



# STEM - Strategic Plan Development Subcommittee

MEMBERS: Thompson Morrison (Chair), Herb Fricke

**June 12, 2015**

**1:00pm – 3:00pm**

506 SW Mill Street, Room 710

Meyer Memorial Boardroom

Portland, OR 97201

JIM PIRO, Chair

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## **AGENDA**

**1. Discussion: Public feedback on STEM Manifesto draft**

**2. Discussion: Additional elements for the Strategic Plan**

**3. Next steps**

**4. Public Comment**

*Members of the public wanting to give public testimony must sign in.*

*There will only be one speaker from each group.*

*Each individual speaker or group spokesman will have three (3) minutes.*

*All meetings of the STEM Investment Council are open to the public and will conform to Oregon public meetings laws. The upcoming meeting schedule and materials from past meetings are posted online. A request for an interpreter for the hearing impaired or for accommodations for people with disabilities should be made to Seth Allen at 503-378-8213 or by email at Seth.Allen@state.or.us. Requests for accommodation should be made at least 48 hours in advance.*



**1** Thanks so much for taking the time to give us feedback on this initial draft of our STEM Manifesto and Strategic Plan. If you've already read the document, this survey should take you ~15-20 minutes to complete. You may download the document here if you'd like to read it: [Click here](#).

**Ready to begin?**

|     |    |      |                                                                                    |
|-----|----|------|------------------------------------------------------------------------------------|
| Yes | 71 | 100% |  |
| No  | 0  | 0%   |   |

*n = 71*

**2** Science and technology are transforming our world. In an increasingly global economy, individuals, communities, and companies need to find ways to adapt and innovate faster - to not only survive, but to thrive. To do that, they need talent that is creative and empowered.

**How important do you feel that it is that we better prepare our students with STEM-related skills that empowers them to be the creative problem solvers needed for this new innovation economy?**

|                    |    |      |                                                                                    |
|--------------------|----|------|------------------------------------------------------------------------------------|
| Important          | 71 | 100% |  |
| Not sure           | 0  | 0%   |   |
| Not very important | 0  | 0%   |   |

*n = 71*

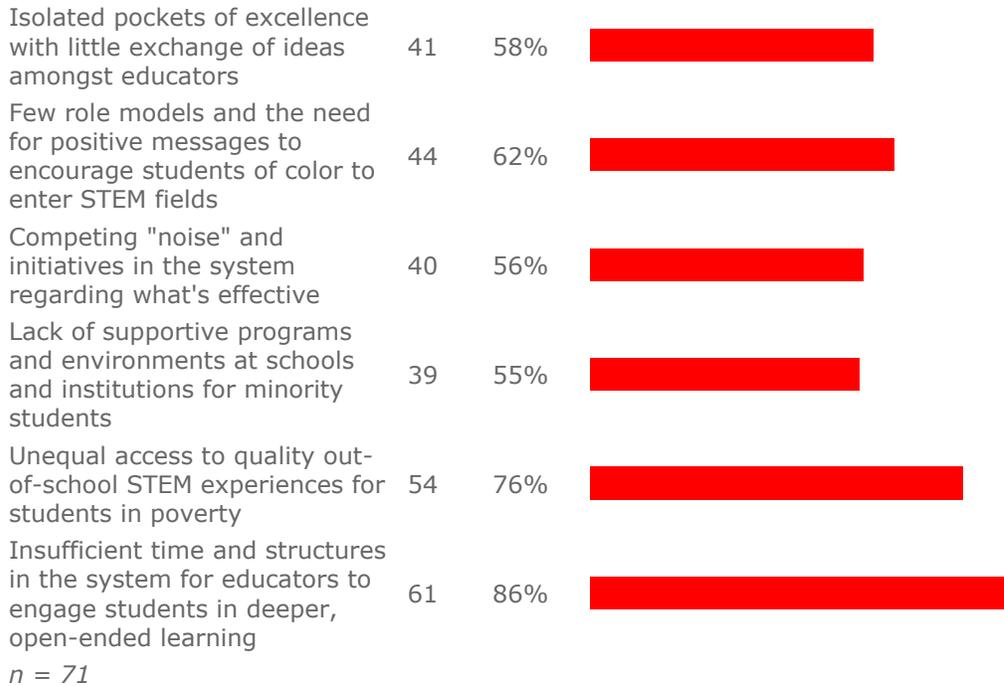
**3** How well do you think we are currently doing to prepare each and every student with STEM-related skills and mindsets to be the creative problem solvers needed for this new economy?

|          |    |     |                                                                                      |
|----------|----|-----|--------------------------------------------------------------------------------------|
| Well     | 0  | 0%  |   |
| Not sure | 11 | 15% |   |
| Not well | 60 | 85% |  |

*n = 71*

**5** Here are some barriers that we see in making sure that our students are prepared with these STEM-related skills and mindsets. Of these, which do you feel are important? (Select all that apply)

|                                                                                            |    |     |                                                                                      |
|--------------------------------------------------------------------------------------------|----|-----|--------------------------------------------------------------------------------------|
| Perceptions of STEM careers and coursework as a difficult and long educational journey     | 32 | 45% |  |
| Content is disconnected from relevant context and few educators have worked in STEM fields | 55 | 77% |  |
| Lack of mathematical reasoning and skills necessary to advance through the system          | 41 | 58% |  |
| Few opportunities for youth to experience potential career options                         | 36 | 51% |  |



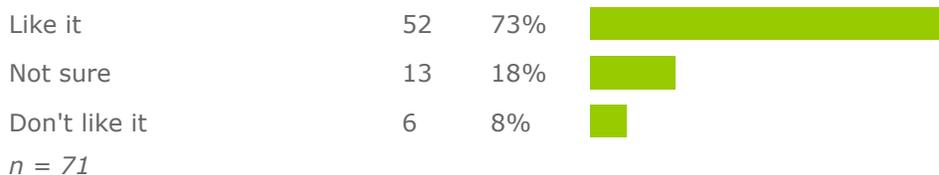
**Our Manifesto has two parts: Vision and Beliefs. Here is how we defined our vision:**

#### **Our Vision**

**To build an inclusive, sustainable, innovation-based economy by reimagining and transforming how we educate and empower individuals and communities. Oregonians of all races, ethnicities, economic status, and geographic locations will develop the fundamental STEM-enabled innovation skills and mindsets necessary to:**

- 6**
  - **Fully contribute to an increasingly complex and technologically rich global society**
  - **Address high-demand workforce and industry needs**
  - **Improve the prosperity of all individuals and communities across the State**
  - **Become creative, life-long learners who can adapt to changing social and economic conditions**

**As an overall impression, what do you think about this vision statement?**



- 11** **The second part of the Manifesto states our beliefs. These beliefs articulate the core values that we share as we embark on this journey to fulfill our vision.**

## Our Beliefs

1. All people have creative potential. Our students should not just be consumers of knowledge, they need to be creators of it in a way that unleashes their creative genius, interests, and talents.
2. Each student deserves an opportunity at prosperity. There continues to be persistent inequities in race, ethnicity, gender, and educational background in high-wage, high demand professions. Many students in poverty and from rural areas are being left behind. No one's talents should be left behind.
3. Diversity is our strength. Differences of gender, ability, race, ethnicity, and culture provide critical and diverse perspectives and voices to address today's complex challenges. Innovation emerges where different ideas and cultures interconnect.
4. Engaged learners succeed. How we teach our students is as important as what we teach them. We must create meaningful learning experiences that empower all students to embrace their curiosity, take ownership of, and joy in their learning, and become lifelong learners.
5. Education is a collective responsibility. Effective STEM learning takes place both in and outside of classrooms. Everyone in our community is a potential educator and we need to build solutions that develop partnerships with all of the human capital in our communities.
6. Innovation is the cornerstone of prosperity. STEM is not just about filling jobs but creating jobs to address challenges and opportunities. Building an innovation-based economy is essential for long-term prosperity resulting in competitive advantage in a global marketplace.
7. Learning takes courage, persistence, and humility. Pushing the boundaries of one's understanding requires us to embrace ambiguity and to take intellectual risks. What we do with what we don't know is as important as what we do know. We should prioritize questions over answers.
8. STEM skills are essential skills. Advancements in science, technology, engineering, and mathematics are transforming every industrial and service sector, from agriculture to energy, medicine to manufacturing, forestry to nanotechnology.
9. All learning is cross disciplinary. It is the interconnectedness of ideas that enable people to integrate new learning with their prior experiences. STEM by its nature synthesizes analytical and creative thinking. It is a powerful tool that sits at the crossroads of the sciences, arts and humanities.
10. The best way to learn STEM, is to DO it. Education is not about retaining facts or disconnected bits of information. Utilizing purpose-driven learning challenges students to pursue deeper questions and to solve problems that are relevant and meaningful.

As an overall impression, what do you think about this "Our Beliefs" statement?

|                        |    |     |                                                                                      |
|------------------------|----|-----|--------------------------------------------------------------------------------------|
| Like them              | 56 | 79% |  |
| Like only some of them | 13 | 18% |   |
| Don't like them        | 2  | 3%  |   |

*n* = 71

**16** In our Strategic Plan, we defined four goals:

1. **Inspire and empower our students to develop the knowledge, skills, and mindsets necessary to thrive in a rapidly-changing, technologically rich, global society.**
2. **Ensure equitable opportunities and access for each and every student to become a part of an inclusive innovation economy.**
3. **Continuously improve the effectiveness, access to resources, and the number of formal and informal STEM educators.**
4. **Create sustainable and supportive conditions to achieve STEM outcomes aligned to Oregon's economic, education, and community goals.**

**What are your overall impression of these goals?**

|                 |    |     |                                                                                    |
|-----------------|----|-----|------------------------------------------------------------------------------------|
| Like them       | 52 | 73% |  |
| Not sure        | 13 | 18% |   |
| Don't like them | 6  | 8%  |   |

*n = 71*

**We have developed strategies to meet each of these goals. We would now like to take a minute to review each of them with you.**

- 21** *Goal 1: Inspire and empower our students to develop the knowledge, skills, and mindsets necessary to thrive in a rapidly-changing, technologically rich, global society.*

**Which of these strategies to reach Goal 1 do you feel are important? (Select all that apply)**

**Promote the development of new teaching approaches**

|                                                                                                                                                     |    |     |                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|--------------------------------------------------------------------------------------|
| that challenges students to be creative, resourceful, persistent, and collaborative in developing knowledge and skills to solve real-world problems | 54 | 76% |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|--------------------------------------------------------------------------------------|

**Increase the interactions of students with STEM**

|                                                                                                                                                     |    |     |                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|--------------------------------------------------------------------------------------|
| professionals who can help students develop aspirations and personal identities as life-long learners and inspired innovators utilizing STEM skills | 52 | 73% |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|--------------------------------------------------------------------------------------|

**Develop new opportunities**

|                                                                                                                                                             |    |     |                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|--------------------------------------------------------------------------------------|
| for students to enhance their critical thinking and problem-solving skills in afterschool or summer programs that are focused on solving complex challenges | 42 | 59% |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|--------------------------------------------------------------------------------------|

**Increase the availability of early college credits**

|                                                                                                                          |    |     |                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------|----|-----|--------------------------------------------------------------------------------------|
| in STEM courses by strengthening local partnerships and articulation agreements between high schools, community colleges | 32 | 45% |  |
|--------------------------------------------------------------------------------------------------------------------------|----|-----|--------------------------------------------------------------------------------------|

and 4-year institutions.

**Increase the development and acceptance of industry-recognized credentials** based on demonstrated skills, including traditional and nontraditional certifications (e.g., micro-credentials, digital portfolios, etc.)

31 44% 

**Provide program "start-up" or retooling funds** to incentivize post-secondary programs aligned to high-wage, high-demand industry needs.

31 44% 

**Increase student interest, understanding, and success in mathematics** through solving real-world problems.

43 61% 

**Improve the quality and relevance of post-secondary mathematics placement processes** and align course offerings to relevant degree/certificate program needs

25 35% 

**Transform P-20 STEM teaching and learning** by supporting the spread of effective approaches and connecting research to practice

37 52% 

*n* = 71

**Goal 2: Ensure equitable opportunities and access for each and every student to become a part of an inclusive innovation economy.**

22

**Which of these strategies to reach Goal 2 do you feel are important? (Select all that apply)**

**Improve student advising** by strengthening career counseling services and tools, increasing access of students to alumni, professional, and near-peer networks, and increasing student access to up-to-date market data about high-wage, high-demand jobs

39 55% 

**Increase STEM internships,** work-based and service learning opportunities, and undergraduate research opportunities in high-demand fields

50 70% 

**Increase the number and quality of P-20 support services** and pre-college transition/bridge programs for

42 59% 

students who are traditionally underserved and underrepresented in STEM

**Increase the number of STEM role models** and access to professional networks for students who are underrepresented in STEM

42 59% 

**Increase needs-based financial support and access to flexible, micro-loan/funds** for first-generation and underrepresented students pursuing high-wage, high-demand credentials

39 55% 

*n = 71*

**Goal 3: Continuously improve the effectiveness, access to resources, and the number of formal and informal STEM educators.**

**23**

**Which of these strategies to reach Goal 3 do you feel are important? (Select all that apply)**

**Create opportunities for STEM educators to experience STEM** in industry and research as part of their professional development.

54 76% 

**Build, strengthen and support statewide partnerships for STEM education through our STEM hubs.**

43 61% 

**Provide incentives to teacher preparation programs** to develop, evaluate, and disseminate effective STEM preservice teaching strategies including continued support during the first three years of teaching.

42 59% 

**Increase career transitions of STEM professionals** into teaching for CTE, math, and science.

41 58% 

**Provide time and resources for educator-to-educator and educator-industry collaborations** around implementation of promising STEM instructional practices and materials

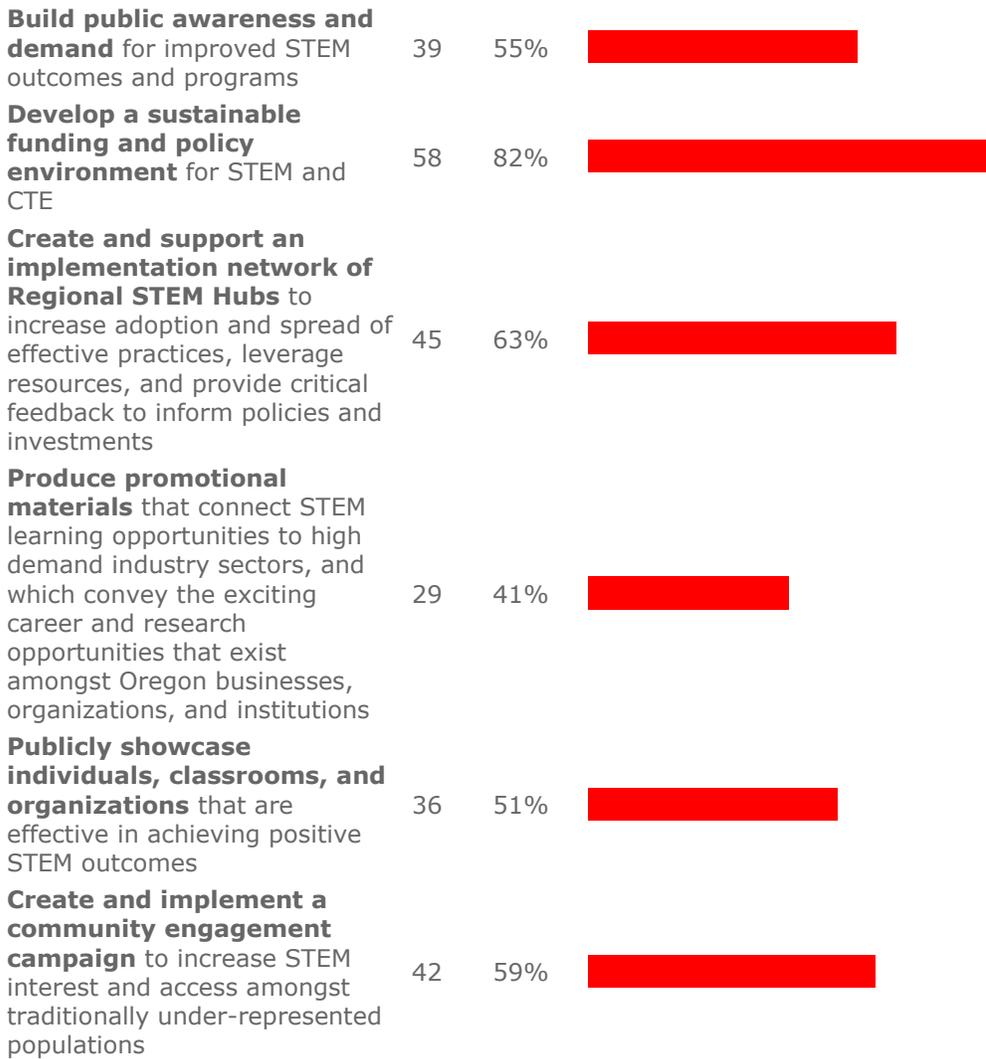
46 65% 

*n = 71*

**24**

**Goal 4: Create sustainable and supportive conditions to achieve STEM outcomes aligned to Oregon's economic, education, and community goals.**

**Which of these strategies to reach Goal 4 do you feel are important? (Select all that apply)**

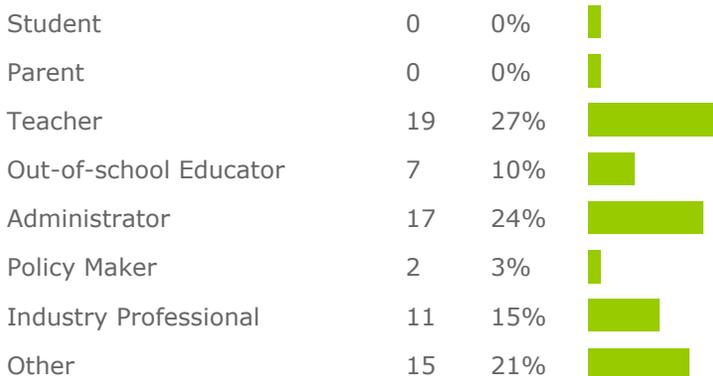


*n = 71*

**Could you tell us a little about yourself?**

**26**

**To begin with, how would best describe your profession?**



n = 71

**28 With what race or ethnic category do you most identify with?**

|                                           |    |     |                                                                                    |
|-------------------------------------------|----|-----|------------------------------------------------------------------------------------|
| Hispanic or Latino                        | 1  | 1%  |  |
| American Indian or Alaska Native          | 0  | 0%  |  |
| Asian                                     | 3  | 4%  |  |
| Black or African American                 | 2  | 3%  |  |
| Native Hawaiian or Other Pacific Islander | 0  | 0%  |  |
| White                                     | 57 | 80% |  |
| Would rather not say                      | 8  | 11% |  |

n = 71

**30 Would you like to be kept informed about STEM education initiatives in the state and to be invited to provide future feedback about our strategic direction?**

|     |    |     |                                                                                    |
|-----|----|-----|------------------------------------------------------------------------------------|
| Yes | 54 | 76% |  |
| No  | 17 | 24% |  |

n = 71

Project: STEMOregon\_1\_3K STEM Plan Feedback

**4 Why don't you feel that we are doing a good job preparing our students with STEM-related skills and mindsets to be the creative problem solvers needed for this new economy?**

- f1.81** There appears to be no clear "roadmap" for students who are interested in STEM careers. The continuum appears to be fragmented. Parents are confused or lack knowledge on what is available in STEM careers and how their children can become engaged. This is a broad platform that need to be segmented to include: grade school introduction of STEM areas, high school emersion in specific career areas of focus, bridging from high school to community college and college/university career areas.
- f1.79** I believe that thee is a growing need, emphasis, and attempt at creating more STEM based instruction and practices that will serve our students for the future. As an arts education advocate, there is a huge missing piece of the puzzle when students are continually asked to be creative - an inherent and learned skill that the arts foster so naturally. I believe in a focus on STEM education as a collaborative, cross curricular way of educating, but without the presence of an artistic education, I do not know if we will be educating creative problem solvers.
- f2.98** Increasing poverty which undermines support for learning. Dis-empowering teachers and de-professionalizing education, and failure to implement education methods and structures proven globally (e.g. Finland). Lack of support for the scholarship of teaching and learning by college faculty, especially community college faculty whose passion is teaching and learning. The over-use of part-time teaching positions in community colleges and universities. The growing expectation and pressures on students to pay for their own educations based on the mistaken view that education is a private good, rather than primarily a public good.
- f2.96** Too much focus on standardized testing in the lower grades. Science/technology/engineering take a back seat to math and ELA and math is often taught in a rigid manner to match testing.
- f2.95** Teachers lack resources and applied curriculum; Limited engagement of businesses in classrooms; Small percentage of students are persisting into STEM post-secondary programs.

- f1.76** Lack of resources in most school districts have so these classes are not offered.
- f1.75** Very poor equity in early preparation for even introductory STEM programs at high schools and higher learning. Access is too dependent on geography, school district funding and emphasis, adequacy of instructional staff. (I note that most of your concern about STEM is related to the new economy and student career preparation. But, ALL students will need an understanding of science, technology engineering and math not just those in STEM related industries. They will need this for allied careers and to make citizen decisions. Where is this emphasis? )
- f2.93** High-stakes reading and math policies are demanding teachers spend more time on those subjects in the classroom, therefore less time is available for science, technology, and engineering instruction. More testing and prescriptive curricula are making it more difficult for teachers to integrate science, technology, and engineering into reading and math. There is little to no time for teachers to integrate problem-based learning, allowing kids to try and fail until they find a solution on their own, which is a great way for kids to develop STEM skills. Funders (public, private, and government) don't allow enough time to really see if a new policy works so things in the classroom are constantly changing. If policies (programs) don't get results in 2-4 years, then funding is taken away to try something new that might work better. This doesn't allow teachers to really learn the new program before implementing it, it would take 2-3 years for teachers to learn and be able to implement it in the best way to be effective. Also, student learning doesn't work that way, it's scaffolded--kids build on it from year to year so to see if something is really effective it takes at least 6-7 years (a kids going through K/1-6th grade).
- f2.92** 1) In elementary schools science is viewed as entirely optional. The introduction of (yet new) CCSS traditional literacy standards and testing ahead of NGSS science standards, coupled with an over-arching view that reading, writing and arithmetic come first, result in tradition-bound administrators 'doubling-down' on extra reading or math rather than supporting it with science and engineering (or social science) lessons. Teachers are also challenged by the latter, lessons that connect S&E with math and language arts. First priority here (elementary level) would be to find examples of how this does work in real Oregon classrooms and disseminate them broadly to both teachers and admins. It would also help that, when we finally phase in NGSS with CCSS, we stick to these standards for at least 8 years, as 'standards creep' has contributed significantly to teacher burnout. 2) Middle school admins and teachers then find it difficult to take in students with a broad range of STEM learning experiences (from none to a lot) and move them forward. Also, secondary ed. is compartmentalized into discipline areas and making cross-disciplinary connections (which better model real STEM career practices) takes special effort. We've made some progress with MSP programs that help connect science/engineering with math, but structural problems around school schedules and teacher collaboration still impede progress. 3) High schools. Math issues arise here-- students do a lot of one step forward-one step back in progressing into post-secondary math classes. We have yet to fix this. Also, interdisciplinary connections seem even harder to establish in high schools, as almost every school is different. Despite this, high school science teachers are hungry for association and collaboration, as evinced at a recent workshop I attended for physical sciences-related teachers in Lane County 4) Our state leadership around STEM is weak. For example, in the STEM Strategic Vision draft document the emphasis on equity and inclusion (laudable) overwhelms the other important message that student STEM knowledge and skills lead to prosperous and society-benefiting careers.
- f1.72** Unfortunately, we have had to focus our schools on a very narrow range of skills. With the demands of high stakes testing, STEM education has taken a backseat to literacy and math. The unintended consequence of this decade long push to "leave no child" behind has unfortunately left more students behind. The demand for STEM workers far exceeded the number of STEM graduates in Oregon programs, thus Oregon students are not able to obtain the high wage STEM jobs available. Rather than encourage students to explore the natural and designed world, we have instead created passive observers that are great at taking multiple choice OAKS tests, but lack the critical thinking and innovation that drives our economy and culture. Science and Art are the engines that drive our culture, yet are two of the areas that are priorities for our schools.
- f1.71** The work we give students in STEM isn't generally that interesting. There are some exceptions - robot contests and the like. But overall, most STEM-related instruction is pretty "cookie cutter."
- f2.85** STEM-related classes seem to only be available to a few students - and our "teach to the test" mindset has destroyed creativity and critical thinking.
- f1.66** Our K-12 culture is excellent at producing buzz words, documents, working groups, new priorities/needs and finding more ways to collect data on our kids but terrible at implementing systematic changes that actually turn the documents into action on the ground. Less time needs

to be spent on the big picture and more time/resources need to be invested into the implementation and on-the-ground work. For our students to be STEM or real-world prepared, we must carve out the time in a school day for them to struggle, fail and overcome without a prescription answer we want them to come to. Teachers must be given the training and permission to engage students in STEM-related skills and mindsets that are not restricted to whatever time is left over when Language Arts and Math is done. I have yet to encounter a time in my professional life where my day was broken into 30-50 minute segments where I could only utilize specific subject area skills and knowledge during certain times of the day. If we want our students to be prepared for the real-world, we need school to reflect the real-world and the careers that these students will fill. All those English majors out there are not super high in demand yet that's where most of a K-12 students' day is spent. It seems the communication skills utilized in STEM, debate in social sciences and graphic design in art classes seem like more appropriate professional skills than Language Arts as a stand alone.

- f2.79** For the last two decades, the assessments our teachers have had to use (the standardized tests used by our educational systems) have not assessed the knowledge and the skills we know all of our students need to be successful post high school. Because of professional pressures (and perhaps not knowing another way to do it) our teachers have been "teaching to the test." I am of the mindset that teaching to the test is fine, if the test is awesome and assesses what we know the students should be able to do and know (assessing creative capacity, application of conceptual knowledge, and higher-order cognitive skills). This kind of test is expensive to design and grade. We need more money and then the thoughtful use of the money to move the needle on what is happening in the classroom. Our teachers are awesome, they just need the time to collaborate and learn new ways of teaching.
- f2.78** Common Core is getting in the way for students to be able to have this freedom of thinking. OST is the key in a well rounded student to become interested in STEM fields.
- f2.77** Schools are too focus on testing, reading and math focused, subjects are taught in silos, focus is on content and not process
- f2.76** Not enough time in class because of too many standards to cover.
- f1.62** Oregon does not appear to be focused on family wage, high demand skills and educational opportunities. National list of "Most Valuable College Degrees" Very high correlation to PLTW program pathways and skills. From the recently released Forbes.com list on "valuable college majors" we can see wht the nation values - and it does not appear to be a good fit with what the education system is focused on. Here is the link:  
<http://www.forbes.com/sites/jennagoudreau/2012/05/15/best-top-most-valuable-college-majors-degrees/> No. 1, biomedical engineering. Biomedical engineers earn a median starting salary of \$53,800, which grows an average of 82% to \$97,800 by mid-career. Moreover, the BLS projects a whopping 61.7% growth of job opportunities in the field—the most of any other major on the list. Engineering concentrations comprise one third of the most valuable majors. Software engineering majors (No. 4) earn a median of \$87,800 after 10 years on the job; environmental engineering majors (No. 5) earn a median of \$88,600; civil engineering majors (No. 6) earn a median of \$90,200; and petroleum engineering majors (No. 9) earn a median of \$155,000—the highest paycheck on the list. The paycheck is not everything, having thoughtful thinking skilled graduates is.
- f1.61** We are stuck in ruts of teaching and learning that are unproductive in an environment rich in information and also filled with greater diversity of all kinds than we have ever seen. The classroom model of instruction at least beginning at middle school must give way to an integrated set of learning methods and tools. This will mean an overhaul in our teacher education programs schools which is already happening with some very productive teams of teachers and researchers.
- f1.59** K12 structures are steeped in tradition: Traditional buildings Traditional classrooms Traditional scheduling Tradition of date-stamping (class of 2015, etc.) Traditional class sizes Traditional educators
- f2.74** Schools are typically not structured in a way that supports teachers to learn from each other and develop new instructional and assessment skills that are aligned to NGSS standards and practices. Teacher professional development can be hit-or-miss in terms of relevancy, utility and quality and is often set-up as "drive-by workshops" without adequate support for implementing in the classroom. Principals rarely have the necessary knowledge, skills and time to support teachers implementing changes to STEM instruction. Without these supports in place, the learning environment for the students remains stuck in the past: at the elementary level - science by worksheet and at the high school - drill & kill. Three things need to change within schools: 1)

Teachers need access to high quality, ongoing professional development, 2) principals need adequate knowledge, skills, dispositions, and time to provide support and leadership to support STEM education, and 3) Districts need to have policies and supports in place allow schools to have the dedicated time for on-the-job professional learning and supports such as dedicated STEM TOSAs to provide the coaching.

- f2.71 Feedback from companies reveals that many still hire top talent from outside the state. The state's poor graduation rate could deter some companies from looking for talent in the area.
- f2.69 There is too much variety in the preparation. Some students get great training and others get pretty lousy training.
- f2.68 There isn't enough Professional Development opportunities for educators to create lessons, units and to learn more about STEM fields. The barriers that educators face prevent them from mastering both the content required and the mathematics.
- f2.64 The roll out of STEM in Oregon has been initiative driven and idiosyncratic - it has been a quilt patch of small pockets throughout the state without cohesive direction or process. Districts have scrambled to meet the requirements of the small grants they have received totally unrelated to the adoption cycle set by the state for science standards and materials adoption. Districts do not have the materials they need or the training, pre- 12. The effort has mostly been among secondary science teachers who are already excited about STEM and who are pushing their districts with no clear direction. The STEM Manifesto & Strategic Plan needs to have a clear definition of STEM and common language terms. It needs to clearly state how STEM relates to the Next Generation Science Standards recently adopted by Oregon. Are the newly adopted State Standards for Science the driving force for STEM? Are the instructional material adoption for Science that is suppose to be in the classrooms in 2016-17 a major driver of this effort? (It certainly needs to be since districts do not currently have enough materials, lesson plans, etc. Hopefully, this effort can become much more cohesive and strategic in implementation in order to sustain a real effort over time.
- f2.63 There's no commitment of the funding necessary to accomplish this! The STEM programs don't come free and teachers can't be expected to magically access and understand them. Your Manifesto/Strategic Plan is pie in the sky, excellent goals and ideals but really no concrete plan to accomplish anything.
- f1.49 Science is not valued due to the overwhelming high stakes testing in language arts and math. All resources are going towards that and we are constantly being told (or it is implied) that we should be really spending our time helping students read and write better rather than focusing on the science.
- f1.47 No evidence or data to support the claim.
- f2.55 We are, for the most part, still teaching science, technology, engineering and mathematics in isolation from each other. We are not being explicit about the connections. Additionally, we are not consistent in providing opportunities for students to solve problems creatively.
- f1.44 1. We continue to allow students to pass through the education system with huge gaps in their learning. 2. We continue to put the emphasis on points/grades and not on learning. 3. We continue to have teachers be the sage on the stage instead of facilitating learning and having students own their own learning. 4. We continue to keep learning at low levels of the learning taxonomy. Recall. Not critical thinking skills. 5. We continue to graduate students with a D-average with few skills and knowledge and call it a diploma. 6. We continue to be a time-based system (teacher and system focused instead of student-focused) 7. We continue to be a credit-driven (system) instead of knowledge driven 8. We continue to think that learning only happens in the classroom. The world is our classroom. More hands-on, student internships and after-school experiences that provide the connection to the standards they are learning in the classroom. 9. Students are entitled to know and understand the learning target in every class and know the differences between good and poor performance on that standard. 10. We continue to chew around the edges and have a shot-gun approach to solutions for Oregon's poor performance on State assessment tests. Yet we still have 75% of students leaving high school and attending a community college and needing remediation! Summary; We need to invest in improving the practices of our K-20 teachers and not allow our youth to be pushed along in school to the next grade or next class without knowing and being able to apply their knowledge in the required standards. This ought to be a pants on fire initiative! We continue to lose kids every day to the system. Because the system is not ready for kids.
- f2.53 - Major, persistent disparities In STEM engagement and participation across gender, racial and

ethnic groups, and socioeconomic lines. - Too much focus on school outcomes and not enough on life-long and life-wide skills and mindsets, like STEM-related interest development and the pursuit of STEM-related hobbies.

- f1.42** We need to do more to ensure students are not just learning about STEM, but that they are doing it and seeing how it directly applies to their lives. We need to get more educators on board with changing their practices away from teacher-centered to student-centered classrooms and away from traditional teaching and learning silos that somehow continue to persist. Education needs to model real life. How can we ensure lasting change, get our district and school leaders on board with how education needs to look different?
- f2.51** Students are not consistently offered course sequences in HS that teach STEM-related skills. In ES and MS, STEM content areas are taught in isolation and not through integrated projects.
- f2.49** STEM learning not connected to real problems nor careers. Expertise of teachers is poor. Amount of time spent on STEM is poor, particularly in the elementary grades and the time available to expand STEM learning outside of the traditional school day is not viewed as part of our education system. Finally, we expect too little of our students.
- f2.42** There is evidence that we have de-emphasized critical thinking, science education, project-based learning and creative innovation. This is particularly true in our elementary schools, but is also true in the higher grades. In addition, math and science classes that may emphasize these skills are reserved for the higher achieving students (as determined by grades). Gateway requirements prevent many of our students from having the opportunity to experience creative problem solving. They are assigned to the plug and chug courses and continue to be low achievers because we are not meeting their learning needs.
- f2.41** The resources and training available to our schools do not align with what is necessary to prepare students for STEM careers. Teachers are also not embracing the resources that are available to bring classrooms into the 21st century.
- f1.38** Math in school is often disconnected from real-world problem solving. Elementary school students do not get regular, integrated science instruction that focuses on scientific thinking and processes. Technology is often seen as an iPad for students to do work, rather than a tool to engineer solutions to problems that matter to students.
- f1.37** I feel that we need to provide opportunities to all children, not just those that have the means or are in a higher socio-economic area. Access is a big issue/barrier
- f1.36** Oregon's one of only 5 states to receive a D rating nationally. We clearly have a tremendous challenge to change our education system and the methods we're using to prepare our students for the future.
- f1.35** As in the picture that is utilized in this document, there is not a diverse pool of students getting the opportunity to engage in STEM projects.
- f2.39** Creativity is the product of inquisitiveness, curiosity and the desire to learn. Most of this has been sucked out the metric-driven/accountability-based learning in school. A few teachers have survived by taking the chance to engage youth, have fun, make it exciting but they are getting fewer and farther between. And then when you look at creativity, relevance and applicability there's a larger disconnect between the system of education and your stated ideals. So I don't think that creativity is a metric that's measured...nor joy, love of learning, reading for pleasure.
- f1.34** Because many educators don't have the knowledge/skills to prepare their students for the 21st century world. Many of these folks are afraid or disinterested in changing themselves or their programs.
- f1.33** I think common core is leading us in the right direction, but we have years of teacher directed copy mimic do mentality to overcome...I truly believe putting together the NGSS with common core will open up doors and provide opportunities to improve this.
- f2.34** There are too few students in STEM fields, mostly because there is no excitement in the field in the formative years of 9-12. Our schools offer nothing for the inspiring child and kids are behind the times when they graduate from high school
- f1.32** Over emphasis on reading writing and math (high stakes testing) without a context for application leaves little time for focus or large-scale, meaningful professional development. Not providing enough intentional instruction/application of the necessary skills.
- f2.30** Help teachers become more comfortable with STEM subject matter in the elementary schools. Move into project based learning more where the students have the opportunity to discover and learn -- to sustain their natural curiosity.

- f2.29 Out of date school facilities and school model that rewards students for being compliant and creates "widgets" instead of innovators. This is driven by a collective bargaining environment that rewards seniority in teachers and mediocrity in the classroom learning environment. Schools are adult focused and do not readily (especially high school) reach out to the clients (the students).
- f2.28 We're still in a pockets of excellence mode with a handful of schools tackling STEM in depth. We need to find more ways to ensure all students have access to STEM experiences, in school and out of school.
- f1.28 The biggest barrier is that those who are educating do not have experience doing this kind of work.
- f2.24 I think that our current educational system is overly focused on testing and the regurgitation of facts. It doesn't allow the flexibility and space for students to dig into subjects in the world around them, instead keeping their focus on grades, tests, and other measures that don't really demonstrate understanding and intellectual development.
- f2.23 Elementary students need to have awareness of STEM relevancy to engage them early to develop interest. Focus needs to be to engage community STEM professional volunteers to develop interest and role modeling. Currently elementary teaching is focused on standards and not relevancy. Relevancy and critical thinking is the key component in developing life long STEM learners. That is not being done today.
- f2.22 inadequate resources; financial, sufficient instructor expertise [both in number of instructors and up-to-date proficiency], and community/"real world" business connections to students.
- f1.24 Too much emphasis on teaching to the test
- f2.19 The evidence is the fact that we such a shortage of skilled workers coming out of our education system. There is obviously a disconnect.
- f2.18 To focused on testing rather than teaching and learning. Teachers are scared to be creative due to high stakes testing.
- f2.16 The education system in the US has increasingly leaned towards benchmark learning where students are taught to perform well on tests as opposed to developing an appreciation for STEM fields and knowledge of how to pursue STEM concepts after school, especially students who don't perform well in STEM classes.
- f1.21 introduction to STEM-related skills must be made at the middle school level and I strongly feel that High School is a little too late. This is because most middle school math teachers do not do an adequate job of teaching the participial application of the subject and instead focus on theory. This turns them off and hence many will reach high school with limited Algebra skills and will tend to skip ANY subjects that requires it. This attitude will follow them to college

$n = 57$

**5 Here are some barriers that we see in making sure that our students are prepared with these STEM-related skills and mindsets. Of these, which do you feel are important? (Select all that apply)**

- f2.98 Lack of systems to change the quality of education or to adopt/adapt proven education models
- f2.96 lack of science instruction in early grades
- f1.76 Lack of training for teachers
- f1.75 Geographic inequity. Access to good STEM seems limited to suburban schools.
- f2.92 State educational leadership is unable to prioritize goals
- f1.62 Most important: STEM is not fun in Oregon schools. In many states STEM is a blast, we can inspire kids to want to do this but we are not (with some exceptions of course).
- f2.64 Lack of cohesive strategic process State wide to instate in our schools. Need high quality STEM at prek and elementary level - need science materials adoption and professional development in our schools. The effort so far feels like an awareness campaign. We don't have enough support for STEM in our schools for any students other than those at focus or magnet programs or in schools in certain zip codes.
- f2.63 NO FUNDS, NO COMMITMENT FROM FUNDRAISERS AT INSTITUTIONS
- f2.53 Insufficient support for preschool children, parents, and families. Too much focus on school and not enough on the entire STEM learning ecosystem.

- f1.42 Persistent practices of tracking in high school math and science courses
- f2.49 Inequity in BOTH in and out of school STEM access
- f2.42 In the above statements that reference students of color and minority students...the statements are also true of students in poverty.
- f2.39 Lack of joy for learning, working with excited teachers
- f1.34 Educators who are afraid to change.
- f2.33 Lack of community based programs that reach beyond schools
- f2.34 admin could care less
- f2.24 The entire education system is based on an out of date model.
- f2.19 perception that STEM related jobs have all gone offshore and no method to effectively take one off successful programs to scale.

*n* = 18

## **7 Why are you unsure of this vision statement?**

- f1.81 This Vision Statement seems a bit long. It should be a concise statement. I like the first sentence of the vision statement below. The remainder of the information is relevant but could be used as part of the strategic plan.
- f2.95 A vision should describe our future state. Start with: Oregonians enjoy .... rather than "To build" Need to define STEM somewhere... it is more than just more science and math courses. It is about engagement, integration of subjects, application.
- f1.76 I like what it says however I am skeptical as to how achievable it is.
- f2.92 On the whole the document feels unfocused and a bit of a 'big list.' Language is quite 'fluffy' for example: "inclusive, sustainable, innovation-based economy by reimagining and transforming how we educate and empower individuals and communities" and "Inspire and empower our students." How about "to significantly and sustainably enrich science, technology, engineering and mathematics instruction throughout Oregon and thus foster scientific creativity and enterprise." Beliefs: See previous comment regarding the beliefs statement. Item 8 should be nearer the top. I suggest the following re-ordering of what's there: 8,3,10,5,6,9. Cut 1 and 2, which are self-evident. 4 is similar to 10. 7 isn't specific to STEM. 9 could be revamped to emphasize that well-designed STEM learning environments serve to bolster fundamental literacy skills. Goals: Cut goal 3 or revamp completely. What is stated there is self-evident, and education overuse of the word 'continuously' as reduced its meaning to rubble. The 'number of educators' seems an odd metric. I suggest "Systematically develop human and infrastructure resources statewide that support excellence in STEM instruction." The bullets below that could use some work. I would put goal 4 first or, alternately, goal 3 as restated above. (one could then cut the remaining of the two). Then go with 2 as stated (but 'inclusive, innovation-driven economy'). Move your goal 1 to 3, restate: "Galvanize student development of the knowledge, skills...." I note that there a 25 bullets in toto under the 4 goals. This is one reason why this document looks like a laundry list. The Significant Barriers (omit 'to be overcome') section can (and should) be distilled down from feedback given in the previous survey item. I suggest keeping it to no more than 5 items.
- f1.69 The emphasis, as with many STEM initiatives, seems to be on developing a productive intellectual sweatshop, in which our citizens can work in the high-tech maquiladora of the future.
- f2.85 Not enough about finding satisfaction in an exciting career that can transform the way we see the world. Too much "head," not enough "heart." And the language is not accessible. Write it for the person who lives next door and is just trying to make ends meet.
- f2.74 The vision places too much emphasis on economic development. STEM literacy should be the focus in a democratic society where citizens need to make informed decisions regarding health (individual, community, society), environment, and economic issues, not just workforce development.
- f2.64 Would be improved by a strong philosophy statement and commonly held definitions. More specific vision of integrating this teaching in our schools prek-12 and how that will be accomplished. List of barriers needs to include sufficient instructional materials in our schools prek-12 and professional development for teachers in a more explicit way. Not only are our minority subgroups not getting enough high quality STEM learning opportunities, I would say that none of our students are receiving these opportunities other than those in specialized focus/magnet schools, and in wealthier zip codes. The vision statement is a nice draft start -

hopefully, it will be strengthened and a cohesive and clear strategic plan for instating this work in our schools will become a reality.

f2.55 Too broad

f2.39 While I agree that STEM (a fairly odd term at best) is part of the driver of economic development, the real driver is innovation, entrepreneurial energy, leading to things we have not yet defined. Teaching STEM factoids does not create equity, nor does it assure economic vitality. We must leave open room for the kid with the welder, the tinkerer in the garage, the interrelationship across disciplines, for deeper/richer learning. If you want things to change you have to be open to change.

f2.34 it could be a goal for anything, just replace the word stem with another field and it is the same as any other educational goal

f1.28 For whom is this the vision? The State of Oregon? Not clear who "Our" refers to... In general, very broad. Strategic plans should be designed to narrow scope---what is "in" and what is "out"---this doesn't succeed in doing so. "Building a whole economy" "Transforming how we educate" seem too broad to me to provide a basis for strategic action. The word STEM almost seems gratuitous. It is about what is important in general for education and society. No arguments about the inspirational content though!! There is an implication of the underlying connection between STEM and innovation. I'm not sure what a "STEM-enabled innovation skill" is. Finally, my test of effective strategy is to imagine the opposite. Is it feasible that another participant in the ecosystem with similar intent would choose a different path? If every other participant would have the same "strategy", then it isn't strategy. Strategy defines a choice of action, not philosophy. Does not explicitly mention the needs of citizens to be educated on scientific issues and mathematical reasoning in order to participate effectively.

$n = 12$

## **8 Why don't you like this vision statement?**

f1.66 Because you could take the phrase "STEM" out of the statement and plug in a number of other initiatives. I don't think it gets at what about STEM is creating these changes. It spends more words addressing the equity and inclusiveness of who will be served and not enough at what it is prioritizing STEM will actually do.

f2.83 Really busy and wordy. Focus your vision, please.

f1.59 It does not adequately address the traditional structures which impede change.

f2.49 vague- not specific enough and not clear what one would do to implement vision

f1.35 Too wordy and lacks any real enthusiasm or momentum for change.

f2.33 While I understand this is all led under STEM, the basic fact is we are leaving behind significant resources and opportunities by cutting Arts from the title. Asking arts programs to integrate STEM is a losing proposition for organizations when we signal they have no place or role. It also is disingenuous to say that STEM naturally incorporates the arts and creative design. The vision statement also puts the burden on people transforming themselves into lifelong learners BUT there is no recognition that other resources are essential.

$n = 6$

## **9 Why do you like this vision statement?**

f1.79 I appreciate the emphasis on creative life-long learning.

f2.99 It seems to encompass diversity as well as the overall importance of STEM to a next generation workforce. It makes me think of developing opportunities.

f2.98 Forward thinking. Lays out the necessary assumptions for moving forward.

f2.96 hits main points but it is a bit wordy

f1.77 It is imperative in today's changing economic and industrial world that we educate our students to become the thinkers and innovators ready to tackle complex problems and find working solutions to save and protect our environment faced with global warming to toxic wastes that are the inevitable by-products of our expanding industrial world.

f1.75 Good thoughts as far as they go, but see my introductory comments on the non-economic arguments for STEM literacy.

- f1.70** The statement is inclusive and is looking to better prepare the future work force by focusing on skills and ideas that translate to future careers.
- f1.72** I like how this vision statement really hopes to change the current situation we have and include all students/perspectives in shaping our future.
- f2.79** In general, I do not believe that our communities truly value the success of all students. I think that many wealthy families do not completely understand the struggles of families living in poverty. Due to how our communities are designed, wealthy and poor families rarely interact (they go to different libraries, grocery stores, schools, etc.). It is difficult to have much empathy for that which you do not know. This Vision Statement talks about the hope for the future in which we realize that the health of our communities depends on the success of all students. To maximize the success of all students, they need to leave our school system prepared to solve problems and contribute back to the community. A strong STEM education will support students' capacity to give back and have future success.
- f2.77** The emphasis isn't just on preparation for STEM related careers but preparation for life itself and life long learning is emphasized
- f2.76** I appreciate the forward-looking talk of creative learners that can adapt since the world is always changing.
- f1.62** It sounds good and like if we do all of that we will accomplish quite a bit. I like the focus on family wage, high demand job opportunities BUT, this should not be about creating workers, we need inspired thinkers who are willing and excited about doing the "tough STEM work." Oregon opportunities in STEM: #1 - Electrical Engineering #2 - Engineering #3 - Mechanical Engineering #4 - Computer Science #5 - Civil Engineering #6 - Nursing
- f2.73** I like the bullets at the bottom to clarify the wordiness at the top.
- f2.71** I like the statement because it is all encompassing and clearly stated. The main action is to "transform how we educate"... a tough task.
- f2.68** Clear and to the point. I think that most people would agree with this vision.
- f2.67** It says we must grow/change our educational system to match current society's direction. It unites all of Oregon's people and places and demands students have a empowering, challenging and rewarding education.
- f2.66** It concerns both economic outcomes and individual outcomes. It is also inclusive of our diverse population.
- f2.63** Great statement of ideals...but, absolutely no ideas about how to get there.
- f1.49** short and to the point
- f1.47** It is very positive and not just a bunch of statements to make it sound good. The statement addresses real issues that need to be addressed and become a reality if we are truly going to make a difference.
- f1.44** It speaks to the realities of a very complex and technologically rich global society. It addresses the need for our industries to stay competitive and to have innovative, skilled employees. It speaks to the need to have fewer people on social services and more contributing to the workforce.
- f2.53** Strong focus on equity, good balance between workforce and broader science literacy issues.
- f1.42** The focus on equity is vital. My fear is that despite our best intentions, we will continue to have individuals who claim that we want "all races..." prepared for the STEM workforce, but we will perpetuate the institutionally racist systems (e.g. tracking in high school science classes) and ultimately ensure status quo.
- f2.51** The last bullet is my favorite - with a vision of CREATIVE and LIFE-LONG learners - it is hard to justify teaching math the way we have traditional taught it.
- f2.42** I believe it addresses the necessary components of citizenry, work force development, personal prosperity and adaptation to a changing society well....all essential justifications for STEM education.
- f2.41** Encouraging creativity back into schools and engaging students. Aligning skills taught in schools with real world skills and employ ability skill sets.
- f1.38** I like the equity focus, and the focus on creativity and sustainability.
- f1.37** It's simplistic enough for all to understand and its pretty clear in its interpretation.
- f1.36** Good outline of the direction and outcomes

- f2.37 It addresses what a STEM educated person "looks like."
  - f1.34 Forward looking, innovative, solution oriented, hopeful.
  - f1.33 I like that it addresses equity
  - f1.32 Provides the overall umbrella of what STEM should address aim for.
  - f2.29 It looks forward to a more positive future
  - f2.28 Captures important aspects of why STEM
  - f2.27 Gets to the point of the root problem
  - f2.25 It is succinct and talks about STEM education in a broader context while also laying out the goals in bullet point format for easy reading.
  - f2.24 I like that it doesn't focus on grades or that sort of thing. What is mentioned in your plan, but I don't see in this mission statement is the key need our society has - we need our students to have these skills so that they can address the complex problems our world faces, much (food shortages, water shortages, etc) of which has to do with environmental issues that we MUST face, but we don't know to to fix.
  - f2.23 Encompasses all aspects of the need and vision
  - f2.22 appreciate inclusion of all, long-range thinking, connection to economic drivers.
  - f1.24 it articulates a great need!
  - f2.18 Thorough.
  - f2.16 I like the emphasis in life long learning. I believe that is the first step towards achieving a nation of thinkers. To establish parents who value and pursue outside learning.
  - f1.21 It is concise and inclusive of all relevant points
- n = 44*

## **10 How might we improve this vision statement?**

- f1.81 See my previous comments.
- f2.98 Addressing currently high-demand workforce and industry needs is too narrow; we want to be in a position of also leading and defining new industries and their needs and defining new ways for societies to operate.
- f2.96 tighten the language and focal points
- f1.77 By having well defined goals in place with real working solutions as we team up experts in STEM education and students of all walks of life to address the issues in as many societal and economic levels as possible. By empowering and educating people from underrepresented groups to face these problems with confidence, they will take ownership of their world and solve the problems they face themselves.
- f2.95 see previous question.
- f2.92 (guess that was done on the previous item)
- f1.70 By adding a stated link that jobs of high demand often have a larger financial benefit as well as job security.
- f1.72 I am wondering if we might need to be clear that STEM education needs to be looked at in the same light as reading and math? For example, literacy and math classes focus on skills that could then be applied to STEM classes/lessons. I see opportunities for more integrated learning.
- f1.69 Include more consideration of why someone should care about STEM other than being an employable worker. Such as making good decisions in life that will ensure personal freedom and civic responsibility.
- f2.85 To change how we approach education so each and every person in Oregon has a chance to create a life they will be proud of - that allows each person the opportunity to feel successful and valued in a fast changing world.
- f1.66 To transform how Oregon educates and empowers individuals and communities to practice STEM-enabled innovation skills and mindsets necessary to: - Fully contribute to an increasingly complex and technologically rich global society - Inspire generations of life-long learners and problem solvers who can adapt to changing social, technologic and economic conditions - Produce new industries and high-demand workers - Improve the prosperity of all individuals and communities across the State

- f2.83 Shorter. More language that builds a system that leverages resources and minimizes duplication of effort. No language about CTE is problematic. CTE is the context for STEM.
- f2.79 I do not have any suggestions at this time, but will think about it.
- f2.77 Not sure
- f2.76 I've never liked "global" since it is not well defined.
- f1.62 How might we inspire teachers and kids to get excited about STEM?
- f1.61 survey too long
- f1.59 Look at how the industry runs.
- f2.74 Refocus on STEM Literacy as the key that contributes to more than just economic development.
- f2.73 Too wordy at the top.
- f2.67 Keep it direct and simple
- f2.66 It's okay as is.
- f2.64 See previous input.
- f2.63 Clearly address basic goals and then state proposed routes to get there. We'd all like to have successful students who prosper, that's a given, no news there, tell us your exact plan including funding, to achieve the mission.
- f1.49 don't know
- f1.47 Provide concrete examples and data to support the vision statement.
- f2.55 Add greater specificity to vision. What does it mean to 'fully contribute'? The plan does not give sufficient structure to support life-long learners who need to retrain as the nature of the workforce and technology shift.
- f1.44 no comment
- f2.53 Ensure that these value statements are shared across communities and don't just reflect the goals of a privileged minority.
- f1.42 Explicitly call out the need for ensuring that our educational systems are not limiting student access to advanced STEM courses because the adults perceive that some kids aren't capable of high achievement. All districts say they value equity, but what are they doing specifically in science, math, and CTE to demonstrate that "all" means "all"? Are they structuring systems in a way that "all" means "all" students who identify with math, science, and engineering because their parents work for Intel, or do we mean "all" students meaning the kid from the family of migrant farm workers understand that an advanced physics class is not just for white kids?
- f2.51 Get rid of the word "re-imagining". We are a community that loves to sit and admire the problem and this word lets us do that. Lets get to ACTION!!
- f2.49 Say what you would like education to look like.
- f2.41 More specific?
- f1.38 Do we need to call out the gender imbalance in STEM fields, especially those outside health care?
- f1.37 no input for you
- f1.36 Greater emphasis on removing barriers for rural and impoverished populations
- f1.35 Utilize more action oriented terminology.
- f2.39 Less utilitarian More humane More discovery
- f1.34 I like it.
- f1.33 The word reimagine may bring up a negative response, but not sure how I would change it?
- f2.33 Explicitly mark the need to invest, financially and economically, in community based entrepreneurship rather than simply a pipeline for jobs. In other words, skills and mindsets are great, but please let's not romanticize entrepreneurs as everyone can "bootstrap" themselves into success.
- f2.34 vision statements do nothing for me , lets see the money flow instead, we already have the vision, articulating it does nothing, a complete waste of time .. just move on with your statement it is meaningless
- f2.29 Get some language that has "teeth" about teaching. Something like, "all teachers will be prepared to engage in high quality STEM teaching"
- f1.28 Get more specific. Use a Kellogg Logic Model approach, and separate most of what you have into

the Impact area. Then work backwards to Outcomes and Outputs which will help uncover the strategic statements, which are hidden inside of the specific actions under your goals. Define who the vision statement is for. Consider a mission statement.

f2.25 The first sentence of the statement does not mention STEM and is a little vague. I would suggest interweaving the mention of STEM with the section about reimagining education.

f2.24 I just shared my idea in the last question.

f2.22 feels right as is

f1.24 none

f2.18 Shorten it.

f2.16 I like it. It's a little long but don't see any way to abbreviate it.

*n = 50*

## **12 Why do you like just some of these belief statements?**

f2.99 I do not like those statements that relate to prosperity. Is that what we really want to focus upon. How about resiliency and sustainability as goals and elements of the manifesto? There should be a much broader aspect to STEM preparation than just prosperity.

f2.85 10 is an overwhelming number of beliefs - too many filters to put ideas through. And, again, too much head, not enough heart.

f1.66 I think these successfully address the role of the learner and even the community, how STEM should be learned but somehow misses our beliefs about the role of the teachers and educational leadership.

f2.78 I think OST is missing within this vision yet it is key to us being successful as a state. Maybe include more language that includes OST.

f1.62 Not enough focus on inspiring kids and teachers. Some STEM courses, modules and programs out there are FUN and they inspire the kids to want to read more about STEM, and to go home and do more with STEM.

f1.61 too long

f1.59 Too many, too cliché.

f2.66 Number 7 seems disjointed. Not all the sentences are captured in the bold heading. It needs some work to clarify and crystallize it. The others are very good.

f2.34 again, this is just a waste of valuable time, while you have been pondering what to say kids have not learned. get on with it.

f1.28 Again, STEM seems gratuitously thrown in to the statements, almost like an afterthought. I have no argument with these philosophies, but be clean in how you are expressing them for the general case of all education.

f2.18 Too many. You can never remember all of that. Keep it simple.

*n = 11*

## **13 Why don't you like these belief statements?**

f2.92 gave criticism of this earlier. Too many items, and in the wrong order.

f2.49 Everything and the kitchen sink... Need to make hard decisions about what's really important in order to effect change in those domains

*n = 2*

## **14 Why do you like these belief statements?**

f1.81 The belief statements as presented present a complete picture of what needs to be focused on to prepare our next generation of workers.

f1.79 very comprehensive

f2.98 They hit many important dynamics, factors, and considerations.

f2.96 Again hits salient points

f1.77 I like them because they appeal to me as an educator today and as someone with a different background, also known as a foreigner once who had to learn in very short time the American

approach and mentality to succeed in the higher education system. I believe that we all have the potential to excel once we take on that responsibility and let our courage and curiosity be our guide in tackling the issues at hand.

- f2.95 very inclusive... you have it all covered.
- f1.76 Inclusive Best way to learn STEM is to do STEM
- f1.75 Strong, positive statements.
- f1.70 The belief statements cover what need to be covered.
- f1.72 I like how this is focusing on learning by doing and that STEM is naturally cross disciplinary.
- f1.71 I really like the statement that everyone has potential to learn STEM.
- f1.69 The belief statements partly address my concerns with the vision. I think they could do more to emphasize the role that scientific and quantitative knowledge could play in the lives outside being part of the workforce.
- f2.83 Although really wordy, it is comprehensive.
- f2.79 I like this because it goes back to why I liked the Vision Statement. It provides a hopeful view that all students have the capacity to succeed and that it is our responsibility as a community to ensure that success. It also addresses that getting every student to succeed will not be easy and that we need "all hands on deck."
- f2.77 They are comprehensive
- f2.76 I like the statement about doing STEM as the best way of learning it.
- f2.74 They're like the 10 commandments for STEM! Seriously, I think you hit on the key reasons why we should engage in this work: helping kids succeed, the nature of learning, collective responsibility, diversity as strength.
- f2.73 I really like 3,9,10
- f2.69 I especially like the part about the best way to learn STEM is to do STEM.
- f2.68 I like the focus on ALL students and experiential learning.
- f2.67 They are all true and ten is a perfect number.
- f2.64 Strong, general statements about learning and education that could be applied to any subject or curricular area.
- f2.63 Again, explicit statement of ideals but without any realistic practical insight about how to get there and how to fund the journey.
- f1.49 format
- f1.47 The statements are visionary and appear to target the broad spectrum of issues that need to be addressed.
- f2.55 The belief statements support the vision and OEIB's Equity Lens.
- f1.44 I like: -All people have potential and each student deserves an opportunity at prosperity. that means that each and every student needs someone to believe in them. To believe that they can be successful I school and life. If the whole community believes in them, they will become engaged learners. Innovation is the key to addressing our economy and creating new businesses and discovering the newest cure for diseases. Yes, STEM / STEAM is essential. All research points to remembering more when you "do".
- f2.53 - Good articulation of assumptions. - Value for both formal and informal STEM learning experiences. - Strong focus on mindsets and dispositions, like interest development. - Strong equity focus.
- f1.42 I have to admit to being pretty excited when I first read these beliefs--they so closely mirror my own. Thank you for calling out the importance of DOing STEM.
- f2.51 "Education is not about retaining facts or disconnected bits of information." I appreciate that the beliefs state this so bluntly. I also like the "collective responsibility" part.
- f2.42 I am impressed with the comprehensive nature of the Beliefs.
- f2.41 Encouraging students to become active learners instead of listeners, making it accessible to ALL learners, Changing the way we educate youth. They are not excited about going to school it is boring and tedious - How can we make it more relevant and engaging?
- f1.38 It's very strengths-based. Inclusive. Puts responsibility for success on the system and the adults in it, rather than placing blame for past lack of success on the victims of oppression.

- f1.37 They address all the things that could be perceived as barriers
- f1.36 Clearly articulate the attributes necessary to develop relevant programs.
- f2.39 Except I'm really beginning to hate "STEM" and this simply increases each time I see it in these contexts--STEM skills is meaningless. If we mean problem-solving, forecasting, modeling, inquiry, communication, we should say this...and if these skills are the same across many disciplines we should say that. I think the process of adding to the well vetted knowledge and to our abilities to solve problems maybe...but reading does this too and history has inquiry, so the shorthand makes this at best meaningless.
- f2.37 These beliefs address what is core to an inclusive education.
- f1.34 I love them all!
- f1.33 Each student deserves an opportunity at prosperity. There continues to be persistent inequities in race, ethnicity, gender, and educational background in high-wage, high demand professions. Many students in poverty and from rural areas are being left behind. No one's talents should be left behind. Love this and how it honors ALL students and that they can all succeed.
- f1.32 Provides more understanding/specificity/outline of how the vision of STEM can be accomplished
- f2.30 As I am now working more in a business and liberal arts university, I see a great need across all degree learners to become more comfortable with STEM subject matter. Some examples are English, Journalism, Communications students need to know some HTML language so to be employable in a high tech world. Marketing students needs to understand data analytics and digital marketing platforms. Art students need to know how to design beyond the canvas and step into User Experience creative positions. STEM reaches across degrees outside of what is typically thought purely of as math, sciences & engineering.
- f2.29 They cover everything necessary to have a quality STEM State!
- f2.25 I like the bolded part which makes it easy to read just the highlights. All of them ring true. Many of them are things I would not have thought of but agree completely with.
- f2.24 I absolutely LOVE this. Great work!
- f2.22 candid, unafraid to address diversity, real.
- f1.24 It reflects exemplary education practices.
- f2.16 I like the emphasis on cross discipline skills, and on life long learning.
- $n = 47$

## 15 How might we improve these belief statements?

- f1.81 I like them as they are.
- f2.99 See previous
- f2.98 The phrase "No one's talents should be left behind" is not all that clear. Responsibility for funding is avoided.
- f2.96 can't think of anything
- f1.77 We can improve by creating real world context situations and problems and educating our students ways to approach these problems. This can be done by providing real mentorship between experienced professionals from all fields and students of all backgrounds because when you clearly show someone young with a thirsty mind how to do things, they will actually do it and hopefully take it to the next creative level.
- f1.75 #7- We need to address an expectation that such traits need to be taught not just expected. #8 - The examples are of disciplinary specific facts not scientific thinking skills such as making decisions based on data, evaluating hypothesis.
- f2.92 (see previous)
- f1.70 I would add something to the affect of "The best way to educate students in STEM is to provide more classes, during school and after school."
- f1.72 I am wondering if it would be worth adding a statement that in addition to honoring diversity, we will look to dismantle systems/barriers that are currently in place that are resulting in STEM being elitist. For example, many schools and districts currently offer STEM activities or enrichment for TAG students. While this is nice, these are often already the same students that have access to STEM enrichment activities.
- f1.69 That depends on what you believe, doesn't it? I believe: Ignorance of science and mathematics

and the conditions of their application in technology and engineering leaves the populace open to demagoguery and misinformation, and increases the risk of exploitation.

- f2.85 What are the top 5 beliefs that really cover what you are trying to do. This list seems like it was made to allow everyone at the table to feel like something they added is on the list. 5 essential beliefs: 1) We can't even image what careers will be available 12 years from now. 2) In order for today's students to be successful and fulfilled, they will need skills of critical thinking, problem solving, and creativity. 3) STEM courses, taught through innovation can give these students the basic knowledge and skills they will need. 4) It is essential that these skills be offered to each and every student in Oregon. 5) Students today, who are being raised in the information and digital age, can show us the way!
- f2.83 Focus and trim back some of the language.
- f2.79 No suggestions at this time.
- f2.77 Not sure
- f2.76 I dislike the word genius because it presupposes that there are some who have and some who have-not the in-born ability. We need students to believe that they can change, not that some people are gifted.
- f1.62 Put more focus on how we are going to do it.
- f1.61 I don't have time for all this
- f1.59 Simplify. Look at how industry manages people (team size).
- f2.74 Add language around the importance of STEM literacy within a democratic society.
- f2.68 I think #10 should be higher up on the list.
- f2.67 Ask more students their opinion.
- f2.66 Clarify 7
- f2.64 Define STEM in the Manifesto and Strategic plan and how it relates to the content Standards adopted by ODE. Speak to the need for instructional materials and quality teaching/learning in our schools. We need in school experiences first and foremost startin with our youngest students. It can't be spotty grants and small initiatives - it needs to be more than a few pockets of some 'stuff' put together to satisfy the deliverables on small grants.
- f2.63 Don't rehash idealistic ideas, there are plenty of those, and most of us in education know them only too well. Tell us how you plan to do something new and different, explicit approaches and requirements and again, how we can fund this.
- f1.49 don't know
- f1.47 The statements need qualifications and data to support their development. Supplemental data to provide verification of why they were developed and stated in the manner of which they are presented.
- f2.55 I like them.
- f1.44 no comment
- f2.53 - Don't use the word "student." The children and youth of our communities are so much more than students and spend the majority of their time out of school. Changing this narrow terminology is one step towards changing our mindset as educators. Also, promoting STEM learning involves not just engaging "students" (i.e., children youth), but also caregivers, families, educators, adult community members, etc. - Emphasize the importance of aligning formal and informal efforts and how this alignment must go beyond simply forcing informal STEM education institutions to serve school-based outcomes. - Emphasize the importance of supporting STEM learning throughout the lives of children and youth, including during early childhood in preschool. - Highlight families and caregivers as a critical leverage point. Research continues to show that long-term STEM outcomes are strongly associated with home environments and experiences and parent and caregiver factors.
- f1.42 #9: should it be "interdisciplinary" instead of "cross disciplinary"?
- f2.51 "The best way to learn STEM, is to DO it." I'd like to see something in this statement about students solving REAL problems - I see the "relevant" part - but something about authenticity would be nice.
- f2.49 How about: "We believe children are capable but need the guidance [role models, career exposure] and quality educational opportunities to realize their potential." Also ALL children, not just under served, need career exposure. Even the most well to do children don't know why they

are learning STEM.

- f2.41 Shorten them
- f1.37 no input for this
- f1.36 Emphasize the need for greater exposure to real world problem solving, innovation and innovative thinking.
- f1.35 Again, you use the words but I just can't help looking at the picture that you chose for the survey. You can't really mean what you are saying if you didn't catch the significance of putting a photo of 4 blonde haired white students on the front of the survey.
- f2.39 I really like this list, overall, so you can see the joy and excitement of learning emerging. But please try to avoid the statements like asking questions over giving answers...and yes that's not the exact transcription. This stuff is meaningful and meaty and should be powerful not platitudes.
- f1.34 I don't know. The next step is to transform our beliefs into actions, from believing to "doing".
- f1.33 Innovation is the cornerstone of prosperity. STEM is not just about filling jobs but creating jobs to address challenges and opportunities. Building an innovation-based economy is essential for long-term prosperity resulting in competitive advantage in a global marketplace. This is really wordy...and not sure what it says?
- f2.33 1. Diversity is our strength. Differences of gender, ability, race, ethnicity, and culture provide critical and diverse perspectives and voices to address today's complex challenges. Innovation emerges where different ideas and cultures interconnect. What about sexuality, citizenship, and bodies? We're backing away from some of Oregon's most pressing issues of immigration, 1st generation citizens, undocumented citizens, and strikingly, how we support BLGTQ youth, who face staggering homelessness and social punishment. 2. All learning is cross disciplinary. It is the interconnectedness of ideas that enable people to integrate new learning with their prior experiences. STEM by its nature synthesizes analytical and creative thinking. It is a powerful tool that sits at the crossroads of the sciences, arts and humanities. This is strikingly false--please do not let our marketing speak get in the way of being truthful. STEM has no inherent nature; it does not naturally synthesize, and we are appropriating the arts and humanities without giving it any space, funding, or validity as an area of investment. 3. Engaged learners succeed. How we teach our students is as important as what we teach them. We must create meaningful learning experiences that empower all students to embrace their curiosity, take ownership of, and joy in their learning, and become lifelong learners. From a design perspective, sure--we as educators design and create learning environments. BUT, we do not create meaningful learning experiences--that belongs to students. This phrasing has severe implications that students are simply objects for us to transform--the power of engaged learning is that youth will hold onto a memory, reflect, and take strength/resilience from that experience. BUT, that experience is co-constructed by them. It is not delivered to them.
- f2.34 get on with it, this is meaningless, it changes nothing. these goals are general educational goals, they are the same for any field.
- f1.28 Just be clear that these are statements about education philosophy in general. That is perfectly fine.
- f2.24 I'm not sure. I think it is thorough and sincere. Now, how do we make sure these beliefs are at the forefront when making decisions? Students first - adults are just there to make it happen for them.
- f1.24 can't think of anything
- f2.19 More emphasis on out of school programs.
- f2.18 Have less of them.
- f2.16 Less points, however I don't know which to remove.

*n* = 47

## **17 Why are you unsure of our goals?**

- f2.96 even though they are goals, they are a bit vague
- f2.95 Goals should have measures and timelines.. You will do what by when? These are nice but very fluffy.
- f2.92 (see previous comments)
- f1.69 They lack any inclusion of something like the "digital literacy" attributes included in some

frameworks (including the Oregon State Technology Standards). These emphasize not just that students, teachers, administrators, and professional developers will know how to "do" technology, but what will happen when they do it--the ethical responsibilities they incur, and the risks they run. For example, the collapse of resource-based economies in the northwest (timber) and south (coal), was not primarily due to lack of resources, but to technologies that changed both markets and the need for labor. In meetings, ODE staff cite the fact that the jobs our kids will have don't yet exist, and the ones we are preparing them for may not exist when they enter the market. What does the vision say about the social science aspects of STEM?

- f2.83 You also need to train and empower teachers to develop innovative instruction and curriculum. Reduce barriers including bureaucracies and paper work. Seems to be missing language around partnerships with business and industry--valuable allies.
- f2.74 Are these the same goals that are in the document? The goals in the document I have access to are different. I like: - Inspire and empower our students to develop the knowledge, skills, and mindsets necessary to thrive in a rapidly-changing, technologically rich, global society. Justed changes in [ ] for these: - Ensure equitable opportunities and access for each and every student to become [STEM literate and a contributing member of society, able to participate in] an inclusive innovation economy. {in other words, refocus on the importance of STEM literacy to society, not just to the economy and individual earning power} - Continuously improve the effectiveness, access to resources, and the number of formal and informal STEM educators [, school leaders, and other STEM leaders]. {It also seems like "access to resources" is out of place. I'm assuming you intend "effectiveness and number of ... as well as access to quality resources} I don't like this one as it is too vague and ambiguous: - Create sustainable and supportive conditions to achieve STEM outcomes aligned to Oregon's economic, education, and community goals.
- f2.55 It is difficult to measure how much you inspire and empower students.
- f2.42 I am struggling with the lack of direct engagement of the community in being champions of STEM education. The last goal speaks to that thought, but I believe it should be more direct.
- f1.35 Because your language seems unsure of them. They appear to be just words...
- f1.32 Not sure if they are comprehensive enough to cover the vision and beliefs previously described. How are they connected to them?
- f1.28 Pretty broad. I think that they will be helpful for long-term goal setting, but need to be more specific if you are truly producing a plan. The four do seem comprehensive and sufficient. They are starting to express your strategy choices.
- f2.19 What are the priorities? They are very nice goals but they do look like they were designed by a committee. What are you not going to do?

$n = 12$

## **18 Why do you like our goals?**

- f1.81 They are good initial goals. We will probably need to tweak some these goals as we move forward.
- f2.99 They are ok - see next
- f2.98 On target.
- f1.77 They are realistic
- f1.75 I like the long term outlook and emphasis on continuous attention not just a short term fix. STEM educational needs are here to stay, they are not just the next thing we need to improve.
- f1.70 Meets the needs of our students
- f1.72 I like how this is focusing on supporting all students to discover STEM learning on a personal level and help develop interest and confidence with STEM topics, application, and future careers.
- f2.85 I like most of these goals. #1 - not so much: I think it needs to be reversed. I think it would be more powerful to say that "We will be inspired by our students, and support them in their creative and innovative endeavors as they make their way through a rapidly changing, technology-rich, global society."
- f1.66 They're simple and address, student, teacher and community.
- f2.79 That they address the community, economic, and educational components of our educational system.
- f2.77 Concrete, attainable and measurable

- f2.76 All of these goals are great and things that need to be done for all things in education.
- f1.61 However, they are aspirational but not sure how well they will guide.
- f2.68 Focus on all entities in education that will benefit student learning.
- f2.67 It addresses the students roles. how and where it happens, how the teachers need to be a part of this change and ways to keep the ball rolling.
- f2.64 General education goals that could apply to any/all content areas.
- f2.63 You're making me sick with all this rehash of idealism, it's all useless unless you get to the real world.
- f1.49 don't know
- f1.47 They sure sound good but what is the reality of the venue to provide these opportunities. Hoe do you plan to measure the success of such lofty goals with limited funding?
- f1.44 I think Goal 1, 2 and 3 are the most essential. Goal 4 is not a priority for me with limited funds. I believe the use of funds should go directly to those activities that will improve student achievement. Goal1: Promote the development of new teaching approaches that challenges students.... way too general for me. We need to teach to higher level thinking skills. It's a complex problem and a huge one! Many of our teachers are not prepared to facilitate learning focused on higher level thinking skills. Goal 1: Add: Increase high school and college STEM student internships that give "credit" for applying their internships to learning the standards in their classroom. Goal 1: Add: Ensure that learning outcomes include application of standards and creation of knowledge. Goal 1: Ensure that ALL students K-12 demonstrate state standards by having students advance only upon mastery of those standards. Goal 3: YEA!!! I loved the first item that spoke to having summer TEACHER internships in STEM industries and research. Give them college credit too! Goal 3: ADD: Strengthen teachers skills in writing explicit and measurable learning targets in STEM standards. Goal 3: ADD: Strengthen teachers skills in writing assessments that are meaningful and a positive learning experience for students. Goal 3: ADD: Change the model of teaching where the teacher is the facilitator and students own their own learning.
- f2.53 Good variety of goals, highlighting the various system levels that must be addressed (e.g., youth, educators, education systems, etc.).
- f1.42 Again, they mirror the goals I hold as an educator.
- f2.51 They are broad enough to cover the scope of work but specific enough to be actionable.
- f2.41 Schools/community groups need access to resources, supportive conditions, be able to inspire again~
- f1.38 They are very process-oriented, I mean they present this work as continual, endless, engaging.
- f1.37 I like what they address
- f1.36 Simple and concise.
- f2.39 I like them but again they are inconsistent with the current reality..you can't measure learning of past factoids or by regurgitating formulaic processes and prepare someone for a every changing world. You might hobble them, reduce the likelihood that they we understand the different between beliefs and scientific knowledge. There has been a revolution in science in the last twenty years which we barely teach in schools. Why?
- f2.37 They are strong and clear.
- f1.33 I like the wording
- f2.30 You should pull in all students and create inclusive language as only a very small % see themselves as being successful in STEM.
- f2.25 These are wonderful cornerstones to aim for.
- f2.24 I think they are lofty and intentional. Nice work.
- f2.22 not static, prompts flexibility to improve.
- f2.18 Short list that make sense and are specific and achievable.
- f2.16 I like the emphasis on underserved communities.

$n = 36$

## 19 Why don't you like our goals?

- f1.59 Too cliché.
- f2.71 Upon a first read, the goals seem a little soft... hard to measure.
- f2.66 They are not SMART goals. Each goal needs to be more specific, measurable, attainable, relevant, and time-bound. They are too vague.
- f2.49 If you inspire and empower you likely don't need the other three.
- f2.33 1. Ensure equitable opportunities and access for each and every student to become a part of an inclusive innovation economy. Access is only the 1st stage of equity, and inclusion is a very weak vision of empowerment. If you want youth to drive this new innovation economy, we have to do more that provide equitable opportunities and access. We would like to see a more direct statement of economic investment to address scarcities. 2. Continuously improve the effectiveness, access to resources, and the number of formal and informal STEM educators. Informal does not describe "extended learning opportunities" provided by non-profits in out-of-school programs. Our programs are not informal, which unfortunately many perceive as less rigorous or slipshod.
- f2.34 you have missed the most important. nothing happens in schools because the administrators do not even care, in our district the stem coordinator did not even know what classes were stem, did nothing to promote them. you have to get the admin on board, they have to hire teachers with science skills, they have to have pay raises to keep them, just like special ed has a differential science teachers need that too, otherwise they just go to industry.

$n = 6$

## **20 How might we improve our goals?**

- f1.81 I see not improvement needed on this initial set of goals.
- f2.99 I think that there should be an element here related to improving understanding of the role of science, math, technology in all students. There is so much poor understanding and lack of respect for sci/tech out there that I think is somewhat promulgated in schools by peer pressure, lack of parental motivation, lack of personal commitment to math/sci/tech/design, etc., that STEM needs to be infused as a core educational component. One way to do this is to embrace STEM ideals across the curriculum. NGSS helps but is in and of itself, insufficient.
- f2.98 Teachers and faculty members in K-12 and community colleges need to be empowered; instead of over-managed as assembly-line factory workers, where students are largely assembly line products.
- f2.96 tighten up the language
- f1.77 by making them more tangible and accessible to students
- f1.75 Could you provide a "what it would look like" scenario if these goals were being met and perhaps a similar scenario about what would happen if they are not. Right now they seem to be lofty but optional goals not imperatives.
- f2.92 (see previous)
- f1.70 Schools will need help funding more hands-on STEM activities. How can we get help paying for this outside of the minimal district budget. How do we get administrators more onboard with STEM?
- f1.72 I am wondering if it is worth mentioning that school systems P-20 need to be established to provide all students with a level of basic STEM literacy that allows them to learn and decide if a major or career in the STEM field is right for them.
- f1.69 Include something about the social aspects and consequences of STEM.
- f2.85 see previous answer
- f1.66 Include how we're seeking change at the highest levels in our leadership and state infrastructure.
- f2.79 I think you could add something about developing an infrastructure around continuous teacher (or educator) collaboration. You hint at it, but I think having it explicit would help prioritize that to make our educational system responsive to changes in economic and community needs, we need built-in forms of collaboration (you say just number).
- f2.77 Not sure
- f2.76 Actually follow through.
- f1.62 How are we going to accomplish them?

- f1.61 Goals need to be paired with metrics that will help you know if you are on the right track.
- f1.59 Innovate.
- f2.74 See responses in previous answer.
- f2.68 Nothing.
- f2.66 Change them into SMART goals. for Example: "Goal 2: Ensure equitable opportunities and access for each and every student to become a part of an inclusive innovation economy." For example, this goal might refer to a reduction on the achievement gap of a certain amount over a specific interval of time. Or it may refer to an specific increase in the number of students of different populations who graduate from high school, or percentage of those who go on to higher education. If it is not specific we will not know if we have achieved it.
- f2.64 The goals are fine - the action plan to enact them needs to be a cohesive, comprehensive effort with instructional materials and professional development in our schools - sustained over time. Funding.
- f2.63 Get real, specify workable solutions. Yes, we need the initial goals but not four times over.
- f1.49 don' know
- f1.47 Provide concrete examples and data to support these goals as well as funding resources.
- f2.55 Some of these goals are not easily measured. By drilling down into each goal it becomes more clear; however, I think terms like and 'inspire and empower' are a bit difficult to nail down.
- f1.44 See previous question. I added them there.
- f2.53 - Don't use the word "student." - Emphasize alignment of efforts in addition to continuous improvement.
- f1.42 no recommendations at this time
- f2.51 Call out the need to improve our existing STEM educators more explicitly.
- f2.49 see prior response.
- f2.42 Be more explicit about engagement of the larger community in being champions and participants of STEM education.
- f1.38 Would be interesting to see exemplars of success already in place, so we can envision what it looks like to be on the right track.
- f1.37 no input
- f1.36 The greatest challenge we face is giving the students access to knowledgeable mentors and teachers as well as the related tools and resources. This needs to be emphasized in the goal statements
- f2.39 Inspired and empowered educators and learners Equity in access and success Increase our community's capacities to reach and engage all learners in science Assure a constancy and consistency of places and resources serving all our youth
- f1.33 Maybe work on partnerships to include funding to support the growth of STEM??
- f2.33 See last panel.
- f2.34 get on with it.
- f2.29 Again, there is nothing that says that this is a teacher's job in Oregon.....it leaves out what teachers WILL DO as a result of this manifesto. Where is the teacher accountability?
- f2.28 #2 could use some clarity, access should apply to the inspiring experiences related to #1
- f1.28 Recognize that the goals and related actions are actually the strategy that you are selecting. There is a lot of unevenness in the bullets under the goals...seems like some of them are programmatic, some are measures, some are activities. Again, would recommend stepping through the Kellogg Logic Model to clarify.
- f2.27 Need to engage the business community to become more involved in STEM based education either in K-12, College level or in other STEM education like Hack/Makerspaces.
- f2.24 I'm not finding the piece to which you referred earlier in the document that STEM can be integrative. I feel like the goals are calling out STEM teachers separately, but the document suggests that maybe all educators need STEM skills. I agree with that assertion, and there are many wonderful techniques to do that. The environmental education community has highly skills educators who are masters at this type of integrated, hands-on, real world education. Huge opportunity there for formal educators to learn and partner with these informal educators.

- f1.24 no improvement suggestions
  - f2.19 Restructure so they can be prioritized. You will not be able to do all of this.
  - f2.18 ??
  - f2.16 I think constantly striving to improve may lead to a loss of focus for the project.
- $n = 48$

**We have developed strategies to meet each of these goals. We would now like to take a minute and review each of them with you.**

**21** **Goal 1: Inspire and empower our students to develop the knowledge, skills, and mindsets necessary to thrive in a rapidly-changing, technologically rich, global society.**

**Which of these strategies to reach Goal 1 do you feel are important? (Select all that apply)**

- f2.99 This requires an inspired workforce, too - teachers must be better prepared through ambitious (and expensive) professional development opportunities. Teachers must be supported in their efforts to retool, too.
- f2.98 Increase the rate of success of high school students reaching college-ready levels of mathematics and writing skills. End the over-use of part-time faculty positions. Use to community organizing strategies, rather than relying on client based methods, to create a culture of finishing high school and attending college.
- f2.93 Ongoing stable funding; commitment to sticking with whatever policies/programs are funded for 6 years with few changes so teachers/providers can really learn and implement effectively (with a few exceptions for epic fails and other major problems)
- f2.83 Include science, engineering and technology somewhere in your strategies. Mathematics is important, but only one element of STEM.
- f1.62 They are all important
- f1.59 Develop authentic STEM environments.
- f2.74 The one about "increase student interest... in math..." should read "in STEM", plus STEM is integrated when you look at "real-world problems"
- f2.64 need more specificity to the strategies and adequate funding.
- f2.63 Why don't you let us RANK the strategies, they're all important!
- f2.22 what would it look like to conduct 'Saturday Academy' across the state, led by industry collaboration?
- f2.19 Retooling and Start-up are not the same thing. Start-up sounds like "pilot" and pilots are usually not sustainable.

$n = 11$

**Goal 2: Ensure equitable opportunities and access for each and every student to become a part of an inclusive innovation economy.**

**22** **Which of these strategies to reach Goal 2 do you feel are important? (Select all that apply)**

- f2.98 Utilize community organizing strategies to create a practice and culture of finishing high school and attending college, rather than relying primarily of a student as client model.
- f1.75 need micro internship short term experiences for early high school students
- f1.69 Increase the professional development of the people who are supposed to provide all these services.
- f1.66 Increase the introduction of STEM professionals and experiences beginning in elementary grades.
- f2.83 You have outcomes mixed with specific strategies in this section (e.g., increase the number...) How do plan to increase the number and quality of P-20 support services...
- f2.79 Add something about what teachers can do in the classroom to support this goal.

- f1.62 All
- f2.66 Increase the number of out-of-school STEM learning opportunities during the school year and summer available to students from underrepresented populations.
- f1.42 Remove tracking practices in high school STEM courses to combat the unintentional sorting of students of color into remedial courses and white students into advanced courses.
- f2.49 Improve elementary STEM education
- f2.24 partnering with other services that work with these students.

*n = 11*

**Goal 3: Continuously improve the effectiveness, access to resources, and the number of formal and informal STEM educators.**

**23**

**Which of these strategies to reach Goal 3 do you feel are important? (Select all that apply)**

- f2.98 Provide a structure of support for the scholarship of teaching and learning in STEM fields, recognizing that continuing progress in teaching is needed and adopting new learning modalities requires significant new forms of understanding that require a full and active understanding by the teachers.
- f1.75 provide incentives and transition instructional skills to STEM professionals interested in teaching
- f1.69 Professional training of those STEM professionals who otherwise will probably fail at their transition into education.
- f1.66 Increase professional development opportunities of proven and successful STEM pedagogical practices
- f2.83 Need to be specific in what you plan to do in the area of "...career transitions" and "...build, strength...".
- f1.62 Easier said than done. Need to move some of this into the classroom or it will not work in all cases.
- f1.61 This is a confusing goal
- f2.74 School leaders (principals, directors of instruction) need professional development to be effective STEM leaders.
- f2.73 Provide summer opportunities.. that is when teachers can attend things.
- f2.66 Develop multi-year professional development programs in NGSS for K-12 STEM teachers.
- f1.49 help train existing teachers!
- f1.44 these are too broad and seem to reflect the same old stuff we have been doing that doesn't really change what students know and can do in the standards. The only one that fits my dream for improvement is having STEM educators experience STEM in industry so they can bring relevancy to their curriculum.
- f1.42 Provide incentives to K-12 teachers who receive additional training in NGSS implementation.
- f2.51 Provide direct training to existing STEM educators to help them realize the gap between current practice and needed practice AND train them make needed shifts.
- f2.49 Fund quality STEM programs for children
- f2.42 Need to have a strategy more directly focused on out-of-school providers.
- f1.38 Support and value school time outside of the classroom in authentic STEM experiences.
- f2.39 let them do their jobs well
- f2.33 Provide time for educator to out-of-school collaborations
- f2.34 just fund us ,
- f2.22 what national industry collaboration best practices have been identified? There are many public charter high schools who are experiencing impressive outcomes.

*n = 21*

**24**

**Goal 4: Create sustainable and supportive conditions to achieve STEM outcomes aligned to Oregon's economic, education, and community goals.**

**Which of these strategies to reach Goal 4 do you feel are important? (Select all that apply)**

- f1.69 The last three strategies seem to be specific examples of the first (awareness/demand). I did not check them, because I do not know if they are effective. Maybe substitute a goal that we will find out what is effective in promoting awareness and demand.
- f2.83 I would also include "rebranding" of STEM. Many outdated perceptions.
- f1.62 all important
- f1.59 Change the traditional K12 hourly structure.
- f1.44 Money is too limited to do these nice-to-do activities. Give incentives to school districts for changing the education system to meet the needs of ALL students.
- f2.49 Fund quality STEM programs for children
- f2.39 room for business and innovation
- f2.30 Don't use the word "STEM" as it has a stigma -- perhaps "technology" "21st century workplace"
- f2.22 similar to the highly successful trade apprentice programs, are there thoughts about developing a similar STEM internship program? This would allow companies to 'grow their own' in a real-world way.
- f2.19 Create a PR program to make math skills cool.

*n = 10*

**25 As you think about our strategies, are there any that you feel are important that we have missed? If so, please share them below:**

- f1.81 I believe the proposed strategies will meet the needs of STEM as a beginning platform. As we move forward and start to implement some of these strategies we will undoubtedly need to adjust some of our direction and areas of focus.
- f2.98 I have included them in previous comments. In addition, the reliance on high-stakes testing and the current effort to "Taylorize" education is a failure that needs to be reversed; the community college culture, which is largely patterned after K-12 needs to be reversed; and economic planning needs to be driven by the public sector in addition to the private sector.
- f2.96 We already have a wealth of research based practices that will improve STEM education at all levels. We already have organizations (e.g., ASTE, NSTA, NARST) that do research in this area, provide opportunities for dissemination, etc. I think a major problem is the continued focus on standardized testing for our students that take away from learning time and reduce their educational opportunities to what is on the test. We need to change our mindset. We also need to start changing public perceptions on schooling and teachers. We are doing a great job (look at research on pre/post testing each year that indicate ALL students make significant progress--it is the summer that causes the achievement gap).
- f1.77 I think these are wonderful starting points that if we can implement successfully, we would off to a great start of creating the future generation of students who are set to succeed in tomorrow's expanding socio-economic world where technology and innovation in research will help provide answers to different diseases and outbreaks and more.
- f2.95 Will the goals guide the STEM Council's investment strategy? how will this plan be used?
- f2.92 This document doesn't emphasize strongly enough the impacts of STEM careers on individual, community and national prosperity. One can addend this with the positive societal impacts of STEM discoveries (which might speak more strongly to underrepresented groups). Information can be found in places such as the Bureau of Labor and Statistics web site, which lists and compares career area growth patterns and average salaries. I know that emphasizing this often provokes a response from those with a 'liberal arts' perspective, but the data is there for all to see. I think leading more strongly with the economic benefits to Oregon of a strong and diverse STEM workforce would strengthen the document.
- f1.70 The idea of developing problem solvers using STEM concepts is important and not mentioned.
- f1.72 I am excited to see this document. I am hoping that there can be a conversation that STEM education is not just an exciting one time activity, but needs to be included in all students' K-12 experience, but especially at the early levels. If we want to really change the direction of STEM education in Oregon, let's start in the early elementary years, so that students leave elementary

school with the desire to continue to explore, investigate, and problem-solving skills.

- f1.66** I think we're avoiding the elephant in the room that most often the reason STEM education is not happening in much of the state is because of leadership. Without a paradigm shift in how STEM or even education in general is valued by state and local leadership, it will forever be an uphill battle even for the best individuals who wave the STEM flag eagerly.
- f2.83** Rebranding of STEM Inclusion of CTE STEM is more than mathematics. include science, technology, and engineering in your plans. Seems like these are really ambitious plans. I would prioritize into phases so that the work is manageable. With the reorganization at the State level, is their dedicated funding and staffing for this work. You are going to need it.
- f2.78** OST time
- f2.77** No
- f2.76** N/A
- f1.62** Do more to work with proven models. What has been researched, what is working? What are the advanced manufacturing states, Washington State, California doing that we are not?
- f1.61** out of time
- f1.59** Until you address the fundamental structure of K12 in terms of how students are processed through the day, we won't see real change.
- f2.74** There needs to be more attention and focus paid to the role of STEM education leaders -- such as school principals and district level leadership such as directors of instruction and even superintendents -- and the professional development they need to be effective STEM leaders, the policies that support STEM education improvement, and what the research says about effective leadership practices (e.g., change management, NGSS-aligned instruction/assessment, etc.)
- f2.66** There should be a stronger emphasis on engaging teachers and administrators in learning experiences to become thoroughly familiar with the kind of learning called for by the Framework and NGSS, especially engineering education. That will directly serve the overall vision.
- f2.64** Adequately fund STEM to make it an integral part of the prek- 12 learning experience for all students
- f2.63** REALITY! Wonderful but very repetitive statements of ideals. Absolutely no recognition of how to get there. Politicians and pundits speak big words but refuse to furnish funding. If you're thinking I sound very frustrated, you're right! I've offered a Science Inquiry-STEM based enrichment program for K-16 classrooms and for professional development for the past 25 years but have never been able to secure reliable funding from schools, government, agencies, nor private sources, often the same parties who are speaking the loudest about need for better STEM programs. The teachers and students indicate that they would like to have my program in their classroom (very favorable feedback) but due to all the other tasks and situations they face (reading/math time, extracurricular activities, classroom management issues, testing), often cannot even return an answer to my email or phone offer, much less find a time slot for my program. Something is really wrong here, so your repeated listing of STEM IDEALS becomes very bizarre after what I've experienced over the past two decades of people really not putting their money where their mouth is! I know we have to keep trying, but we need to direct our efforts at those who don't understand what's going on, not keep preaching to the choir. Thanks for asking and listening.
- f1.49** Help give current teachers support, training, and funds to implement STEM.
- f2.55** Increase opportunities and understanding around pathways for life-long learners.
- f1.44** Yes. Increase student aspiration, skills and knowledge in STEM by increasing literacy, confidence, awareness, persistence and ACHIEVEMENT for all students. We do this by changing the education system from a time-based system to a performance-based system. It's the only way we will ever meet 40/40/20 goals.
- f2.53** - Identify knowledge gaps and encourage research efforts in these areas. - Develop and support culturally and community relevant programming and experiences. - Work with families and community organizations. - Support STEM engagement and learning the caregivers and families in addition to children and youth. - Share strategies and research across formal and informal sectors. For example, what can schools learn about how science centers have effectively engaged underserved communities?
- f1.42** It was included, but I want to emphasize just how important funding will be in making sure this plan is actually carried out. We need to ensure that we are able to provide adequate levels of PD

to ensure that teaching practices change. Unfortunately, sometimes incentives are needed to get teachers into the PD--but once we get them there we can facilitate the change process IF the PD is high-quality and mirrors the active learning we want our students to be able to do. If teachers experience it, they are hooked.

- f2.51** I've already mentioned this - but I believe the number 1 strategy that needs focused attention is helping our existing educators understand the dramatic shifts that need to occur to help us realize this visions (through meeting current STEM professionals, examining data of past practice, taking college level STEM courses) AND provide on-going, high quality professional learning opportunities to help them make these shifts.
- f2.49** Much of the strategy is focused on high school aged children and much on teacher education. The inspiration needs to start MUCH earlier and elementary education in STEM is particularly weak. We need quality programs and kids in those programs - so fund the quality programs not more teacher training that teachers do not use. There is very little here about the quality of teacher training programs and accreditation. It seems that colleges and universities that train teachers need a re-set with regard to STEM education.
- f2.41** I feel as though our STEM Hub missed the mark to engage local schools into the conversation.
- f1.37** none
- f2.39** We MUST reconsider what we do to fit better what we want--if you want training then that's fine, we need well trained professionals. But how do you leave room for the leaders among teachers who can reach and engage youth in high quality, rigorous, deeper learning that leaves many more doors open. How do you allow interdisciplinary thinkers to thrive too? The current net outcomes is that we are turning too many innovators of the science and engineering because we have sucked the very life out of science...when in doubt stop digging. How do you stop digging? If you read and build an education system based on the framework for SCIENCE you will begin to get at this, to a point. You still have the culture that requires coverage curriculum--8 geology question, 24 biology, 3 astronomy (the real potential source for future innovation!!!)
- f1.33** Not that I can think of
- f2.33** Investment and financial investment is woefully understated. The vision seems to romanticize skills and mindsets, as if that substantively changes inequities. Informal learning is misnamed. Out of school is preferred. Arts and humanities are subsumed to and appropriated by STEM. Not clear that CTE has a significant place in this. Definition of equity is highly limited to gender, geography, and race.
- f2.34** you need to get administrators on board, they do not have science backgrounds, the superintendent never took a science class, they are clueless.
- f2.30** I would recommend not using the word STEM in any publicity to students as it's intimidating and tired. I would suggest a gathering of mixed student population giving you feedback on what would resonate with their peers. Want to know what it takes to step into the 21st century workplace? Did you know campaign (state salaries in the STEM fields) You would be amazed at how many college and high school students want to work at Nike -- perhaps use them in a campaign around material science, data analytics, sales forecasting (math)
- f2.28** Seed funds for promising teacher training and out of school time programs.
- f2.24** I've already shared some ideas in previous questions.
- f1.24** none
- f2.18** STEM funding is currently competing with many other streams. Perkins, CTE REVI, STEM HUBS etc.... This needs to stop. We need to focus on what is most important and let the other initiatives go away.
- f2.16** na

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