Oregon Mathways Toolkit

Finding Focus in High School Mathematics

The vision of the Mathways Project is to strengthen the mathematical capacity of Oregon students while concurrently providing more options for students to pursue mathematics content that aligns closely with their learning and career goals.

| Objectives of Oregon Mathways |
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1. Identify, refine and disseminate best pedagogical resources and practices across 9-14 classrooms, to promote student actions needed for citizenship, certificates, college and career readiness.
2. Explicitly identify the two years of content expectations for all students to engage in after an 8th grade mathematics course.
3. Develop a framework for third credit options to guide school and district staff in the development of courses beyond the first two credits of mathematics.
4. Align high school math pathways to entry level college options for students.

| Facilitating Conversations about High School Focus |
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In spring of 2018, the Oregon Department of Education (ODE) hosted a series of regional conversations across the state to raise awareness of the Oregon Mathways project, and begin the process of identifying the common content expectations in mathematics for all Oregon graduates (objective #2).

Workshop participants were invited to reimagine high school pathways and to identify core content through a series of perspectives of stakeholders, including: (1) knowledge in the room; (2) higher education; (3) student engagement; and (4) community and business. Each of these perspectives were introduced as a “lens” by which participants could think about core focus content for all students in high school math.

Resources and links to tools used to support these conversations are provided in this document, as to support continued conversations across the state during the 2018-19 school year. Educators that participate in these conversations are encouraged to share their work with ODE and the education community on the Oregon Educator Network. Questions about this work can be directed to Mark Freed, ODE Mathematics Education Specialist, at [mark.freed@state.or.us](mailto:mark.freed@state.or.us) or 503-947-5610.

| Workshop presentation and agenda |
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* [PowerPoint slides used for Spring 2018 workshops](https://docs.google.com/presentation/d/1o9HOZmQixMN-2-3nxdq4DchAwToxgQciWS1pmo_Ts4Q/edit?usp=sharing)
* [Agenda template for regional workshops](https://docs.google.com/document/d/1oG78_EE1mJwbqYcrloS6ZTlEglfOfrVniCXcVTXDWMk/edit?usp=sharing)

| Lens 1: Knowledge in the Room |
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The beginning of finding focus is to leverage the knowledge of practitioners from across the state. Start the conversation by thinking about the math content critical for all student to know and/or math skills students should be able to do.

* Download or copy to your Google drive using the [link to template to record focus content](https://docs.google.com/spreadsheets/d/1sZw4Zd4Iw1zCrsOMXbT3H2o5ybKAb97KB3nQVxbCbCU/edit?usp=sharing)
* Capture this thinking by using the template provided below, under the first tab of “brainstorm focus content”
* Identify this as “Knowledge in the Room” which would be the yellow column

| Lens 2: Higher Education |
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The transition from high school to college is difficult for many students. National surveys suggest that post-secondary faculty and high school teachers can hold different priorities of mathematical content students should know. Aligning systems across high school and post-secondary institutions requires an understanding of content students should be able to know to be successful.

Two studies form Oregon faculty are shared to help understand what math would be of most benefit to students if they choose to attend a college or university.

* The first is a study conducted by the Oregon University System (OUS, 2009) that aimed to identify mathematical concepts and skills are needed to succeed in first-year University courses that depend on mathematics.
* The second study is a similar study carried out through the Core to College grant that asked professors from STEM related fields what math is needed for success in an entry-level course (e.g. Biology 101, or ECON 101).

Review the content identified in the documents below and add them to the spreadsheet template provided above. Identify this as “higher education” content in the red column.

* **OUS (2009) - What Math Do Students Need to Succeed at Public Oregon University?**
  + Link to OUS (2009) [FULL TEXT](https://drive.google.com/file/d/1nomiJ3AGuk6Dn1it3z8UZvpS7OPTNf5z/view?usp=sharing)
  + Link to OUS (2009) [OVERVIEW (NCTM Presentation)](https://drive.google.com/file/d/1QZL-OwOaUxcWCfgk5zDu3ojA--OBKph-/view?usp=sharing)
* **Oregon Core to College Focus Groups (2013)**
  + Link to [Core to College Overview](https://drive.google.com/file/d/1Gmz0RnGEi4-TSFMFa5hE1zEK9UB6UHEG/view?usp=sharing)
  + Link to [Biology](https://drive.google.com/file/d/1CH9ETxKj-7YZVw3CpFvlYTw8uaVJSoVD/view?usp=sharing) notes
  + Link to [Chemistry](https://drive.google.com/file/d/1puNmiWlJrcZaKrzEdSF92CcEqdUDHnf-/view?usp=sharing) notes
  + Link to [Physics](https://drive.google.com/file/d/1GQeItu_v_fpkGCyST0_mswynCTaeoIah/view?usp=sharing) notes
  + Link to [Economics](https://drive.google.com/file/d/1E6Dxqt4b_W0qu3J0cM8FRMAbvx7BYlrc/view?usp=sharing) notes
  + Link to [Psychology](https://drive.google.com/file/d/1CMrJOjxErG66GkYB66-N4fe79U4631rd/view?usp=sharing) notes
  + Link to [Sociology](https://drive.google.com/file/d/1eX3qimDcJQDyP4I4zu-Z2nMwzOAPd5uL/view?usp=sharing) notes

| Lens 3: Student Engagement |
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Engaging students requires opportunities for all students to learn and apply mathematics content that will prepare them for a smooth transition to their particular postsecondary or career choice. It is key then to mathematics content that is relevant to the students’ life, and incorporates problem-solving and critical thinking skills.

The videos below provide perspectives from students to provide context to the work of identifying core math content. Review videos below and add content and practices that would lend itself to engaging applications that would students would find useful and/or engaging. Identify this as “engagement” content in the blue column within the to the spreadsheet template provided above.

* Link to Video 1: [Student Reflections](https://youtu.be/Opvobz2koes)
* Link to Video 2: [Math in Real Life Reflections](https://youtu.be/-mJGXCnAqR0)
* Link to Video 3: [Performance Based Assessment](https://youtu.be/9xsvz6ARINc)

| Lens 4: Community |
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A variety of community stakeholders are also interested in the math skills students have after they graduate. This could include a variety of views including, but not limited to, business, government, parents, and media. For the purposes of this exercise, the focus of the supplemental on the needs of business and industry, but other perspectives could also be included if needed.

Review the content identified in the documents below and add them to the spreadsheet template provided above. Identify this as “Community” content in the green column.

* Link to [Architect Video](https://youtu.be/yH1DAtJ5wfc)
* Oregon Employment and Work Keys crosswalk
  + Link to [Oregon East Cascades](https://docs.google.com/spreadsheets/d/1EbKnMKf7P9D9Z1eh1hiPRI4c4vUKbjI73OHP54OZ8Aw/edit?usp=sharing) high wage and high demand jobs
  + Link to [Work Keys Description](https://drive.google.com/file/d/1_5AFSE4oPW3ewJTjbDAPyVFasRHNvWku/view?usp=sharing)
* Additional research studies
  + Link to [The Conference Board report: Are They Really Ready to Work?](https://drive.google.com/file/d/1W43gd_DvEIdX8HNSE7NgnBvDue_PsCoX/view?usp=sharing)
  + Link to [NCEE Report: What Does it Really Mean to Be College and Work Ready?](https://drive.google.com/file/d/1_xzwg_uNdYQmXFjJpuFPqkfyZOC1Kzv7/view?usp=sharing)

| Action Plans |
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Finding focus activities serve as a launching point for conversations to identify common agreements about the content and skills in mathematics that are valued from a variety of viewpoints.

The Action template below is provided to help continue such conversations in districts and schools by identifying with state level activities identified and district activities to support this work. Feel free to share with [mark.freed@state.or.us](mailto:mark.freed@state.or.us) if you would like to communicate activities that could be done at the state level to support the high school pathways work.

* Link to [Mathways Action Plan Template: 2017-2024](https://drive.google.com/open?id=1H-jBNocJWfezleI-D1wxWgiKrEeSwENu)