

# MSSM – A PARTNER FOR MAINE STEM SUCCESS



Maine School of Science  
and Mathematics

Strategic Plan  
DRAFT February 2019



## **MSSM – A PARTNER FOR MAINE STEM SUCCESS**

The Maine School for Science and Mathematics is a leader in Maine Secondary STEM education by providing exceptional student outcomes, teacher and student resources, and being a valued, accessible resource for students and educators across Maine.

## Setting the Stage

In 2018, upon hiring an experienced, dynamic executive director, the Maine School of Science and Mathematics undertook a dual-prong strategic planning process. Faculty and staff used the operational design model to examine MSSM from the inside out, while the Board of Trustees formed a Strategic Plan Steering Committee to examine STEM education nationally, and MSSM's role within the State of Maine educational landscape. This Plan is the combination of those efforts.

## MSSM's History

MSSM was established in 1993 as a public magnet school for the purpose of providing certain high-achieving high school students with a challenging educational experience. Since the first entering class in 1995, MSSM's students have been achieving remarkable academic results. MSSM has developed and grown a very popular middle school focused summer camp which excites and engages students in STEM subjects. MSSM has been at the forefront of efforts to break down gender barriers in STEM education. MSSM summer camp has an equal number of weeks for girls and boys and MSSM student enrollment has been roughly gender equal for a number of years. MSSM's current residential enrollment is capped due to the capacity of its one dorm.

## MSSM's Mission

MSSM brings together and helps a group of Maine's most academically motivated high

school students to become innovative, well-rounded scholars with the ability to develop, investigate, and communicate critical ideas that improves the human condition and benefit the people of Maine. We understand that highly motivated and prepared students are found in a diverse selection of communities across the state and benefit from programs delivered in a variety of ways. MSSM is a trusted partner to those communities and a vital part of the education landscape for the delivery of secondary STEM education in Maine.

## MSSM's Future

As MSSM passes its 25<sup>th</sup> anniversary, it will build on its core competency of outstanding student outcomes to become a partner for STEM education across the State. MSSM will expand its impact by training teachers, providing STEM teaching resources and filling gaps in local education offerings by providing high level STEM classes to students who otherwise would not have access to such classes.

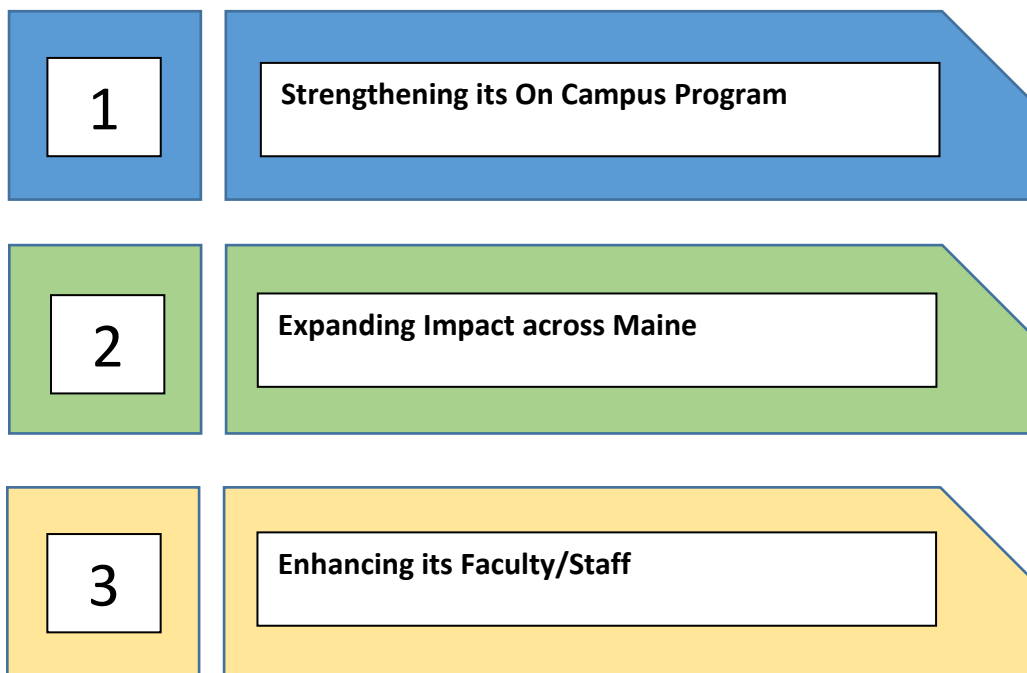
## MSSM – AWARDS AND RECOGNITIONS

This section needs to be filled out with 2 stories of graduate success and impact on the State of Maine along with data about the school and its successes.

## **The Plan**

MSSM shall be a recognized leader in the delivery of secondary STEM education, a vital partner to Maine public schools, and a valued, accessible resource for students and instructors across the state.

To ensure MSSM is a foundational partner in secondary STEM education in Maine, MSSM commits itself to achieving its plan by:

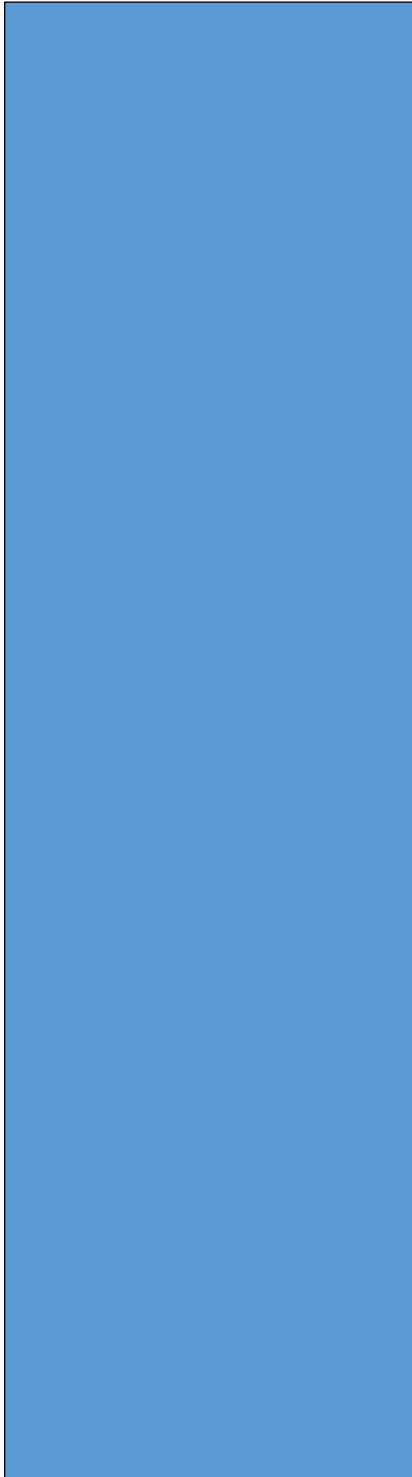


MSSM's residential program has been a foundational piece of its exceptional student outcomes since inception. Every qualified, exceptionally motivated Maine student, no matter their socio-economic circumstances, should have the opportunity to experience the MSSM residential program.

To maintain exceptional outcomes, the MSSM facilities need to be improved and maintained. World-class students, faculty and staff need first-rate facilities.

#### KEY INITIATIVES

- **Increase access** – Qualified students, in grades 9-12, regardless of their socio-economic status, will have full access to MSSM's residential program by reducing the room and board fee.
- **MSSM must control all of its critical facilities** – To adapt quickly and provide for student, faculty and staff safety and educational needs, MSSM must control the day-to-day operation of all of its critical facilities.
- **Modern lab spaces** – Flexible, adaptable spaces that encourage collaboration and hands-on learning must be created.
- **Update graduation requirements** – Students who demonstrate solid foundations in math, sciences, and humanities will have increased opportunities to move more quickly into advanced courses and research opportunities.
- **Engineering spaces** – Accessible spaces that encourage hands-on learning, long term projects and supports both faculty led programming and student projects.
- **Flexible classroom, meeting and office spaces** – Learning environments should be safe and support discussion and discovery.
- **Technology** – MSSM must provide the tools needed to support computer science programming and expanded virtual/online programming.
- **Provide Research and inquiry opportunities** – Students will be supported in the conducting of long-term research and solving real-world challenges, including competitions.



- **Safe, clean, and comfortable residential dorms** – To grow and support the residential program, student housing must be at a comparable standard to other residential magnet schools.
- **Proper residential staff housing** – Residential staff is a key component to a great student experience and must have proper accommodations.
- **Sufficient faculty housing** – Availability and quality of faculty housing is critical to faculty hiring and retention.
- **Optimize school size** – Students should have a vibrant, diverse educational community. Support this by growing the educational program to between 200-230 students.

MSSM must expand its outreach to become a vital partner to Maine public schools, and a valued, accessible resource for students and instructors across the state.

MSSM remains a too well-kept secret across the state. Though active partnerships and broader recognition of MSSM's ability to meet the needs of Maine's high-achieving students, MSSM will be seen as a key partner in the Maine STEM landscape.

### KEY INITIATIVES

- **Advancement Team** – MSSM will strengthen its working relationship with the MSSM Foundation, ensuring a productive partnership for fundraising, support, growth and outreach.
- **Train the Teacher** – Leverage MSSM's core STEM competencies to provide training for middle school and high school STEM teachers.
- **Summer Camp** – Maintain and strengthen MSSM's middle school focused summer camp.
- **External Accreditation and Assessment** – Accreditation will support the ability of MSSM Students to participate in dual enrollment classes and will credibly satisfy MSSM as well as external constituents that MSSM is successful in achieving its outcome objectives.
- **Resource for Teachers** – Leverage MSSM's core STEM competencies to develop, organize and distribute online STEM lesson plans and enrichment materials
- **Accelerated College pathways** – Students will have the opportunity to begin their college studies already having achieved an Associate's Degree or transferable university credits while at MSSM
- **Expanded Partnerships** – Students should have expanded J-Term options, internships and access to other industry partnerships.
- **Virtual classes** – Develop online classes, learning modules and other direct student learning methods to partner with and support students whose existing school cannot meet their STEM educational needs



### 3

#### Enhancing its Faculty/Staff

MSSM can continue to provide world class student outcomes, only as long as it has exceptional faculty and staff.

#### KEY INITIATIVES

- **Hiring and retention** – MSSM will ensure it remains competitive in hiring and retaining faculty and staff by focusing on all relevant factors.
- **Partner Opportunities** – Opportunities for MSSM faculty and staff partners and families have an impact on hiring and retention and should receive special focus.
- **Involvement in Residential Life** – Students benefit greatly by enhancing the connection between faculty/staff and the residential life experiences of students.
- **Facilities** – MSSM recognizes this is a major area of focus, and has incorporated facilities upgrades in Section 1 of this plan.

## **IMPLEMENTATION FRAMEWORK**

**The following goals and strategies form the framework for the school's growth and improvement work for the next five years.**

# 1

## Strengthening its On Campus Program

MSSM's residential program has been a foundational piece of its exceptional student outcomes since inception. Every exceptionally motivated Maine student, no matter their socio-economic circumstance, should have the opportunity to experience the MSSM residential program.

To maintain exceptional outcomes, MSSM facilities need to be maintained and improved. World-class students, faculty and staff need first-rate facilities.

**GOAL:** Provide an exceptional residential education experience to more Maine students.

**OBJECTIVES:**

1. Reduce the room and board fee, to a nominal amount, to remove finances as a hurdle for enrollment of MSSM appropriate students.
2. To adapt quickly and provide for student, faculty and staff needs, MSSM must control and manage the day-to-day operation of all of its critical facilities.
3. Modern lab spaces, which are flexible, adaptable spaces that encourage collaboration and hands-on learning must be created.
4. Update and make flexible graduation requirements in order to allow students to pursue their areas of greatest interest.
5. Revising the daily schedule and graduation pathways will support and encourage student-driven long-term research and solving of real-world challenges.
6. MSSM must provide the tools needed to support the delivery of computer science, engineering and expanded virtual/online programming
7. Flexible classroom, meeting and office spaces are needed to create learning environments that support discussion and discovery.
8. MSSM should have a campus plan that supports an inclusive community.
9. To grow and support the residential program, student housing must be at a comparable standard to other residential magnet schools.
10. Residential staff is a key component to a great student experience and must have proper accommodations.
11. Sufficient faculty housing is needed as availability and quality of faculty and staff housing is a critical piece to faculty and staff hiring and retention.

12. In order to have a vibrant, diverse educational community, and to serve more students, the onsite educational programming should grow to between 200-230 students.

### **STRATEGY I**

Have MSSM's statute and annual appropriation changed to reduce the room and board fee from being fully a family responsibility to being offered at a reduced cost for Maine students to attend MSSM.

#### **Required Resources:**

- Support from the Department of Education, Governor, and Legislature.
- Additional funding from the State to reduce room and board costs for Maine students.

#### **Earliest Timing:**

#### **Rationale:**

- As the full cost of room and board has climbed, a number of potential applicants are not applying for admittance to MSSM due to the perception of cost.
- Financial aid is available, but many current families struggle to fund their portion of the cost, even after financial aid.
- As a public magnet school, every qualified Maine student should be welcome at MSSM.
- MSSM should be a top option for qualified students from all areas of Maine.

#### **Additional Expected Benefits:**

- Diversity makes for a more vibrant school community.
- Assist the State in providing an appropriate education for all students.

### **STRATEGY II**

Control critical facilities.

#### **Required Resources:**

- Existing lease agreement with Limestone will need to be reviewed.
- A long-term decision regarding building new facilities and where to locate them will be needed.

#### **Earliest Timing:**

**Rationale:**

- The last 10 years of leasing the academic space from the local RSU has resulted in a backlog of deferred maintenance, safety issues, and little to show for the rent that was paid.
- Faculty and staff are frustrated at the inability to control their day-to-day work spaces

**STRATEGY III**

Educational spaces, including lab spaces, classrooms and meeting spaces, should be built or renovated to accommodate flexible, collaborative student experiences.

**Required Resources:****Earliest Timing:****Rationale:**

- STEM education is moving to collaboration, active learning and integrated learning.
- Flexible classroom and lab spaces allow the spaces to adapt as the learning changes.
- Existing facilities are in need of a major investment, that investment must bring maximum return on student outcomes.

**Additional Expected Benefits:**

- Better facilities will help with faculty, staff and student recruitment.
- Better facilities will support exceptional student outcomes.

**STRATEGY IV**

Increase the flexibility of MSSM graduation requirements so students can create programs of study that meet their interests and aspirations.

**Required Resources:**

- Program Team to review and propose revised requirements.

**Earliest Timing:**

- Graduation requirements phased in for students graduating Class of 2021.

**Rationale:**

- Flexible graduation requirements will support students in the pursuit of their areas of interests and aspirations.
- Flexible graduation requirements will allow students and faculty time for long-term projects or real-world problem-solving

**Additional Expected Benefits:**

- Student projects, science fair participation, and real-world experiences help MSSM achieve higher visibility around Maine and the country.
- Students who are pursuing their areas of interests and aspirations are more likely to remain enrolled at MSSM and stay in Maine after college.

**STRATEGY V**

70% of MSSM graduates will have completed a long-term research project or participated in a real-world problem-solving team.

**Required Resources:**

- Flexible graduation requirements
- Faculty and staff time for mentoring projects
- Access to lab space and maker space outside of regular class hours

**Earliest Timing:****Rationale:**

- Students who want to pursue additional schooling will be more successful coming from a background of research and real-world problem solving.

**Additional Expected Benefits:**

- Programs customized to student interests will increase interest among prospective families and reduce attrition.

**STRATEGY VI**

Technology, including stable, affordable internet service, is vital to the expansion of MSSM's role in Maine STEM education.

**Required Resources:**

- Fiber optic internet connection
- Internal network capable of supporting all faculty, staff and student needs

**Earliest Timing:****Rationale:**

- Delivery of distance education is reliant on high-speed, stable, internet connection.

**Additional Expected Benefits:**

- Increased internet bandwidth and stability will enhance the student experience.

## **STRATEGY VII**

Campus planning in support of an inclusive community. Before any new construction is undertaken by MSSM, a master plan should be developed with input from all stakeholders.

### **Required Resources:**

- Funding for a master planner to work with MSSM to develop a master campus plan.

### **Earliest Timing:**

### **Rationale:**

- MSSM grew organically from the assets made available with the closing of Loring Air Force Base. Now, almost 25 years later it is time for a comprehensive plan for the creation of a campus to support MSSM's mission of delivering exceptional student outcomes.

## **STRATEGY VIII**

Student residential housing should be brought up to a standard comparable to similar residential magnet schools.

- Students should be housed in rooms no larger than doubles.
- Gender and age appropriate housing should be ensured by investing in flexible clustered dorm spaces as opposed to a large, monolithic solution.
- Appropriate residential life staff housing should be included in the dorm spaces. Appropriate as to number of units and their layout.

### **Required Resources:**

- Renovated dorm space and/or additional dorm space needs to be pursued.
- Thornton Academy built a new dorm, which accommodates 52 students (26 double rooms, arranged as suites with a shared bathroom, shared living room and two separate bedrooms) and 4 residential life apartments, at a cost of \$4.2 million. The dorm is 22,700 square feet (per square foot cost \$185).

### **Earliest Timing:**

### **Rationale:**

- MSSM's sister schools all have multiple dorms and a strong preference to rooms no larger than doubles.
- Competition for Maine and international students is increasing. Dorm space is an integral part of a residential program.

- Residential life staff need appropriate apartments in order to recruit and retain qualified staff.

### **STRATEGY IX**

Add additional faculty/staff housing as housing is a critical component to faculty/staff recruitment and retention.

#### **Required Resources:**

- Purchase additional faculty/staff housing or incorporate faculty/staff apartments in new dorm construction projects.

#### **Earliest Timing:**

#### **Rationale:**

- Faculty/staff recruitment is enhanced by the availability of faculty/staff housing.
- Faculty/staff housing should be safe and comfortable to enhance faculty/staff retention.
- Faculty/staff housing should be similar in quality to support team cohesion

### **STRATEGY X**

Grow the on-site education program to between 200 – 230 students.

#### **Required Resources:**

- Additional dorm space
- Admittance of day students
- Retention of enrolled students
- Grade 9 as entry point for qualified students

#### **Earliest Timing:**

- Day students can be enrolled by Fall 2019

#### **Rationale:**

- Small schools, with enrollment below 300 -400 students have been shown to deliver better results in academics, safety and connectedness compared to larger schools.
- A high-performance organizational environment is not likely to be bigger than 230, and a connected learning community not much bigger than 350.
- All highly-motivated Maine students should have access to MSSM.

#### **Additional Expected Benefits:**



- As enrollment and demand grows, enrollment focus may want to shift back to upper classmen, in order to serve more Maine students per year.

## 2

### Expanding Impact Across Maine

MSSM must expand its impact across Maine to become a vital partner to Maine public schools, and a valued, accessible resource for students and instructors across the State.

MSSM remains a too well-kept secret across the state. Through active partnerships and broader recognition of MSSM's ability to meet the needs of Maine's high-achieving students, MSSM will be seen as a critical part of the Maine STEM landscape.

**GOALS:** Increase MSSM's visibility around the state by increasing its partnerships and highlighting MSSM student achievements and college readiness and become the STEM resource for students and instructors across the State.

**OBJECTIVES:**

1. MSSM will create, staff and fund an Advancement Team. The Advancement Team will strengthen MSSM's working relationship with the MSSM Foundation, ensuring a productive partnership for fundraising, support and growth.
2. Partner to develop and deliver teacher training to over 50 middle school and high school STEM teachers each year.
3. Maintain and strengthen MSSM's middle school focused summer camp, especially its emphasis in supporting gender equity in STEM education.
4. Obtain External Accreditation because accreditation will support the ability of MSSM Students to participate in dual-enrollment classes and will credibly satisfy MSSM and external constituents that MSSM is successful in achieving its outcome objectives.
5. Develop, organize and distribute online STEM lesson plans and enrichment materials for teachers around the state to use.
6. Expand Accelerated College pathways so that students will have the opportunity to begin their college studies already having achieved an Associate's Degree while at MSSM and/or have a clear pathway to the faster achievement of an advanced degree.
7. Students should have expanded J-Term options, Internships and access to other industry, university and research partnerships.
8. Develop online classes, learning modules and other direct student learning methods to partner with and support students whose existing school cannot meet their STEM education needs.

### **STRATEGY I**

Develop and support a high-functioning advancement team to support the MSSM Foundation and to strengthen MSSM's partnerships with all stakeholders to enable and support the school's vision for state-wide student impact.

#### **Required Resources:**

- Full-time advancement office

#### **Earliest Timing:**

#### **Rationale:**

- Stable, consistent funding from not just the State of Maine, but from a wide variety of stakeholders is necessary for MSSM to impact STEM education across the state.
- Alumni, alumni parents, and parents of current students, should be the strongest supports of MSSM and a key focus in how MSSM tells about its successes, but need consistent contact and outreach.

### **STRATEGY II**

Develop and deliver STEM teacher training to middle and high school teachers.

#### **Required Resources:**

#### **Earliest Timing:**

- Train the Teacher program, Summer 2019

#### **Rationale:**

- The Plimpton research showed a strong need for STEM-focused teacher training.
- MSSM is statutorily required to support STEM education around the state.

#### **Additional Expected Benefits:**

- The more MSSM faculty and staff interact with other Maine teachers, the stronger MSSM's partnerships with local schools can become.

### **STRATEGY III**

Maintain and strengthen MSSM's middle school focused summer camp, especially its emphasis in supporting gender equity in STEM education.

#### **Required Resources:**

**Earliest Timing:**

- Ongoing

**Rationale:**

- MSSM's summer camp alumni make up a majority of our enrolled students.
- Emphasizing gender equality in STEM education supports equal access to STEM fields for all Maine students.

**Additional Expected Benefits:**

- MSSM summer camp exposes MSSM and the Limestone community to a broad cross section of the State.

**STRATEGY IV**

Obtain external validation of outcome objectives through the accreditation process.

**Required Resources:**

- Administrative team proposal as to which accreditation agency, time frame and cost estimate provided to the Board for approval.
- Faculty and staff time necessary to complete the accreditation process.

**Earliest Timing:**

- Accreditation proposal to the Board for a vote at the October 2019 meeting.
- Inclusion in the 2020 budget.

**Rationale:**

- Dual-enrollment and accelerated graduation agreements are easier to achieve with partner institutions if MSSM is accredited.
- External validation of MSSM's programs will highlight the differences in what MSSM offers.
- Increased STEM opportunities for students necessitates the need for MSSM to distinguish its programming.

**STRATEGY V**

Develop, organize, and distribute online STEM lesson plans and enrichment materials for teachers around the state to use. Initial steps should be focused on computer science and math content areas.

**Required Resources:**

**Earliest Timing:****Rationale:**

- The Plimpton research highlighted the need for STEM resources for many Maine teachers.
- MSSM has an obligation to support STEM education across the state.
- MSSM can be seen as a partner with local school to provide STEM education to students whose local schools lack the resources necessary to develop their own STEM lessons.

**Additional Expected Benefits:**

- Increasing MSSM's partnerships with local schools will remove some of the competition between local schools and MSSM. The focus will be on the delivery of appropriate education to students.

**STRATEGY VI**

Enhance and deepen student achievement by expanding accelerated college pathways.

**Required Resources:**

- Maintain existing dual-enrollment agreement with University of Maine System
- Develop accelerated graduation pathway with University of Maine Orono Engineering program
- Develop accelerated graduation pathway with Maine Maritime Academy

**Earliest Timing:****Rationale:**

- MSSM students do university level work, not just in STEM classes, but in the humanities as well.
- Accelerated pathways demonstrate the quality of the MSSM education, and provide value to the Students and the State of Maine.

**Additional Expected Benefits:**

- Third-party validation of the quality of MSSM's education helps recruitment of additional students for MSSM's residential programming.

**STRATEGY VII**

Cultivate partnerships across the State with institutions of higher education, research, and industry.

**Required Resources:**

- Executive Director, faculty and staff time to cultivate partnerships

**Earliest Timing:**

- Immediate

**Rationale:**

- Our students and faculty are best served by strong partnerships in STEM fields.
- Students who have opportunities for experiences in research or industry are more likely to pursue higher education or employment in STEM fields.

**STRATEGY VIII**

Develop online classes, learning modules and other direct student learning methods to partner with and support students whose existing school cannot meet their STEM educational needs.

**Required Resources:**

**Earliest Timing:**

- Immediate – Jack Kent Cooke Foundation grant work, allowing MSSM to develop Algebra 1 and biology online programming.

**Rationale:**

- Not every student who can benefit from MSSM STEM classes can be a residential student at MSSM.
- MSSM should provide content that local schools, cannot provide on their own.

**Additional Expected Benefits:**

- Additional cooperation between MSSM and local schools will provide opportunities for students who can most benefit from MSSM's residential program to become familiar with MSSM.

### 3

#### Enhancing its Faculty/Staff

MSSM can continue to provide world class student outcomes, only as long as it has exceptional faculty and staff.

**GOAL:** Increase MSSM’s ability to hire and retain exceptional faculty and staff.

**OBJECTIVES:**

1. MSSM will ensure it remains competitive in hiring and retaining faculty and staff by focusing on all relevant factors, including compensation, work environment, professional development opportunities, and other key factors.
2. Opportunities for MSSM faculty and staff partners and families have an impact on hiring and retention and should receive special focus.
3. Students and faculty benefit greatly by enhancing the connection between faculty/staff and the residential life experiences of students.
4. MSSM recognizes facilities are a major area of focus, so all facility needs, including those focused on faculty and staff are covered in Section 1 of this plan.

**STRATEGY I**

**Required Resources:**

**Earliest Timing:**

**Rationale:**

**Additional Expected Benefits:**