career and Technical Education (CTE) Program. This additional credit must be in addition to the number of those credits otherwise required under Subsection (1) and Section 1278a (1) or under Section 1278a (2).

1. Do the requirements give the option for students to take just physical education OR health?

No. One credit that includes both physical education AND health must be earned by high school students for graduation. The requirement could be met in 2 separate courses each earning 1/2 credits. The 1/2 credit for Physical Education may also be awarded by the school district or public school academy for <u>approved</u> participation in extracurricular athletics or other extracurricular activities involving physical activity. Please note, however, that this pertains <u>only</u> to the <u>physical education</u> <u>credit guidelines</u> of the MMC, <u>not</u> the <u>health education credit guidelines</u>.

2. What extra-curricular athletics or other extracurricular activities involving physical activity are allowed to fulfill the 1/2 credit of physical education?

A district may determine what extracurricular activities involving physical activity may be used as credit toward the physical education requirement. The Department strongly recommends the local school board develop its own policy outlining what is acceptable for the credit as to be clear to students and parents and consistent in implementation.

3. Can a student required to take the MMC modify or waive the state's physical education or health credit requirement for any reason?

Yes, under certain conditions. The Michigan Merit Curriculum (MMC) MCL 380.1278b, allows a student to substitute one Physical Education and Health credit to acquire extra English language arts, mathematics, science or world language credits, if a student has an approved personal curriculum.

In addition, students may test out of any state-required graduation credit if the student earns: 1) a qualifying score, as determined by the Department, on the assessments developed or selected for the subject area by the Department or 2) the student earns a qualifying score, as determined by the school district or public school academy, on one or more assessments developed or selected by the school district or public school academy that measure a student's proficiency in the content expectations or guidelines that apply to the credit.

Science

What the Michigan Merit Curriculum Law Says:

Sec. 1278b (1)(b) At least 3 credits in Science that are aligned with subject area content expectations developed by the Department and approved by the State Board under this Section, including completion of at least Biology and either Chemistry, Physics, Anatomy, or Agricultural Science, or successfully completing a program or curriculum that provides the same content as the Chemistry or Physics benchmarks, as determined by the Department. A student may fulfill the requirement for the 3rd Science credit by completing a Department-approved Computer Science program or curriculum or formal Career and Technical Education (CTE) program or curriculum. The legislature strongly encourages pupils to complete a 4th credit in Science, such as Forensics, Astronomy, Earth Science, Agricultural Science, Environmental Science, Geology, Physics, Chemistry, Physiology, or Microbiology.

380.1278b (5)(f) The Science credit requirements of Subsection (1)(b) are not subject to modification as part of a personal curriculum under this Subsection.

1. What are the required number of science credits?

At least 3 credits in science that are aligned with subject area content standards approved by the State Board. A student may fulfill the requirement for the 3rd Science credit by completing a <u>formal CTE program or curriculum</u>.

2. What course(s) may serve as a student's 3rd Science credit?

Districts determine content, structure, and delivery of Science courses. The standards themselves represent 3 science credits. Districts are responsible for ensuring that students have an opportunity to learn the content outlined by the <u>Michigan Science Standards</u> since these will be tested on the 11th grade <u>Michigan Merit Exam</u>. More information can be found in the <u>Science Credit Guidelines</u> document.

3. Can a student take a CTE class for the 3rd Science credit?

Any course or program, including CTE, which integrates Science content may count as the 3rd science credit. If the 3rd Science credit is <u>exchanged</u> for a <u>formal CTE</u> <u>program or curriculum</u> then science content does not need to be integrated. However, districts are responsible for ensuring that students have an opportunity to learn the content as outlined in the <u>Michigan Science Standards</u> since these will be tested on the 11th grade <u>Michigan Merit Exam</u>.

4. Can a student take a computer science class for the 3rd Science credit?

Any course or program, including a computer science course, which <u>integrates</u> science content may count as the 3rd Science credit. Currently there is not a department-approved computer science program or curriculum that can be <u>exchanged</u> for the 3rd science credit.

5. Do districts have to provide the courses specified in the legislation (see above)?

No. <u>380.1278(b) (7)</u> states "The board of a school district or board of directors of a public school academy that operates a high school ... may provide this curriculum by providing the credits specified in this Section and Section 1278a, by using alternative instructional delivery methods such as alternative course work, humanities course sequences, CTE, industrial technology courses, or vocational education, or by a combination of these. School districts and public school academies that operate CTE programs are encouraged to integrate the credit requirements of this Section and Section 1278a into those programs."

6. Can Earth Science still be offered for high school credit in 8th grade?

Any high school credit offered in middle school must be based on the high school standards. Middle school students must have an opportunity to learn the 6th-8th grade science standards in order to be prepared for high school science so care should be taken to ensure that any middle school earth science class contains both the middle school and high school content. More information can be found in the <u>Science Credit Guidelines</u> and at <u>www.michigan.gov/Science</u>. [See also <u>Earning</u> <u>Credit</u> and <u>Career/Technical Education</u>]

Social Studies

What the Michigan Merit Curriculum Law Says:

Sec. 1278a (ii) At least 3 credits in Social Science that are aligned with subject area content expectations developed by the Department and approved by the State Board under Section 1278b, including completion of at least 1 credit in U.S. History and Geography, 1 credit in World History and Geography, 1/2 credit in Economics, and the Civics course described in Section 1166(2). The 1/2-credit Economics requirement may be satisfied by completion of at least a 1/2-credit course in Personal Economics that includes a Financial Literacy component as described in Section 1165, if that course covers the subject area content expectations for Economics developed by the Department and approved by the State Board under Section 1278b.

Sec. 1278b (5)(h) The Social Science credit requirements of Section 1278a (1)(a)(ii) may be modified as part of a <u>personal</u> <u>curriculum</u> only if all of the following are met:

This document is intended to provide general guidance. Due to the complexity of the law, policies and guidance will continue to evolve. For specific information regarding the law, please refer to MCL 380.1278a and MCL 380.1278b.

 The pupil has successfully completed 2 credits of the Social Science credits required under Section 1278a (1), including the Civics course described in Section 1166(2)

1166(2) The course shall include the form and functions of the federal, state, and local governments and shall stress the rights and responsibilities of citizens. A diploma shall not be issued by a high school to a pupil who has not successfully completed this course. This course requirement is not a graduation requirement for a high school pupil who has enlisted or been inducted into military service.

1. What are the required number of Social Studies credits?

Three credits of Social Studies aligned with the subject area content expectations developed by the Department to include 1 credit in U.S. History and Geography, 1 credit in World History and Geography, 1/2 credit in Economics, and 1/2 credit in Civics/Government. More information can be found in the <u>Social Studies Credit</u> <u>Guidance</u> document.

2. Where will educators find the Social Studies content standards?

Content standards and other guidelines can be found at <u>www.michigan.gov/academicstandards</u>.

3. How does the legislation change regarding personal finance impact my Economics curriculum? Don't we already have personal Economics content expectations in our Social Studies standards?

Legislation states that a personal economics course that includes a Financial Literacy component also cover the Economic standards. There is little change except to increase emphasis on Personal Economics. The current content expectations for Economics include E4 Personal Finance which has 6 content expectations on Personal Economics.

4. Can we replace a Economics course with a "Personal Finance" or "Personal Economics" class?

Legislation requires districts to provide students with opportunities to learn all the Social Studies content expectations, including those addressing economics, regardless of course names. Districts can develop personal finance or personal economic courses that meet their students' learning needs that do not include the Economic content expectations as long as students have opportunities to learn the economic content elsewhere. More information can be found in the <u>Social Studies</u> <u>Credit Guidance</u> document.

5. Recent legislation requires "that the high school social studies content standards developed by the Michigan Department of Education include the content covered by the federal naturalization test." What do we need to do at the local level to make sure this content is addressed?

MDE completed a crosswalk of the 100 Citizenship questions and the Social Studies Content Expectations. 79 of the citizenship questions are already included in the Social Studies Content Expectations. The other 21 questions are either rote memorization, have different answers in different parts of the state, or change over time. Schools and teachers addressing the Social Studies Content Expectations with appropriate detail will address all content on the Citizenship test.

6. Recent legislation requires "that Michigan's social studies curriculum and statewide assessment program include instruction and testing about genocides, including the Holocaust." What changes in the Social Studies Content Expectations will MDE make to address this concern?

Michigan's current Social Studies Content Expectations already include the Hololcaust, "the genocides of Armenians, Romas (Gypsies), and Jews, and the mass exterminations of Ukrainians and Chinese," and "-causes of and responses to ethnic cleansing/genocide/mass extermination (e.g., Darfur, Rwanda, Cambodia, Bosnia)." Schools and teachers addressing the Social Studies Content Expectations with appropriate detail will address content on the genocides including the Holocaust.

Visual, Performing and Applied Arts What the Michigan Merit Curriculum Law Says:

Sec. 1278a (1)(iv) The board of a school district or board of directors of a public school academy shall not award a high school diploma to a pupil unless the pupil has successfully completed at least 1 credit in Visual Arts, Performing Arts, or Applied Arts, that is aligned with guidelines developed by the Michigan Department of Education.

Sec. 1278a (2)For pupils who graduate from high school in 2016, 2017, 2018, 2019, 2020, or 2021 ONLY, a pupil may partially or fully fulfill 1 credit of [a world language] by completing a Department-approved formal Career and Technical Education (CTE) program or curriculum or by completing visual or performing arts instruction that is in addition to the requirements under Subsection (1) (a)(iv).

Sec. 1278b (5)(g)(j)(j) The Visual Arts, Performing Arts, or Applied Arts credit requirement under Section 1278a (1)(a)(iv) may be modified as part of a <u>personal curriculum</u> only if the modification requires the pupil to complete 1 additional credit in English Language Arts, Mathematics, or Science or 1 additional credit in a language other than English, or requires the pupil to 1 complete a formal CTE program. This additional credit must be in addition to the number of those credits otherwise required under Subsection (1) and Section 1278a (1) or under Section 1278a (2).

1. What are the required number of credits for the Visual, Performing, and Applied Arts?

Students must complete 1 credit aligned with the guidelines developed by the Michigan Department of Education. See information the <u>Personal Curriculum Options</u> and <u>Career and Technical Education</u>.

2. Where will educators find the Visual, Performing, and Applied Arts guidelines?

Content standards and guidelines can be found at <u>www.michigan.gov/academicstandards</u>.

3. Can a student exchange a World Language credit for a Visual, Performing, and Applied Arts credit?

Yes. Starting with the graduating class of 2016 a student has the option to reduce the number of World Language credits to one and increase the Visual, Performing, and Applied Arts credits to two. If a student entered 3rd Grade before 2006 they are exempt from the world language requirement under the Michigan Merit Curriculum (MMC), even if they graduate in 2016 or later.

World Language What the Michigan Merit Curriculum Law Says:

Sec. 1278a (2) In addition to the requirements under Subsection (1), beginning with pupils entering 3rd Grade in 2006, the board of a school district or board of directors of a public school academy shall not award a high school diploma to a pupil unless the pupil has successfully completed during Grades K to 12 at least 2 credits that are grade-appropriate in a language other than English or course work or other learning experiences that are substantially equivalent to 2 credits in a language other than English, based on guidelines developed by the Department.

For pupils who graduate from high school in 2016, 2017, 2018, 2019, 2020, or 2021 ONLY, a pupil may partially or fully fulfill one credit of this requirement by completing a Department-approved formal Career and Technical Education (CTE) program or curriculum or by completing visual or performing arts instruction that is in addition to the requirements under Subsection (1)(a)(iv). The board of a school district or board of directors of a public school academy is strongly encouraged to ensure that all pupils complete at least one credit in a language other than English in Grades K to 6. For the purposes of this Subsection, all of the following apply:

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- (a) American Sign Language is considered to be a language other than English.
- (b) The pupil may meet all or part of this requirement with online course work.
 - 1. What, and for whom, are the credit requirements for a language other than English?

Beginning with the graduating class of 2016, students need to complete, during Grades K-12, the equivalent of 2 grade appropriate credits in a language other than English or have course work or other learning experience that are substantially equivalent to 2 credits. If a student entered 3rd Grade before 2006 they are exempt from the world language requirement under the Michigan Merit Curriculum (MMC), even if they graduate in 2016 or later. However, districts can, as with any other subject, impose their own World Language requirements that go beyond the requirements of the MMC.

2. How can students meet the requirement?

Students can meet the world language requirement in the following ways:

- By completing the equivalent of 2 credits in a language other than English during Grades K-12.
- Through learning beyond the K-12 classroom: formal study abroad, study abroad programs, college coursework, home or heritage languages, online courses, or other life experiences as determined by the district.
- Students who are graduating from high school in 2016, 2017, 2018, 2019, 2020, or 2021, only may partially or fully fulfil 1 credit of the World Language requirement by completing a Department approved formal CTE program or by completing Visual, Performing, or Applied Arts instruction that is in addition to the Visual, Performing, and Applied Arts requirement.
- More information and guidelines on meeting the credit requirements for learning a language other than English can be found at www.michigan.gov/academicstandards.

Career/Technical Education (CTE) What the Michigan Merit Curriculum Law Says:

Earning Credit

380.1278(b) (7) The board or board of directors may provide this curriculum by providing the credits specified in this Section and Section 1278a, by using alternative instructional delivery methods such as ... **Career and Technical Education (CTE)**. Mathematics

Sec 1278a (1)(a)(i) ...A pupil may partially or fully fulfill the algebra II requirement by completing a **Department- approved formal CTE program or curriculum**, that has appropriate embedded Mathematics content, such as a program or curriculum in

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Electronics, Machining, Construction, Welding, Engineering, Computer Science, or Renewable Energy, and in that program or curriculum successfully completing the same content as the Algebra II benchmarks assessed on the Department-prescribed state high school assessment, as determined by the Department.

<u>Science</u>

380.1278b (1)(b) ...A student may fulfill the requirement for the 3rd Science credit by completing a **Department- approved formal CTE program or curriculum**... World Language

Sec. 1278a (2) (2)... For pupils who graduate from high school in 2016, 2017, 2018, 2019, 2020, or 2021 ONLY, a pupil may partially or fully fulfill 1 credit of this requirement by completing a **Department-approved formal CTE program or curriculum...**

1. What is a "Department-approved formal Career and Technical Education (CTE) program"?

This is defined in the <u>Michigan Administrative Code</u>. According to R 395.241, Rule 11, a "Department-approved formal CTE program or curriculum" consists of:

- A coherent sequence of courses so that students gain academic, technical, and work behavior skills.
- Instruction that includes classroom, laboratory, work based learning, and leadership opportunities.
- Instruction that is supervised, directed, or coordinated by an appropriately certificated CTE teacher.
- Consists of standards approved by the State Board (R395.243, Rule 13).
- Must receive approval from MDE/OCTE through an application process (R 395.244, Rule 14).

According to R 395.243, Rule 13 "Successful Completion" means

- Complete coursework covering all state program standards, and/or
- Take any required technical assessment.

For state and federal funding purposes, a new CTE instructional program must submit an application to operate which must be approved by the MDE CTE office. The number of courses covering the standards in a CTE program is determined by the district and submitted in its application. The district may design one or two year programs. Not all high school students in CTE instructional programs can complete the requirements for certificates. Some industry certificates/licensures can only be received once a student turns 18 years old or after they have completed additional postsecondary coursework.

2. What is the difference between replacing a MMC credit requirement and earning a MMC credit requirement through a CTE program?

The law is explicit in stating that a credit may only be replaced by a "Departmentapproved formal CTE program," as described above and in the <u>Michigan</u> <u>Administrative Code</u>. By replacing a course with formal CTE program, the program does not need to embed the content standards from the content area being replaced. On the other hand, students may earn credit in a variety of ways, including integrating academic content into CTE instruction. (See also <u>Earning</u> <u>Credit</u>).

3. Which MMC credit requirements may be replaced with a CTE program?

The following credits may be replaced only with a Department-approved formal CTE program as defined in <u>administrative code</u> for students *without* a personal curriculum:

- 1 credit of a world language; and/or
- 1 Science credit.

Completion of a Department approved formal CTE program may be used to replace one or both of these credits.

Through a personal curriculum, students have options for replacing one MMC credit in Social Studies, physical education/health, and/or visual, performing and applied arts with a Department-approved formal CTE program. More information is available on the <u>Personal Curriculum webpage</u>. One Department-approved formal CTE program may be used to replace up to three of these credits.

4. Can the CTE content be modified under a personal curriculum?

Only the content outlined by the content standards and required by the Michigan Merit Curriculum (MMC) can be modified with personal curriculum. If MMC content is embedded within the CTE program it is assumed that it is content integral to success with the skills and knowledge needed for successful completion of the CTE program. Therefore it is not recommended that students in a CTE program of study use a personal curriculum to modify content.

5. In order to replace a Mathematics credit with Department-approved formal CTE program or curriculum, how do districts determine what Mathematics content needs to be embedded so that the content is the same as the "Algebra II benchmarks assessed on the Department-prescribed state high school assessment?"
There are no specified "Algebra II benchmarks" on the state high school assessment.

Because of the specificity in the legislation regarding the exchange of Algebra II with a formal CTE program, there is no difference between exchanging the Algebra II credit and earning Algebra II credit through the integration of the Mathematics into a CTE program or class. Districts are encouraged to use the <u>Mathematics Credit</u> <u>Guidelines</u> to ensure that students have the opportunity to learn all of the Mathematics standards before they graduate whether they are enrolled in formal CTE program or not.

6. Which MMC credit requirements can be earned through a Career and Technical Education (CTE) program?

CTE programs may be used to help students partially or fully earn the necessary credits in a variety of required credit areas. For example, a district may allow a student to receive credit for Mathematics in building trades classes, if the district determines that the building trades program covers the required high school content expectations for those subjects. It is also possible for CTE courses to be used to help students in, for instance, an electronics class earn credit for the "one additional Math or Math-related" credit required in the MMC. The amount of academic credit granted for CTE Programs is a local decision.

<u>Guidelines for Awarding Academic Credit in CTE, Humanities and Other Delivery</u> <u>Models</u> provide a format for using teacher work teams in each local district to examine the CTE curriculum and determine the amount of academic credit to award based on a crosswalk with the content expectations. Local districts are encouraged to use the guidelines for awarding academic credit in ways other than CTE as well.

7. Can a student take a CTE class for the 3rd Science credit?

Yes, any course, including CTE programs, that integrates Science may count as a Science credit. If the 3rd Science credit is *exchanged* for a <u>formal CTE program or curriculum</u> then Science content does not need to be integrated. However, districts are responsible for ensuring that students have an opportunity to learn the standards for Science as outlined in the <u>Michigan Science Standards</u> since these will be tested on the 1th Grade Science exam. [See also <u>Earning Credit</u> and <u>Career/Technical Education</u>]



Michigan Department of Education Memorandum February 23, 2017



STATE OF MICHIGAN DEPARTMENT OF EDUCATION LANSING

BRIAN J. WHISTON STATE SUPERINTENDENT

RICK SNYDER GOVERNOR

MEMORANDUM

DATE: February 23, 2017

TO: Local and Intermediate School District Superintendents Public School Academy Directors

- **FROM:** Venessa A. Keesler, Ph.D., Deputy Superintendent Division of Educator, Student, and School Supports
- **SUBJECT:** Digital Badges Documenting Student Competencies

Since the passage of the Michigan Merit Curriculum (MMC) in 2006, student credit is based on demonstrated proficiency and not seat time. Districts are responsible for determining these proficiency measures. This law complements the Governor's call for Any Time, Any Place, Any Way, Any Pace learning and the Michigan Department of Education (MDE) Top 10 in 10 goal of personalized learning for all students. Furthermore, districts have the flexibility to decide how students' knowledge and skills are shared with postsecondary institutions and potential employers (i.e. transcripts). Finally, advances in technology, including Student Information Systems (SIS) and the data hubs support districts that are looking for ways to better share the authentic work that students have mastered. Digital badges allow students to share with a variety of audiences what they know and can do. This <u>short video</u> provides an introduction to digital badges. The technology is exciting because badge providers can construct a badge to include the academic standards and 21st century skills as well as other competencies gained through the learning experience. Unlike credit based on course completion, a badge is a digital portfolio that includes authentic evidence of student proficiency.

The badge presents an opportunity to thoughtfully personalize learning for each student by allowing educators to see what demonstrated competencies students already bring to the learning environment. It also encourages more defined relationships and communication between the out-of-school time world and the formal system. An example of digital badging and credit issuance is taking place through the Section 99h FIRST Robotics Grants, a grant program managed by the MDE. Grantees agreed to:

- Be willing to offer elective high school credits for students who have successfully logged 60 hours, provided the team attends a minimum of two FIRST in Michigan district competitions.
- Be willing to participate in the digital badging program established by the statewide FIRST Robotics team of coaches.

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The FIRST in Michigan organization has developed a badging system to support districts and coaches issue digital badges. More information can be found at: <u>https://www.firstbadges.com/</u>.

For more information about granting credit or the MMC, please visit our <u>Frequently Asked</u> <u>Questions</u> document. For more information about the Section 99h FIRST Robotics Program, access the <u>grant criteria here</u>. For questions about how you might consider using digital badges or any of the above information contact:

- Lorraine Thoreson, <u>ThoresonL@michigan.gov</u>, 21st CCLC / After School Programming
- Gregg Dionne, <u>DionneG@michigan.gov</u>, Curriculum and Instruction Unit
- Ann-Marie Mapes, MapesA@michigan.gov, FIRST Robotics and Educational Technology

cc: Michigan Education Alliance



Visual Representation of All FiM Badges











2018 FIRST Badges All Badges Matrix and Summary with Standards Alignments

FIRST Badges CAD (Computer Aided Design)

Computer Aided Design (CAD) is the use of computers to create, analyze and document a design. These processes are valuable in understanding how parts of a robot work together and in the manufacturing of the parts to build a robot.

Computer Aided Design 1	Describe ISO view, orthographic views	Explain absolute and relative measurements	Draw simple iso drawing with dimensions	Create a simple 2D drawing part	Create a simple 3D part using some of the following tools: simple extrude, revolve, sweep, cut, hole wizard.
Computer Aided Design 2	Import robot parts from STEP files. Include the following: Origin, what they mean, used for common parts and catalog items and where to retrieve.	Mate 3 EXISTING parts constraining 6 degrees of freedom	Mate 1 object on the surface using conincident / align; Demonstrate 1 mate on center of circle (concentric)	Set part properties for both material and units. Find total weight using CAD software and center of gravity on an FRC robot subsystem	Create an assembly drawing with complete parts list and report in a BOM (Bill of Materials) table
Computer Aided Design 3	Demonstrate a multi (6 or more) component assembly	Demonstrate a multi (4 or more) component assembly that moves	Find the center of gravity	Develop an assembly library	
Computer Aided Design 4	Develop a revisions tracking process	Determine shifting CoG with robot motion	Perform a stress analysis on a rigid component	Perform a stress analysis on a moving part	Copy complete robot to 2nd storage location in a way that all files and assemblies work

As participants / students complete the tasks in the badge series, the following standards are represented:

21st Century Skills	Learning and Innovation Skills Think Creatively Reason Effectively Use Systems Thinking Solve Problems	Information Literacy Access and Evaluation Information Use and Manage Information	ICT Literacy Apply technology effectively
Common Core Math	HS.G-CO.A.1	HS.G-GMD.B.4	
	HS.G-CO.A.2		
	HS.G-CO.A.3	HS.G-MG.A.1	
	HS.G-CO.A.4	HS.G-MG.A.2	
	HS.G-CO.A.5	HS.G-MG.A.3	
	HS.G-CO.A.6		

FIRST Badges Communications

Communication 1	Identify and describe the team communications channels. Including the goals, target audience and frequency of the publication.	From the communication channel selected, contribute or collaborate on two media items.	Participate in a communication channel according to team standards.	Contribute, collaborate and/or create 2 presentations in preparation for future speaking opportunities.	
Communication 2	Select 2 team communication channels and explain how they are inter-related. Explain how the communication channels contribute to the overall team goals.	In 2 different communication channels, create and publish 2 items for each channel, positively reflecting FIRST values of Gracious Professionalism and the team's values. Items used in the Level 1 badge should be excluded from this badge.	Engage in a communication channel by learning how the media items are produced	Participate in 2 public speaking opportunities, successfully completing the preparation and presentations	
Communication 3	Describe the current state of all team communication channels. Create, update or review the team communication plan.	Edit and publish 10 items related to the communication channel.	Online or at a competition, compare and benchmark 5 other teams and their communication channels.	Determine where team compares in terms of strengths and weaknesses in a selected communications channel.	Create and deliver a presentation related to the team goals. Record the presentation and review for to ensure participants are using effective communication techniques.
Communication 4	Take a leadership role for own team or another FIRST program team related to communications.	Assist the team in creating quality communications aligned with team goals. The deliverable items for the portfolio should include a wide variety of published items, demonstrating leadership and include attribution.	Collaborate with other FIRST teams to create quality shared media across 2 communication channels. The deliverable item(s) for the portfolio should include attribution and positively reflect FIRST values.	Provide leadership to mentor other participants to prepare and deliver effective presentations. The portfolio deliverable should include evidence of improvement or change.	

The Communication badges allow participants to learn, participate and provide leadership in team communications as well as contribute, collaborate and create materials in a variety of media.

As participants / students complete the tasks in the badge series, the following standards are represented:

Guide and Lead Others	
Common Core English Language Arts CCST.ELA-LITERACY	
Reading in Science & Technical Subjects	
RST.11-12.1-10 (all)	
Writing in Science & Technical Subjects Writing (CCST.ELA-LITERACY) Language (CCST.ELA-LITERACY) Reading Informational Text (CCST.ELA-LITER	ACY)
WHST.11-12.1 A-E (all) W.11-12.1. A-E (all) L.11-12.1.A Rl.11-12.1	
WHST.11-12.2 A-E (all) W.11-12.2 A-F (all) L.11-12.1.B Rl.11-12.4	
WHST.11-12.3 W.11-12.3 A-E (all) L.11-12.3.A RI.11-12.5	
WHST.11-12.4 W.11-12.4 L.11-12.4. A-D (all) Rl.11-12.6	
WHST.11-12.5 W.11-12.5 L.11-12.5.A Rl.11-12.7	
WHST.11-12.6 (Internet project) W.11-12.6 (Internet Project) L.11-12.5.B	
WHST. 11-12.7 W.11-12.7 (Research Project) L.11-12.6 Speaking & Listening (CCST.ELA-LITERACY)	
WHST.11-12.8 W.11-12.8 SL.11-12.1 A-D (all)	
WHST.11-12.9 W.11-12.10 SL.11-12.2	
WHST.11-12.10 If writing for awards: SL.11-12.3	
W.11-12.1 A-E (all) SL.11-12.4	
W.11-12.2 A-E (all) SL.11-12.5 (Digital Media)	
SL.11-12.6	

FIRST Badges Engineering Design

Engineering Design 1	Maintain a personal	Compare / contrast the	Define requirements	Research simple	Propose feasible solutions	Create a model and
	engineering notebook	engineering design process and	including objectives,	machines that can be	and choose the best	determine if the model
		the scientific method	game actions and	used to model the	solution with an weighted	meets the design challenge
			size/weight of the	solution and describe	objectives table.	criteria.
			complex machine	how to find the center		
				of mass.		
Engineering Design 2	Participant maintains a	Identify professional sources of	Write 3 requirements	Create drawing of a	Create and test a prototype.	Discuss with a mentor if the
	personal engineering notebook	simliar challenges/solutions	related to a complex	prototype in CAD and	Determine if it met the	prototype should be used in
	for an FIRST-related		machine action.	participate in a team	criteria.	production or re-designed.
	engineering project			design review.		
Engineering Design 3	Student maintains a personal	Define the problem - in the FRC	Requirements: Write a	Decision: Create a	Design Review: Work with	Build a prototype. Include a
	engineering notebook for an	game, identify 3 problems	set of requirements for	weighted objectives	an adult to determine the	materials list in your design
	FIRST-related engineering	related to the engineering	one of the identified	table for the problem	validity of your solution.	report. Test the prototype,
	project and uses this notebook	challenge. Compare/contrast	problems. Include	identified in the	Document any identified	including data collection to
	to produce a portfolio	solutions to similar challenges	performance metrics.	requirements. Define	changes and iterate the	evaluate for design
				your priorities and	changes into the CAD	improvement or rationale to
				constraints.	prototype.	abandon design.
Engineering Design 4	Student maintains a personal	Make connections to other	Research: Identify	Produce a Design		
Lingineering Design 4	engineering notebook for an	disciplines from the FRC	exemplars of a design	Report to include the		
	FIRST-related engineering	challenge. Document these	report produced by a	problem scope.		
	project and uses this notebook	connections.	university engineering	technical review.		
	to produce a Design Report.		student (senior design	design requirements		
			class) or an engineering	and description.		
			company/firm.	evaluation and next		
				steps		

Participants completing this hadge series learn design skills and an understanding of the engineering design process in the context of the EIPST Pohotics Competition

21st Century Skills

Think Creatively **Reason Effectively** Use Systems Thinking Solve Problems Make Judgements and Decisions

Learning and Innovation Skills Information/Media/Tech Skills Life and Career Skills

Adapt to Change Be Flexible Manage Goals and Time Interact Effectively with Others Work Effectively in Diverse Teams Manage Projects

NGSS Standards	HS-ETS1-1
7	HS-ETS1-2
	HS-ETS1-3
	HS-ETS1-4

Access & Evaluate Information

Use & Manage Information

Apply Technology Effectively

FIRST Badges Electronics

Electronics badge series is designed for participants to learn about the wiring, sensors, schematics, motors, motor controllers, control system components and power used in the FIRST Robotics Competition.

Electronics 1	Use wiring standards to join / splice wires, terminate with proper connector and use tools to splice or crimp wires	Identify sensors used on a complex machine included switches, potentiometers, gyroscopes, encoders and identify the output types (analog/digital)	Describe the common symbols on schematic diagram.	Identify motors and motor controllers available within the scope of the FRC challenge. Identify the publisher of the technical specifications of the motors and motor controllers.	Identify the components of the complex machine control systems including the roboRIO, power distribution panel, voltage regulator module, pneumatic control and network radio.	Identify the battery type and size for the challenge requirements, operate the main breaker, determine battery charge and how batteries charge and discharge.
Electronics 2	Solder, apply heat shrink and label wires.	Describe the expected behavior of a specific sensor and how it can be applied to a robot function.	Follow a schematic wiring diagram to trace a circuit.	Wire a motor to a machine subsystem and power distribution board	Connect at least 1 component of the control system to another component of the control system.	Explain how PWM and CAN communication methods differ.
Electronics 3	Explain how wire size impacts resistance and current flow, then select the wire size according to published standards	Attach a sensor and connect the sensor to the control system.	Create a working schematic for a complex machine	Connect control system components and verify connectivity.	Create a battery charging, rotation and tracking system	Demonstrate the complex machine is electrically isolated and define the procedure to correct a situation if the chassis is found to be electrically charged.
Electronics 4	Create a layout of the required control system components optimizing the layout to eliminate interference with the movement of the chassis and mechanisms.	Create a troubleshooting checklist for all sensors installed on the complex machine.	Create a troubleshooting checklist for control system components specific to a robot.	Create a data table listing complex machine behaviors detailing voltage and amps. Use this data to predict voltage and amp hours available in a battery after a variety		

As participants / students complete the tasks in the badge series, the following standards are represented:

21st Century Skills	Learning and Innovation Skills Think Creatively Reason Effectively Use Systems Thinking Solve Problems	Information Literacy Access and Evaluation Information Use and Manage Information
Common Core Math	HS.G-CO.A.1	HS.G-GMD.B.4
	HS.G-CO.A.2	
	HS.G-CO.A.3	HS.G-MG.A.1
	HS.G-CO.A.4	HS.G-MG.A.2
	HS.G-CO.A.5	HS.G-MG.A.3
	HS.G-CO.A.6	

FIRST Badges Participation Leadership

Participation / Leadership 1	Identify internal and external team communications, know the team history and funding.	Actively participate in the build and competition season. Understand and use common safety precautions in the team's shop, in the competition pits and fields and personal protection equipment (PPE).	Identify examples of coopertition where a team or an individual displays unqualified kindness and respect in the face of fierce competition.	Identify examples of Gracious Professionalism which is a way of doing things that encourages high- quality work, emphasizes the value of others and respects the individuals and the community.	Identify design constraints, functions and strategies for a complex machine. Analyze another complex machine
Participation / Leadership 2	Participate and contribute to a team business function (sponsors, demonstrations, presentations to community or school, recruitment).	Train new team members on shop safety, review the team safety plan for the build area, travel and competition. Know and demonstrate basic first aid practices. Use PPE appropriately.	Provide evidence to a team mentor of a personal or team example of coopertition. Provide evidence to a team mentor of a personal or team example of gracious professionalism.	Provide expertise or training to students on another team or in another FIRST program.	Describe the game strategy to score points, avoid penalties, and observe another team's robot to determine strategy compatibility. Contribute to the build, fabrication or integration tasks for a complex machine.
Participation / Leadership 3	Lead a business function from planning to completion (sponsor presentation, outreach activity, recruitment drive, etc) with mentor assistance.	Review, and if necessary, update a component of the team safety plan with a team mentor's input. At competitions, ensure all team members use safe lifting techniques to transport robot, pit equipment or team supplies	Teach or present the concept of gracious professionalism and coopertition to an audience of the participant's choice.	With mentor input, select an area of the participant's choice and provide significant leadership. Areas can include, but are not limited to, robot design, fabrication, build process, sub- system responsibility, scouting, award submissions.	
Participation / Leadership 4	Team Goal – Identification of a meaningful team goal with a measurable outcome. Identify the gap between the current status and the desired, measurable outcome	Gap Analysis - Identify the gap between the current status and the desired, measurable outcome	Process – Identify and provide details of the processes, activities, training or other activities used to attain the measurable goal outcome.	Analysis – Provide an analysis of the success or failure of the processes.	Evaluation – Was the desired threshold of the measurable outcome attained? Provide evidence of how the threshold was measured.

The Leadership badge series enables a participant to understand the FIRST values and foundations, learn safety practices and recognize how FIRST robots work. The series concludes with a portfolio of a student's leadership project.

As participants / students complete the tasks in the badge series, the following standards are represented:

21st Century Skills

Learning and Innovation Skills Information Literacy Life and Career Skills Think Creatively Apply technology effectively Adapt to Change Reason Effectively Be Flexible Use Systems Thinking Manage Goals and Time Solve Problems Interact Effectively with Others Make Judgements and Decisions Work Effectively in Diverse Teams Communicate Clearly Manage Projects Produce Results Access and Evaluation Information

Common Core English Language Arts

Reading in Science & Technical Subjects (CCST.ELA-LITERACY) RST.11-12.1-10 (all)

Writing in Science & Technical Subject (CCST.ELA-LITERACY)	Writing (CCST.ELA-LITERACY)	Language (CCST.ELA-LITERACY)	Reading Informational Text (CCST.ELA-LITERACY)
WHST.11-12.1 A-E (all)	W.11-12.4	L.11-12.1.A	RI.11-12.1
WHST.11-12.2 A-E (all)	W.11-12.5	L.11-12.1.B	RI.11-12.4
WHST.11-12.3	W.11-12.6 (Internet Project)	L.11-12.3.A	RI.11-12.7
WHST.11-12.4	W.11-12.7 (Research Project)	L.11-12.4. A-D (all)	
WHST.11-12.5	W.11-12.8	L.11-12.5.A	Speaking & Listening (CCST.ELA-LITERACY)
WHST.11-12.6 (Internet project)	W.11-12.10	L.11-12.5.B	SL.11-12.1 A-D (all)
WHST.11-12.7	If writing for awards:	L.11-12.6	SL.11-12.2
WHST.11-12.8	W.11-12.1 A-E (all)		SL.11-12.4
WHST.11-12.9	W.11-12.2 A-E (all)		SL.11-12.5
WHST.11-12.10			SL.11-12.6

Guide and Lead Others



Use and Manage Information

FIRST Badges Machining

Machining is a set of processes where raw material is shaped using tools and machines; the participants will experience a variety of real-world, increasingly complex manufacturing processes.

Machining 1	Tool selection for the task including hand and power tools	Know and understandt shop safety when using hand and power tools	Measure, cut and finish pieces for a complex machine using common measurement tools including rulers, tape measures, calipers and micrometers.	Explain common fasteners and sizing; properly tap or drill holes using the correct tools.	
Machining 2	Use a precision measuring tool to precisely cut a piece with minimal waste.	Teach team safety rules to new members and model the safety rules and regulations of the shop.	Explain limitations of common power tools.	Select the appropriate fastener for the task, recognize reversed threads. Determine the correct tap for a given application.	Use calipers and micrometers to accurately measure and size and position of an object to drill holes
Machining 3	When machining with a mill, explain the process of determining rotation and feed rates.	Explain the operation of a lathe, describe pieces to be machined with a lathe and use a lathe to turn a simple piece.	Explain the operation of a mill, describe pieces to be machined with a mill and use a mill to make a simple piece.	Explain challenges to making multiple piece assemblies and methods to overcome the challenges to maek a functional assembly.	
Machining 4	Using a manual mill, machine a part with interior pockets or cutouts	Using a manual mill, machine a part requiring multiple tools (face, turn, drill, thread, etc.)	Using a manual lathe, machine a part requiring multiple tools.	Using a part designed in CAD, use CAM software to create code and machine the part on a CNC machine	Write G&M codes to machine a part using a CNC machine.

As participants / students complete the tasks in the badge series, the following standards are represented:

21st Century Skills

Learning and Innovation Skills

Think Creatively **Reason Effectively** Use Systems Thinking Solve Problems Work Creatively with Others

Life and Career Skills Work Effectively in Diverse Teams Communicate Clearly

Communication/Collaboration Collaborate with Others

Common Core Math

HS.N-Q.A.3 HS.G-GMO.B.4 HS.G-MG.A.1 HS.G.MG.A.2

Standards for Mathematical Practice

MATH.PRACTICE.MP1 MATH.PRACTICE.MP2 MATH.PRACTICE.MP3 MATH.PRACTICE.MP4 MATH.PRACTICE.MP5 MATH.PRACTICE.MP6 MATH.PRACTICE.MP7 MATH.PRACTICE.MP8

FIRST Badges Programming

The Programming badge series concentrates on the progression of programming skills including the autonomous operation of a complex machine, networking, advanced logic and data structures.

Programming 1	Introduction to autonomous	Using variables and constraints,	Use loops and data structures to		
	programming of a complex machine	loops and data to build	build subroutines and programs		
		subroutines and programs in a	in a variety of languages.		
		variey of languages			
Programming 2	Programming the navigation of a complex	Programming for time-based	Advanced logic using pneumatic	Use data structures in	Interpret logged data from a
8	machine under autonomous control.	and velocity-based motor	controls and vision;	programming and	complex machine.
		controls		interpreting data from a	
				complex machine.	
Programming 3	Introduction to networking in real-world	Programming structures to	Advanced vision controls		
	applications for local area networking	dynamically control a machine	including finding ranges and		
	(LAN) and controller area networks	with control loop feedback	targets.		
	(CAN).	mechanisms.			
Programming 4	Advanced autonomous programming for	Manage the programming	Participate in industry practices		
1.10810111184	a variety of use cases.	project for a complex machine	including code review and best		
			practices for clean, efficient code		

As participants / students complete the tasks in the badge series, the following standards are represented:

21st Century Skills

Learning and Inr Life and Career Skills

Think Creatively Work Effectively in Diverse Teams **Reason Effectively** Use Systems Thinking Solve Problems Work Creatively with Others

Communication/Collaboration **Communicate Clearly**

Standards for Mathematical Practice

Collaborate with Others

K12 Computer Science Framework

Core Concepts		MATH.PRACTICE.MP1
Computing Systems	Data & Analysis	MATH.PRACTICE.MP2
Devices	Collection	MATH.PRACTICE.MP3
Hardware & Software	Visualization & Transformation	MATH.PRACTICE.MP4
Troubleshooting	Inference & Models	MATH.PRACTICE.MP5
		MATH.PRACTICE.MP6
Algorithms & Programming	Networks and the Internet	MATH.PRACTICE.MP7
Algorithms	Network Communication & Organization	MATH.PRACTICE.MP8
Variables		
Control		
Modularity		

Core Practices

Program Development

-

Practice 3: Recognizing and Defining Computational Problems Practice 4: Developing and Using Abstractions Practice 5: Creating Computational Artifacts Practice 6: Testing and Refining Computational Artifacts



Digital Badges Principles and Standards of Quality for Recognizing Learning



DIGITAL BADGES: PRINCIPLES AND STANDARDS OF QUALITY FOR RECOGNIZING LEARNING

This resource is a brief summary of various related digital badge articles and could be used as a basis for developing basic standards and criteria for badge use.



Digital Badges: Principles for Recognizing Learning and Badge Face Credibility for Employers and Colleges

Introduction

Modern electronics ushers in a host of communication and sharing services today from Twitter and Facebook to LinkedIn. Both the individual and the professional have valid uses of these conveniences today. It isn't a surprise, therefore, why digital badges are becoming popular in the communication world as they project a "picture worth a thousand words" in a manner that is supported by many of the electronic services. Uses for these badges are often to convey a level of accomplishment, completion, or proficiency both in the game world as well as in the educational realm.

With Michigan's current focus on preparing all students to be career- and college-ready and the need to meet the increasing demand for a skilled workforce, the "any's"¹ have helped focus instructional improvement efforts on personalized learning and multiple learning pathways. There is also a recognition that increased learning time, particularly through quality after-school and other informal educational experiences, provides opportunities to engage and empower students to learn outside the formal education arena. This flexibility in learning options presents a challenge to traditional student transcripting processes. However, technology, in particularly local and regional data systems, supports documentation of student learning in a digital, portable format, i.e. digital badges. This document will review a few key articles that highlight the principles for recognizing learning with digital badges so that they are seen as credible communication tools as to what the bearer knows and can do. Standards and criteria to evaluate a badge are then proposed.

Principles for Recognizing Learning with Digital Badges

Rehak and Hickey (2013) describe nine principles for recognizing learning with digital badges. The principles emerged from a project titled "Introducing the DML Design Principles Documentation Project" posted by Hickey (2012). In short, digital badges are credentials that can be obtained in numerous ways from a performance, product, or other assessment proficiency. As the digital badge is the achievement product it is easy to see that motivation, assessment, and learning are related factors that should not be ignored. The following nine principles are summarized below in order of prevalence in the current badging practices as found in the prior research work cited.

1. Use badges to map learning trajectories.

Levels of badges can be linked with various levels of student accomplishments and aligned with standards or competencies. This would require that the curriculum is organized in a manner that offers badging opportunities. This would likely occur at the course or program level and could include learning projects.

2. Align badges to standards.

National or International learning standards serve to increase the credibility and external value of the badges. Alignment of the standards to the badges provides transparency within

¹ "Any time, any place, any way, any pace"



the credential and improves communication. Further, this badge-standards relationship formalizes the credibility of the assessments (any number of types) and the related badge.

3. Have experts issue badges.

Expert authorities issuing badges builds the credibility of the badge and likely influences the usefulness to the external community (employers and postsecondary program leaders). It was noted that if the issuing authority also held an external (certified program) or community recognized credential, that may build legitimacy and credibility to the badge being issued.

4. Seek external backing.

External backing of the business and industry community partners is important to the perception of the stakeholders. For instance, the automotive group Automotive Youth Education Systems (AYES) has a direct link to its business alliances and is completely transparent by way of presenting those partners' logos – who further link to their industry alliances.

5. Recognize diverse learning.

Individual student progress is a personal and individual experience that cannot be expected to follow a production line learning pace. Recognizing these personal differences is important and also builds credibility to those who understand human development. Credentialing badge options that meet a broad spectrum (specific and numerous) of student learning needs is the utility of badging.

- 6. Use badges as a means of external communication of knowledge and/or skills. Communicating how badges can be shared with other individuals and organizations is important as this conveys the importance to the student as well as the individuals and organizations who seek candidates to fill programs or employment positions.
- 7. Make badges permanent.

Technologies and processes change and both standards and assessments will change in time. Although badge expiration policies are a specific and legitimate decision by the authorizing entity, it seems important to preserve the individual's historical record. This information should be important to both the person as a part of his or her learning development (*I obtained certifications in the past; therefore, I can accomplish additional competencies to achieve another badge.*) as well as to the employer or postsecondary program leader who may value the individuals past accomplishments as an indicator of his or her future prospective accomplishments.

8. Recognize educator learning as well.

Allowing the educator to obtain badges either from individual professional development endeavors or along with the students while progressing through a project builds value towards badges. Professional development that leads to badges allows educators to brandish their accomplishments among their colleagues as well as other stakeholders in the world of work. Students who see their teachers with credible badges would likely identify their teachers as role models to follow. Students who see their teachers obtain badges in projects along with the students will likely view their teachers as partners in the learning process.



9. Award formal academic credit for badges.

A summative or high level badge that is obtained from completing an educational program's competency that results in their academic credit would likely make all the students feel empowered. This empowerment is built via transference from achieving lower level badges, which the allotted accumulation could result in academic credit. Students can focus on the next badge as a goal, while learning that multiple milestones sum to a greater product of a more recognized badge or credit. Although the research indicates this is rare – it is an opportunity that can be achieved as well. The key will be in allowing other decision makers to see the badging system as a credible process and badge product. This will likely need to be accomplished on an individual program basis. Transparency and communication will likely be key to informing and persuading the decision makers. Therefore, it would make sense to provide these leaders with tools to assist in this communication process. Which brings us to the next topic: credibility of digital badges.

Credibility of Digital Badges

It seems obvious that a sheriff's badge obtained from a box of cereal is not as credible as a brass stamped badge with some official number engraved on the lower end. In the case of digital badges it isn't the art or the medium that brings credibility, but rather the issuing authority of the badge itself. For instance, if a student received a digital badge as a result of passing a teacher-made test in programming that would not be nearly as credible as a specific badge issued by Microsoft, Linux, or SAS.

Casilli and Knight (2012) describe that the value of the badge as a credible source will depend on the employer's perception of the badge's issuing authority. In the case of educational academics, where the students will transition to a postsecondary institution, the value of the badge is a most important criteria from the school or the program they will attend. Therefore, credibility depends on the employer's or school program leader's perception of the badge through the issuing authority.

One important aspect that needs to be mentioned is that the not all badges are equal. For instance, if an employer is looking for a professional to perform tasks that require competency in multiple common computer applications, then a badge representing the Microsoft Office Suite (MOS) 2013 Master certification badge would be more valuable than the MOS Exam 420: Excel 2013 certification badge. However, if an employer were looking for a professional Information Technology expert for the company, he or she would likely value the Microsoft Technology Associate (MTA) Exam 366: Networking Fundamentals more than the MOS 2013 Master certification as the credibility aligns with the duties and competencies that need to be performed by the prospective employee.

In summary, we have three criteria tied to two cases that we have discussed to this point. The three criteria are: target person's perception, issuing authority's credibility, and the specific competencies tied to a specific badge. The two cases are education and employment. Therefore, we have two targets that should be focused on to evaluate the credibility of the badge for a specific use:

• School program leaders' perception of the issuing authority and the duties and competencies tied to a badge.



• Employers' perception of the issuing authority and the duties and competencies tied to a badge.

Standards of Quality for Digital Badging

Summarizing the information from above into a set of standards statements would convey the spectrum of principles and target uses (postsecondary and/or employment) as related to a badging process. The following list is a summary of those principles and items that would be needed for the ideal learning-badging system.

Standard #	Standards Language Statement
1	Acquiring various levels of digital badges result in higher levels of digital badge/s.
2	Badges are aligned to international or national learning standards and at various levels of the standards and competencies. Badge acquisition toward progression is highly visible in the chosen path of learning.
3	Badging authorizers are perceived as an expert group or organization to the learners and the stakeholders (e.g., employers and postsecondary program leaders).
4	Badging authorizers have highly recognized external links, alliances, and supporters that are easily verified.
5	There exist multiple levels and routes to demonstrate achievement to acquire a badge/s of competency.
6	Communication material is developed and shared in multiple ways of how student badges can be shared effectively for the level of accomplishment.
7	Badging authorizing or storage systems are designed to store and present historical badges accomplished by an individual.
8	Educators are able to acquire and share their badges through professional development as well as in a manner that matches their students in their partnered learning projects.
9	Academic credit is awarded by a student directly obtaining a recognized digital badge.
10	Postsecondary program leader/s perceives the badge issuing authority as being credible.
11	Employer/s perceive the badge issuing authority as being credible.
12	Badge duties and competencies align to the postsecondary program.
13	Badge duties and competencies align to the employment duties.
It is important t systems or pro value of a bade	o note that although the above list presents quality standards for badging cesses, that information could be gleaned to create a set of standards for the ge.

Rating Criteria for Digital Badges

Although the standards listed above could be used simply as a check list, it would be more meaningful if each standard could be rated. To rate a badging system on the badging system or process standards above, it is apparent that anchors are needed to classify a rating. Therefore, a rubric was developed using a five-point rating system with at least two to three anchors. The first standard was pretty cut and dry and resulted in a dichotomous "yes" or "no" check. See the Badging Systems Rating Rubric at the end of this review.



Scoring the Badging System

The score is the point of meaning for any assessment. Typically scores consist of a continuum and the score point on that continuum indicates where the specific rating falls for measure. Therefore, it would be important to clarify the continuum that is relayed in standards. In reviewing the standards it becomes apparent that the continuum of importance is the formal credibility perceived via the badge by employers and/or postsecondary program leaders.

The sum of the maximum rating (5 points) multiplied by the number of standards (13) provides the maximum rating attainable on our continuum of badge formal credibility (65 points). Therefore, the range of scores is the minimum (1 point) times the number of standards (13 points) to the maximum of 65 points. In viewing the continuum we can assign both an anchor and a usefulness statement. The low end of the scale indicates a low credibility badging, which result in badges that a person may only want to share informally. The high end of the continuum would include highly credible badges that are valued and add credit or certification to the person's profile. See the graphical depiction below for a depiction of the continuum of badging credibility as well as the anchors that could be associated.

Continuum of Badging Credibility



Share with my personal friends and family

Share with friends, family, and in a professional profile



References

Hickey, D. (October, 2012). Introducing the DML design principles documentation project. Published on Humanities, Arts, Science, and Technology Alliance and Collaboratory (HASTAC) website. Retrieved from: <u>http://www.hastac.org/blogs/dthickey/2012/10/08/introducing-dml-design-principlesdocumentation-project</u>

- Rehak, A. & Hickey, D. (May, 2013). *Digital badge design principles for recognizing learning.* Published on Humanities, Arts, Science, and Technology Alliance and Collaboratory (HASTAC) website. Retrieved from: <u>http://www.hastac.org/blogs/andirehak/2013/05/20/digital-badge-design-principles-recognizing-learning</u>
- Casilli, C. & Knight, E. (June, 2012), 7 Things you should know about badges. Educause Learning Initiative website publication. Retrieved January 28, 2015 from: <u>http://www.educause.edu/library/resources/7-things-you-should-know-about-badges</u>



Badging Systems Rating Rubric						
Standard #	Standards Language Statement	F	Ratin	g Criteria and Point Value		
1	Acquiring various levels of digital badges result in higher levels of digital badge/s.	Yes = 5	X		X	No = 1
2	Badges are aligned to international or national learning standards and at various levels of the standards and competencies. Badge acquisition toward progression is highly visible in the chosen path of learning.	A set of highly recognized standards are used and are reported to students as a progression through their learning path = 5	4	3	2	A set of locally developed standards are used = 1
3	Badging authorizers are perceived as an expert group or organization to the learners and the stakeholders (e.g., employers and postsecondary program leaders.)	A highly recognized group or organization for their content area are the badge authorizers = 5	4	A popular group, organization, or individual authorizes the badges = 3	2	A group, organization, or individual authorizes the badges = 1
4	Badging authorizers have highly recognized external links, alliances, and supporters and are easily verified.	Badge authorizers have multiple easily verified and highly recognized alliances and supporters = 5	4	Badge authorizers have one to two easily verified and highly recognized alliances and supporters = 3	2	Badge authorizers award badges = 1
5	There exist multiple levels and routes to demonstrate achievement to acquire a badge/s of competency.	Badge awarding exists on multiple levels and routes in each students learning process or projects = 5	4	Badges are awarded for achievement on multiple levels through the students learning process = 3	2	A badge is awarded for achievement as a result of the students learning process = 1
6	Communication material is developed and shared in multiple ways of how student badges can be shared effectively for their level of accomplishment.	Students are educated in multiple ways in which badges can be communicated and shared = 5	4	3	2	Students receive badges = 1
7	Badging authorizing or storage systems are designed to store and present historical badges accomplished by an individual.	Badge systems retain historic information for individual students - citizens = 5	4	3	2	Students receive badges = 1



Standard #	Standards Language Statement		Rating	g Criteria and Point Value		
8	Educators are able to acquire and share their badges through professional development as well as in a manner that matches their students in their partnered learning projects.	Educators are able to receive badges from both professional development and along with students in their program projects = 5	4	3	2	Educator receives a badge = 1
9	Academic credit is awarded to a student directly obtaining a recognized digital badge.	Students receive direct credit as a result of achieving a credible badge = 5	4	3	2	Students receive a badge that represents program completion = 1
10	Postsecondary program leader/s perceives the badge issuing authority as being credible.	Postsecondary program leader/s values the badge issuing authority = 5	4	3	2	Postsecondary program leaders/are familiar with the badge issuing authority = 1
11	Employer/s perceive the badge issuing authority as being credible.	Employer/s value the badge issuing authority = 5	4	3	2	Employer/s are familiar with the badge issuing authority = 1
12	Badge duties and competencies align to the postsecondary program.	Badge duties and competencies align to the postsecondary program = 5	4	3	2	Badge duties are similar to the postsecondary program = 1
13	Badge duties and competencies align to the employment duties.	Badge duties and competencies align to the employment duties = 5	4	3	2	Some (20%) of the badge duties and competencies align to the employment duties = 1
	Score = /65 = %					

Appendix F1

Pankow Letter of Support for Robotics





Erik J. Edoff SUPERINTENDENT

John H. Haas DIRECTOR FOR PANKOW CENTER

Dean E. Sabelhaus ASSOCIATE DIRECTOR FOR PANKOW CENTER

October 5, 2018

To the Curriculum Department of L'Anse Creuse:

FIRST Robotics Team 453, *Rock'em Sock'em Robotics*, is comprised of students from L'Anse Creuse Public Schools (LCPS). Coupled with the language in the FIRST Robotics grant the Michigan Department of Education accepted and the academic training Robotics participants receive, **I fully support the proposal to offer members a letter grade and a .5 credit towards graduation each season.**

What separates Robotics from other clubs is the diverse amount of academia the students are exposed to during a season. Students are trained & assessed in curriculum designed from national and international learning standards in the following domains:

- 1. Communication
- 2. Machining
- 3. Participation & Leadership
- 4. Programming

- 5. Safety
- 6. Engineering Design
- 7. Electronics
- 8. CAD

Due to this highly technical learning experience, students should be offered a letter grade and .5 credit each 11-month season if they are able to meet the following criteria that is laid in the proposal:

- Successfully complete at least 1 of 4 levels in 3 of the 8 domains
- Participate in 60 hours of team meetings and events
- Attend 2 FIRST robotics competitions with Team 453
- Volunteer and document 10 hours of community service on behalf of Team 453

I hope the district can not only see the value of students participating in the *Rock'em Sock'em Robotics* program, but also embrace and approve the proposal to attach a letter grade and credit to this extraordinary student-learning experience.

Respectfully,

John Haas Director for Pankow

NOTICE OF NONDISCRIMINATION: It is the policy of L'Anse Creuse Public Schools not to discriminate on the basis of race, color, religion, national origin or ancestry, gender, age, disability, height, weight or marital status in its programs, services, activities, or employment. Inquiries related to nondiscrimination policies should be directed to: Civil Rights Coordinator, Assistant Superintendent for Human Resources, L'Anse Creuse Public Schools, Harry L. Wheeler Community Center and Administrative Offices, 24076 F. V. Pankow Blvd., Clinton Twp., MI 48036, (586) 783-6300. Nondiscrimination inquiries related to disability should be directed to: Section 504 Coordinator, Director for Special Education, (586) 783-6300.

Appendix F2

LCHS Robotics Final Letter of Support

L'ANSE CREUSE HIGH SCHOOL

Erik J. Edoff SUPERINTENDENT

Stephen P. Czapski PRINCIPAL

Alysia M. Samborsky ASSOCIATE PRINCIPAL

> Trisha W. Lewis ASSOCIATE PRINCIPAL

Thomas E. Moss DEAN OF STUDENTS

October 11, 2018

LCPS Department of Curriculum;

It is my sincere pleasure to write this letter of support on behalf of the FIRST Robotics Team 453, *Rock'em Socke'em Robotics.* This team is comprised of high school students from the L'Anse Creuse Public Schools. Additionally, due to the significant amount of technical and academic learning time associated with this club...I fully support the proposal to offer members a letter grade and a .5 credit towards graduation each season. Students participate in national learning standards in the areas of communication, machining, CAD, electronics, programming and engineering. This is an amazing technical learning experience "outside" of the traditional classroom worthy of an earned letter grade and credit toward graduation.

If you have further questions regarding my support of this initiative, please contact me at 586-783-6400 x1200.

Best Regards,

Staplian P. Czym

Stephen P. Czapski Principal

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Appendix G1

University Of Michigan Email

junkbates

From:
Sent:
To:
Subject:

Zach Marentay <zahama@umich.edu> Thursday, October 4, 2018 2:15 PM junkbates@gmail.com Pass/Fail Coursework

Hello,

Thank you for contacting our office. Below you will find a statement in regards to how pass/fail courses are evaluated for prospective applicants to the University of Michigan:

The Office of Undergraduate Admissions recalculates the GPA for students applying to the University of Michigan and this is done on an unweighted 4.0 scale. Courses that are taken 'pass/fail' are not considered as part of the recalculated GPA. We are still able to evaluate courses taken 'pass/fail' as part of a student's curriculum; however, it is strongly encouraged that students elect to take courses for a letter grade in order to be considered a more competitive candidate for admission.

If you have any other questions, please let me know.

Best,

--



Appendix G2

Oakland University Email

junkbates

From:	Shane Lewis <splewis@oakland.edu></splewis@oakland.edu>
Sent:	Thursday, October 4, 2018 1:27 PM
То:	G Bates
Subject:	Re: High School "Pass/No Pass? classes

Hi Gretchen, Yes, I am the Associate Director in Undergraduate Admissions here at OU.

Please let me know if you need anything else!

Best, Shane

On Thu, Oct 4, 2018 at 1:01 PM junkbates <<u>junkbates@gmail.com</u>> wrote:

Hi Shane,

Thank you for that clarification. May I have your title and department for my records on this matter? Thank you!

Gretchen

From: Shane Lewis [mailto:<u>splewis@oakland.edu</u>]
Sent: Thursday, October 4, 2018 12:09 PM
To: junkbates@gmail.com
Subject: Re: High School "Pass/No Pass? classes

Greetings Gretchen,

Here at Oakland University we do not typically recalculate a student's grade point average for admission or scholarship purposes. If the school has not already done so, we will add weight to a student's GPA if they have taken Advanced Placement (AP) or International Baccalaureate (IB) courses. Otherwise, we utilize the cumulative GPA as provided by the school.

If the school does not factor this pass/fail course into the student's cumulative GPA, this will have no impact on their admission decision or scholarship consideration at OU.

I hope this was helpful; please let me know if you have any further questions!

Best,

Shane

On Thu, Oct 4, 2018 at 11:47 AM Dawn M. Aubry <<u>dmaubry@oakland.edu</u>> wrote:

------ Forwarded message ------From: **junkbates** <junkbates@gmail.com> Date: Thu, Oct 4, 2018 at 11:33 AM Subject: High School "Pass/No Pass? classes To: <<u>dmaubry@oakland.edu</u>> CC: junkbates <<u>junkbates@gmail.com</u>>

Ms. Aubry,

I would like to clarify how Oakland University treats in state high school "Pass/No Pass" classes on high school transcripts for purposes of grades and entrance. In other words, what "grade", (GPA) number or otherwise, would be applied for a student who receives a "Pass" in one of these classes?

There is a District proposal about a "Pass/Fail" class and I am researching data about how this would affect students applying to universities such as yours prior to its presentation at our curriculum committee.

Thank you,

Gretchen

586/206-5556

Sent from Gmail Mobile
Shane P. Lewis

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Associate Director

Undergraduate Admissions Oakland University North Foundation Hall, Room 101 318 Meadow Brook Road Rochester, MI 48309 (248) 370-4431 Fax: (248) 370-2186 oakland.edu/futurestudents

Shane P. Lewis Associate Director

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Appendix G3

Michigan State University Email

junkbates

From: Sent: To: Subject: Brown, Terence <Brownter@msu.edu> Thursday, October 4, 2018 3:12 PM junkbates@gmail.com Re: Credit Evaluation

Gretchen,

Good afternoon, and thank you for your inquiry. For the purposes of our review process, in general, opting to take classes as pass/fail is not recommended. Such courses are not assigned a grade or included in our recalculation process. There have been prior instances (separate from our current review process) in which a "pass" grade was treated similar to a school or district's lowest passing grade but, even in those instances, pursuing pas/fail options often did not work to a student's advantage.

By chance, what policy is your district pursuing and what is your role related to it (administrator, parent, etc.)?

Regards,

Terence Brown, M.A. Assistant Director Office of Admissions Michigan State University

Sent from my iPhone

EMail from Customer Date: Thursday, October 04, 2018 11:17:52 AM

From: junkbates@gmail.com To: "admis@msu.edu" <admis@msu.edu>

Subject: Credit Evaluation

Mr. Terrence Brown,

I left a voicemail for you earlier today. I would like to clarify how Michigan State University treats in state high school "Pass/No Pass" classes on high school transcripts for purposes of grades and entrance. In other words, what "grade", (GPA) number or otherwise, would be applied for a student who receives a "Pass" in one of these classes?

There is a District proposal about a "Pass/Fail" class and I am researching data about how this would affect students applying to universities such as yours prior to its presentation at our curriculum committee.

Thank you, Gretchen 586/206-5556