

IMPLEMENTATION GUIDE



 **MESA** Mathematics
Engineering
Science
Achievement
OREGON

Theory of Change

Oregon MESA's Theory of Change outlines our big picture model for how communities *create a more prosperous society for all*. The model is based on education and social science research, quantitative and qualitative evaluations of equity initiatives, and Oregon MESA's 35+ years of lived experience.

MESA Theory of Change



GATHER: To begin, we must understand the barriers to creating a prosperous society for all by conducting community-specific social justice assessments, including:

- Geography and demographics.
- Who has resources (including money) and how it flows.
- Political structures and power dynamics.
- Industry and workforce.

Collecting this information allows the community to clearly identify meaningful goals and actions. We then gather a diverse team of people committed to working towards these goals.

CULTIVATE: We recognize that to create a more prosperous, equitable community, we must commit to dismantling the systems of oppression that create the disparities we are trying to address. With this in mind, we cultivate in our teams and community a culture that values and supports:

- **Assets**—We focus on what individuals and communities bring, not what they lack
- **Empathy**—We recognize and value other people's perspectives, feelings, and experiences.
- **Growth Mindset**—We believe that everyone can improve with time, support, and effort. We embrace all experiences, especially failure, as opportunities to learn.
- **Innovative spirit**—We look for creative solutions and are willing to try new things.

BUILD: We use a strengths-based culture to build reciprocal relationships. These relationships:

- **Assets**—Recognize the assets that all individuals and communities bring to the relationship.
- **Needs**—Meet the needs of all parties.
- **Collaboration**—Are grounded in deep collaboration.

INNOVATE: We use our strengths and relationships to imagine and test solutions to the problems our community identified. To do this, we invite:

- **Flexibility**—We are willing to adapt to new situations.
- **Creativity**—We encourage novel ideas and approaches.
- **Agency**—We see each person as a source of inspiration and encourage them to share and try their ideas.
- **An abundance mindset**—We see a world full of possibilities and resources instead of focusing on limitations.

IMPACTS: To know if we are getting closer to our goals, we must carefully observe and reflect on the impacts of our work. In particular, what are we doing that creates positive change and promotes equity? How can we amplify this work? What existing needs and opportunities should be our primary focus?

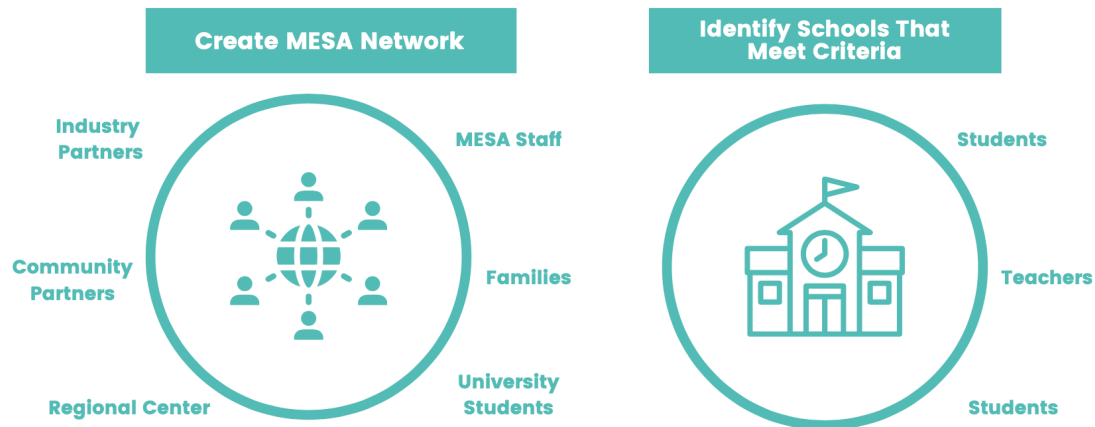
Of course, this process is iterative—our assessments lead us to continually adapt our team, goals, and processes to move closer to the ultimate goal of a prosperous society for all.

Theory of Action

Oregon MESA's Theory of Action describes how we implement our Theory of Change through our programs, organizational structure, and partnerships.



MESA Theory of Action



PURPOSE: Build Relationships, Clarify Roles and Responsibly, Provide Training.

GATHER: For Oregon MESA, our “shared goal” is the vision: To close the opportunity and achievement gaps in STEM for students in Oregon. This includes addressing the needs of youth and their families as well as the needs of the education system, industry, and community to create a more integrated STEM learning ecosystem.

Youth with untapped potential for STEM need free, safe, out-of-school spaces that build:

- **Agency**—Youth believe that they can realize a positive future for themselves.
- **Identity**—Youth have STEM and innovation mentors that they can relate to, build their identity as a “STEM person,” and have connections that can help them continue to grow.
- **Competencies**—Youth have opportunities to practice STEM and soft skills (e.g., communication and teamwork) in relevant contexts.

Education, industry, and community stakeholders are looking for:

- Measurable increases in student success.
- Trained talent to fill STEM jobs.
- Increased diversity in STEM fields to reflect the diversity of our society.
- Changemakers to address community needs.

To gather diverse people together around our shared goal, MESA does two things:

- Creates the Oregon MESA network, including industry partners, community partners, Regional Centers, MESA staff, families, and university students.
- Works with this network to identify schools that meet MESA criteria and invite their students, teachers, and schools to participate.

The purpose of these partnerships is to:

- Build relationships between stakeholders.
- Identify the roles and responsibilities individuals and institutions play in the process.
- Provide training in how the MESA program works.
- Cultivate shared values, culture, and skills that support equity and reciprocal relationships.



MESA Theory of Action

Recruit Teachers & Partners



Recruit Students



Hire Diverse Student Staff



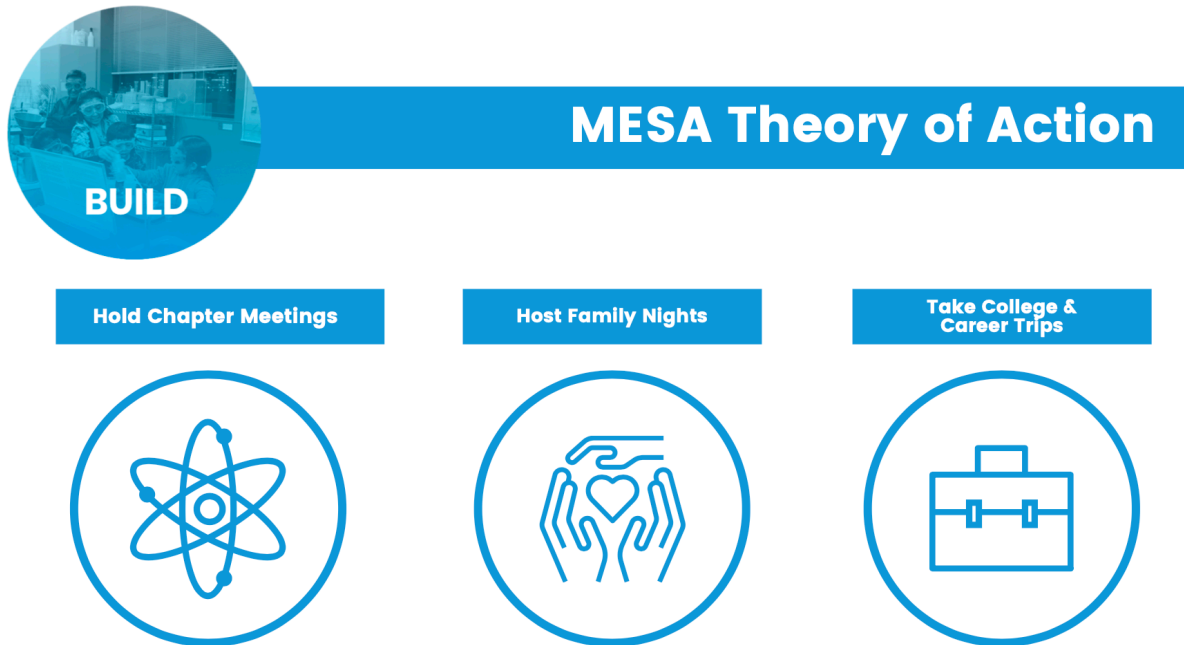
PURPOSE: Develop Student-Teacher Relationships, Build Trust & Connection with Families, Students Feel Invited, Build Group & Individual Identity, Provide Near Peer Mentors

CULTIVATE: As we bring people into the organization, it is important to cultivate a culture that values assets (not deficits), empathy, a growth mindset, and an innovative spirit. We make this possible in the way we:

- **Recruit and train teachers**—We provide teachers with professional development in equitable project-based invention education. Advisors use these practices to lead MESA Chapters and to also translate them into their classrooms for more engaging learning experiences for students.
- **Recruit and train partners**—We identify organizations that become regional centers and industry professionals that provide mentorship through their insight about STEM careers. MESA provides training for all partners to prepare them for leading MESA programs and working with MESA students.
- **Recruit students**—We partner with schools and Advisors to recruit underrepresented students through special invitations and family engagement.
- **Hire and train diverse student staff**—We recruit and hire staff that reflect our student population and bring unique life experiences. Hiring student staff also leverages the unique expertise of a multi-disciplinary higher education community.

In addition to populating the program, the process:

- Allows students to feel invited and believed in by adults that they respect.
- Builds positive student-teacher relationships.
- Builds students' group and individual identity related to STEM and innovation.
- Provides middle and high school youth with university students as near-peer Mentors and examples of the next step towards a STEM career.
- Builds trust and connection between families, schools, universities, and industries.



PURPOSE: Expose All to Education & Career Opportunities, Demystify STEM & Invention, Build Sense of Belonging in New Spaces, Build Group & Individual Identity, Focus on Process & Relationships

BUILD: To build reciprocal relationships between families, teachers, students, staff, and partners, Oregon MESA:

- **Holds Chapter meetings**—Students attend Chapter meetings after classes at their school. The Chapter Advisor (usually a teacher) and Mentor (university students or industry professionals) lead the meetings.
- **Hosts Family Nights**—The local MESA Regional Center hosts Family Nights early in the year to introduce the whole family (students, caregivers, siblings, etc.) to MESA. Families participate in challenges that promote innovation and are encouraged to engage with school, industry, and university partners.
- **Takes College and Career trips**—MESA staff coordinate visits to local universities and industry sites for Chapter students and teachers.

These activities build a Community Roadmap into STEM fields by:

- Demystifying STEM and invention.
- Exposing students, families, mentors, and teachers to educational and career opportunities.
- Allowing industry and educational partners to attract future applicants.
- Building a sense of belonging in new spaces.
- Building group and individual identity, which is particularly important for middle and high school-aged youth.
- Focusing on the invention process and relationships between students, Advisors, Mentors, and Partners.



MESA Theory of Action

Host Competitions
Demo Day, MESA Day,
Nationals



PURPOSE: Expose All to Education & Career Opportunities, Celebration of Accomplishment, Connect with Families, Practice Communication Skills

INNOVATE: MESA encourages innovation in many ways and uses a human-centered design approach for developing programs and in our curriculum. The most obvious example of innovation are the invention projects at the heart of Demo Day, MESA Day, and National competitions. Students use the Oregon MESA Invention Toolkit process to discover a problem in their school or community, develop understanding and empathy for the people affected, and invent a solution with iterative development, testing, and user feedback.

In addition to instilling a spirit of innovation in the students, the competitions:

- Expose the MESA community to educational and career opportunities by connecting families and teachers with educational and industry partners.
- Celebrate the youths' accomplishments.
- Engage families in the experience and goals of MESA.
- Allow students to practice communication skills critical for social and professional success.

The educational design of the challenges and program structure also reflect innovation in STEM education. The program cultivates an innovative spirit and STEM identity by:

- Focusing on how STEM can address real community needs.
- Creating opportunities for youth to practice STEM in meaningful contexts.
- Incorporating soft skills such as teamwork, empathy, and communication into the design and innovation process.



MESA Theory of Action

HS Graduation Rates
Increase



Retention in College
STEM Degrees Increase



STEM Identity Increases
in Middle & HS Students



IMPACT: MESA conducts evaluations in multiple ways to understand the program's impact on students and stakeholders. These evaluations show that Oregon MESA:

- Increases high school graduation rates.
- Increases retention in college STEM degrees.
- Increases STEM identity in middle and high school participants.

MESA also aims to see measurable long-term impacts in the following areas:

- Sense of meaning, accomplishment, and economic resilience for alumni/ae.
- Increased representation of people in the STEM workforce who have been historically under-represented.
- Increased representation of people who have been historically underrepresented in entrepreneurial/innovation settings.
- Diverse STEM innovators positively impacting communities (especially marginalized communities) to create a more equitable, prosperous society.

What does success look like?

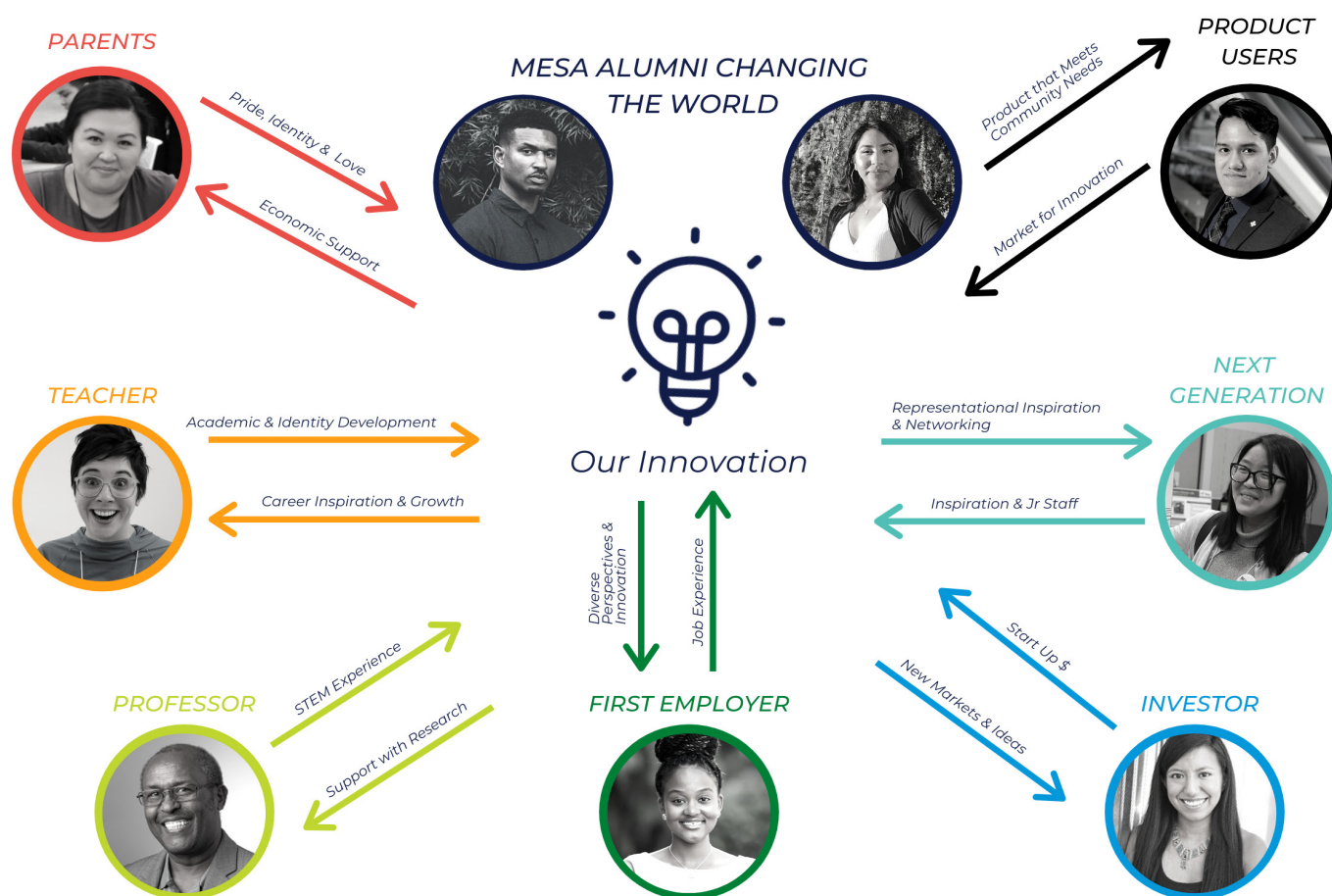
In MESA's Vision of Success, MESA Alumni/ae are changing the world. They are women, people of color, and first generation college students who become the leaders of businesses, ventures, and research. They are also part of a networked, symbiotic ecosystem where they provide as much as they receive. In this Vision of Success, MESA alums receive:

- Inspiration and social support from parents, educators, and even the next generation of young folks,
- Mentorship and academic preparation from teachers and professors,
- Career and business development from employers, investors, and a community of users.

These relationships are mutually beneficial, as MESA alums also provide:

- Financial security to their parents and community,
- Innovative ideas and products to employers, investors, teachers, and the community of users,
- Inspiration and representation to the next generation of learners.

MESA VISION OF SUCCESS



Research indicates that Oregon MESA's model is moving us closer to this vision of success. To begin with, Oregon MESA improves student achievement and attainment for high-needs students. In 2016, research from Education Northwest showed that over a two-year period, MESA students had higher grades in science and math than their demographically matched peers, even after starting out behind the district average. Low-income and underrepresented minority students showed the largest improvements (Greenberg Motamedi & Singh, 2016). A research study in 2020 also examined the academic outcomes of 431 Oregon MESA students across 10 years of data in four school districts. Researchers found that MESA students had 3.13 times the odds to graduate from high school in four years than matched peers, and "MESA's impact on high school graduation was tangible and important." Eighty-seven percent of MESA students graduated from high school on time, compared to 80% of the matched group and 73% for Oregon students overall (Greenberg Motamedi, Serrano, & Hanson, 2020).

MESA Alumni are also making a difference. They are innovative entrepreneurs like Bosco Kante, a mechanical engineer and Grammy winner from Grant High School, who invented a device revolutionizing the music industry. Bosco credits the relationships he built in MESA for getting him there. They are also programmers, community leaders, math and science teachers, transportation engineers, and patent lawyers. The students in our programs today will fill those roles, and more, in the future.