Curriculum & Instructional Materials

Room 1 (Vicki, Jake, Andres, Jennifer, Kym, and Ted)

Strengths

What resources do we have?

- Model HQIM in a number of grades, particularly MS & HS biology
- Some work in physics in chemistry
- Vision of the end goal

What is working well?

- Open nature of the materials
- Design: Phenomenon based

Weaknesses

What resources/tools are we lacking?

- HQIM are not covered in all grades and all disciplines
- Lacking in earth science, and engineering at HS; massive gaps in elementary
- While resources exist, we are well below a critical mass of educators who understand the value
- Resources (PL) lacking for implementation
- Implying that this is the only way to teach NGSS
- Clear vision of intermediate steps for getting to the end goal

What improvements are needed?

- Project based approaches (which can work as well as phenomenon-based)
- Sequencing that is flexible

Opportunities

What are the most immediate needs?

- Support are needed for materials selection in districts
- Time for teachers to build capacity
- Support to get teachers interested in and comfortable with change

Room 2

Strengths

What resources do we have?

- Locally developed materials
- Locally developed rubrics based on others (e.g., Equip, NextGen Time, EdReports Rubric)
- OpenSciEd & NGSX Training
- LASER model which says that curriculum alone is “not enough”; we need support for teachers (e.g., coaching, PL)
- Informal learning experiences (from museums, state parks, city facilities), which are now aligned with NGSS, model 3-D lessons, coach, teach

What is working well?

- Piloting materials
- Seeing teachers build their own capacity
- Standards-based instruction

Weaknesses

What resources/tools are we lacking?

- OER for elementary
- Lack of elementary HQIM identified by EdReports
- Training for admin?
- Tool to support “standards-based grading”
- Some autonomy means that localized curriculum may not be high quality as defined by HQIM 3-D instruction

What improvements are needed?

- Tight time constraints including time to teaching science in elementary school
- Highlighting the interdisciplinary nature of science teaching (e.g., ELA and math integration)
- Helping teachers understand phenomenon-based learning, especially how to identify local phenomena that identify a bundle of PE’s; how to distinguish between a phenomenon and a DCI

Opportunities

What are the most immediate needs?

- Schools want to build their own cross-disciplinary curriculum that are localized but they need to know how to do that so that the materials are high quality and 3-D and hit all of the SEPs
- States who are going through standards revisions can use this opportunity to learn how to create or identify 3-D exemplar units using the Equip rubric (e.g, bundled PE’s, storyline with coherent sequence, anchoring phenomenon, lesson level phenomenon, 3-D formative and summative assessments); these exemplar units could help schools to develop or identify curricular resources
- Redesigning “field trips” that introduce phenomena; highly immersive experiences in informal learning environments that are connected to classroom 3-D learning

Room 3

Strengths

What resources do we have?

- Review processes like EQUIP, EdReports
- Collective learning opportunities
- Growing body of model/high-quality examples of IM

What is working well?

- Review is useful for learning, but the outcomes and takeaways are not generalized. The rigor of systemic reviews is a learning experience.
- Identifying anchoring phenomena drive us towards coherence

Weaknesses

What resources/tools are we lacking?

- Need an outcome-based way of assessing how we are doing with the IM
- Better support for identifying excellent anchoring phenomena to support NGSS learning goals

What improvements are needed?

- Review processes (EQUIP) can drive homogeneity in materials and stifle innovation.
- Support for usability of materials in real classrooms with real constraints

Opportunities

What are the most immediate needs?

- Develop set of resources/tools that measure efficacy
- Models for creating national materials that can be easily/successfully/practically localized
- Models for developing (quality, educative, effective) materials that fit within Ts preparation and teaching time

Room 4

Strengths

What resources do we have?

- STT
- OpenSciEd
- NextGenStorylines
- TeachEngineering
- Digital Commons
- Common Core Examples

What is working well?

- Examples of Phenomena (#'s)
- XXX

Weaknesses

What resources/tools are we lacking?

- Interdisciplinary connection between Common Core & NGSS
- Interdisciplinary unit examples
- NGSS/State standards aligned materials utilized by teachers
- Not enough understanding how the 3D elements can be incorporated into creating resources. Also, lack of understanding the standards

What improvements are needed?

- Support for choosing/making sense of Phenomena
- Effective/efficient ways to increase knowledge/use of standards aligned resources
- XXX

Opportunities

What are the most immediate needs?

- K-5 materials and PD. science does not need to be taught on its own. Connections to math and literacy can be made with science.
- Administration expectations to teach science in K-5—How can we get admin. "Buy-in"?
- Time/schedule to include science in K-5

Room 5

Strengths

What resources do we have?

- Districts and regions where there is support for professional learning and materials. Where there is leadership and admin support that is on-going
- Capacity to customize materials to address local concerns and phenomena
- IM as catalysts to do deep capacity building
- Sustainability of connections to science in districts

What is working well?

- Ongoing support is key
- District and admin support for professional learning is key
- Exciting research in the field to continue to transform curriculum
- Fostering a longer-term group of leaders to build teacher capacity
- Using the curriculum materials to tease out what are the best practices and routines to support high quality instruction

Weaknesses

What resources/tools are we lacking?

- Need tools or resources to help systems at all levels to develop leadership and vision that is required for continuous progress and change

What improvements are needed?

- Finding the right balance for teacher educative content and usability
- Differentiating in what HQIM looks like at different grade levels? Addressing differences in contexts, acknowledging strengths/weaknesses and the differing needs of teachers at various grade levels.

Opportunities

What are the most immediate needs?

- Addressing the balance and tension of supporting teachers while ensuring that materials are accessible and useable
- Need tools or resources to help systems at all levels to develop leadership and vision that is required for continuous progress and change
- How to address scale of supporting implementation

Room 6

Strengths

What resources do we have?

- Rubrics for evaluation
- Strong leadership throughout the country
- Stem teaching tools--great resource
- Available curricula

What is working well?

- Open access/free resources in many of the different areas (set of units is better than one-off units)
- Professional learning that comes with tools=more support for teachers to pick high quality resources
- Co-development of resources: scale co-design processes, surveys of students interests

Weaknesses

What resources/tools are we lacking?

- Sub issues/enough time for PL with adoptions**
- Covid--hard for in person learning
- Teachers are all over the map in their NGSS journey--hard to customize PL
- ESS Curriculum
- CCC and Phenomenon usage

What improvements are needed?

- More time for PL with adoptions**
- Covid catch up
- Customize PL
- Full year commitment to earth and space science
- Community supports
- Preservice science teacher preparation on NGSS

Opportunities

What are the most immediate needs?

- Continued professional learning of what NGSS looks like - a federal program at the scale of Eisenhower, MSP, LSCI, SSI to pay for PL
- Administrators--need to be brought into the conversation--why it is important for all of their students--benefits to the rest of the curriculum
- Principal's voice is only so strong in urban districts--sometimes it has to go higher than them--superintendents/state level
- Use of crosscutting concepts--how to be leveraged with integration of phenomena
- Networking for education faculty?
- Research on curriculum use (Horizon), also on development processes of curriculum teams (comparative, to identify common challenges but also innovative strategies)

Room 7

Strengths

What resources do we have?

- EQuIP rubric, Task Screener
- NGSS Time
- Ed Reports
- Supplemental resources like Mystery Science, Picture Perfect (e.g., literacy-based/elem-specific Science content)
- 5D model is easy entry pt for Ts
- Neighboring districts, regional collaboratives, etc.

What is working well?

- The standards themselves *are* driving coherence
- Providing curricular materials + working to generate buy-in for new ways to “do Science”
- Connecting Science to other content areas/broader goals
- Leaders who prioritize Science adoption and support their use and identify the need for coherence

Weaknesses

What resources/tools are we lacking?

- Budget in small districts for HQIM + PL
- Elementary Science-focused resources
- High School buy-in (JeffCo)
- Energy/capacity for PL and continued implementation

What improvements are needed?

- Developing clear set of materials in approved list
- Implementation of NGSS is still very state-based
- Getting district leadership to support necessary professional learning/prioritizing Science can be a challenge

Opportunities

What are the most immediate needs?

- Professional learning has been on the backburner with COVID needs
- Learning recovery for students is forefront of folks minds; how can we tie that into the work folks are doing with implementing and supporting HQIM?

Room 8

Strengths

What resources do we have?

- Leads/coaches personally create spreadsheets to curate resources (ex. Where to start)
- STEM teaching tools
- Achieve/NGSS website
- National Academies reports and recommendations

What is working well?

- Lots of things exist/are available.
- Purchasing both materials *and* PL *and* equipment
- When have time to match resource to what you need
- Research/Practice partnerships
- Looking to districts that are excelling and finding out what they are using/doing!
- Collaborations across districts (move the needle faster)

Weaknesses

What resources/tools are we lacking?

- Inventory - a list! Not everyone is even aware of what is available/out there. Ex. here are your essential resources.
- TIME - importance needs to be placed on science by others! Resources to support a systemic shift!
- Resources and PL experiences for leaders

What improvements are needed?

- Folks involved in the work not to make assumptions about what educators know about
- Way to make it not feel overwhelming (from teacher perspective, leader perspective, etc.)
- Smaller scale projects, initiatives, examples not as well known. How do we help people learn about these, match resource to particular need.
- EQuIP and EdReports sets the bar high, but what about everything else -where do we find things that don't fit the criteria to even be reviewed (ex. https://www.globalsystemsscience.org/)
- Interest and value for science at different levels in the system (esp the K-5 teachers - they have to want to do science, materials alone insufficient - need the PL support AND leadership support)

Opportunities

What are the most immediate needs?

- Vision for K-12 science - needs to be important at every level in the system - all stakeholders
- Policy needs to align with what we are doing
- Equity issue - science can't be the thing that's dropped - whether that's class time/courses, staff (coaches), etc.
- Data to support positive impact, get more buy-in!

Room 9

Strengths

What resources do we have?

- MS products with help from funding (OERs)
- K-8 focus of shifted curricula
- HS Bio - MBER (https://www.modelbasedbiology.com/)
- Interactions - Concord consortium https://concord.org/our-work/research-projects/interactions/
- HS Integrated courses are starting to take hold

What is working well?

- XXX
- XXX
- XXX

Weaknesses

What resources/tools are we lacking?

- HS HQIM are lacking, but that is starting to change (albeit slowly)
- Recognition of the rigor of an integrated course; ensuring HS Earth & Space Science is taught with fidelity and rigor within the integrated model
- Administrators! - concern about starting to teach science in 6th grade - it's too late

What improvements are needed?

- Go beyond the shifts; whole curriculums are needed
- Pre-service teacher training to know what to look for regarding 3D T&L
- Shift administrator lens on science education and what it looks like in the classroom; they need to bring teachers into the process of selecting HQIM

Opportunities

What are the most immediate needs?

- Considerations of time and funding for teacher PD
- Professional Learning for Administrators in how science supports the literacy and math scores as well.

Room 10

Strengths

What resources do we have?

- In the Instructional Materials, there are many opportunities for DCI development.
- Equip review process exists to support materials that are not reviewed yet by EdReports
- OERs exist such as OpenSciEd, SAIL, IHub Units, etc.

What is working well?

- More of these high quality resources can be adapted to fit the needs of individual states
- Plan in NE for adopting reviewed materials w/ ESSER funds

Weaknesses

What resources/tools are we lacking?

- Elementary Science Resources- Resources lack educative opportunities for teachers to develop SEPs and CCCs
- Lack of choice in reviewed and developed materials
- State boards don't have resources/experience reviewing OERs in a "textbook world".
- Expectations of teacher prep time to teach materials and read facilitation guides

What improvements are needed?

- Need more teachers to field test created units
- Still need to develop the SEPs in instructional materials and the CCCs are still a mystery in how they fit into the learning process.
- How can we help boards navigate "uncharted waters" of OER resources?
- Usability of curricular materials- from prep of materials to educative materials and reading load to facilitate

Opportunities

What are the most immediate needs?

- Curriculum materials and cost of supplies for elementary given constraints on instructional time
- 3D interim assessments at the district level
- Professional learning for teachers on the curriculum materials
    - Not just seat time, but the quality of PD provided by curricular vendors, engaging teachers in learning about the NGSS and instructional priorities. Experience as a learner, student hat
    - Value in collaboration of other educators working together to study practice, improve outcomes, and grow together

Room 11

Strengths

What resources do we have?

- Existence of high quality instructional materials
- Curriculum materials that connect content areas - highlighting all standards that are being addressed in a science activity/curriculum
- Curriculum developers with deep understanding of NGSS and building NGSS-aligned instruction (e.g., students figuring things out, student agency, range of practices)

What is working well?

- Recognition among curriculum developers of purpose of formative assessment within curriculum
- XXX
- XXX

Weaknesses

What resources/tools are we lacking?

- Education for parents / taxpayers about NGSS-aligned instruction
- Materials that attend to the wide range of needs of students / educators
- XXX

What improvements are needed?

- Increased understanding among teachers about the role of formative assessment
- Understanding and supporting student agency
- Adequate time for science instruction for meaningful learning with NGSS-aligned materials

Opportunities

What are the most immediate needs?

- Professional learning for educators (leadership team, teachers, etc.) general to NGSS and specific to curriculum they are using
- Connecting robust/3 D assessment with curriculum materials for formative/guiding instruction while also meeting state assessment goals
- Strengthening coherence from district leaders, school administrators, teachers, families regarding importance of robust NGSS-aligned instruction

Summary Slide

Strengths

What resources do we have?

- HQIM (specifics cited)
- Rubrics/Review processes and tools
- Districts
- Locally focused materials

What is working well?

- Open/free access
- Connecting resources (materials, PL, support)
- Phenomenon examples

Weaknesses

What resources/tools are we lacking?

- HQIM not in all grades/level (e.g., elementary science, earth science)
- Resources & PL for implementation
- Inventory of available materials
- Education for parents/taxpayers
- TIME

What improvements are needed?

- Help with local phenomenon based-learning/customization
- Cross curricular (esp. elem)
- Grade-level specificity
- Involving all 3 dimensions
- Leadership support
- “Friendly” “accessible” resources/tools

Opportunities

What are the most immediate needs?

- Materials selection help
- Building teacher capacity
- Models that that highly useable, accessible
- Supporting implementation at scale
- Professional learning (esp. abt curriculum materials)
- K-5 materials
- Involvement of administrators–leadership and vision
- Data and research

Major Themes

Many examples, resources, and rubrics for curriculum. But there are still holes (e.g., elementary science)

OERs – strengths and challenges (esp. state adoption)

Have tools for review from design and features but lacking some for outcomes

Need professional learning for teachers. Needs to be high quality. Experience as a learner. PL around how to find and use materials.

Customization of materials for equity

Usability, content, accessibility balance with quality with classroom constraints

District and administrative buy-in–immediate and long-term. Need PL for them as well. Pr

Novice and experienced teachers–needs for these

Standards are driving coherence but implementation is state-based

Challenges of school closures on science

Themes continued

Preservice teachers–how to prepare

Challenge of TIME–lack thereof and variation in science.

Different outcomes and different levels of the system and the needs to have materials

Informal learning experiences are aligned

Field trips

State-based curriculum development needs training

Cross-curricular approach esp. in elementary

Connection between and flexibility of the tools–materials, PL

Federal policies–e.g., Eisenhower and other funding mechanisms

Summarizing Thoughts

This is a **system** and all parts need to be considered and aligned

- Materials, educators, administrators, families, policy-makers