Curriculum and Instruction

Virtual Breakout

Group 1-

Opportunities/Challenges

- How to free up teachers, so they can learn how to use materials?
- Making time- 20 min/day avg science instruction- Horizon report- Banilower
- Logistics vs quality of instructional lesson
- Tension between core content areas- at odds but shouldnt be- affects instructional practices
- Science core focus vs broader STEM priorities
- Continuing to inform teachers about Framework. Teaching how we were taught vs new methodology
- Promise/challenge of OER- save money on materials, shift budgets to professional learning
- when do they have the time and how are they going to figure out how use complex materials

Goals

- Scaffold instructional materials for teachers to improve onboarding and implementation
- Change district policies so students aren't pulled out of science for other supports
- Protected time for science
- Include science in early elementary school literacy blocks to introduce science into earlier grades
- Defining disciplinary literacy and content area literacy

Actors and Actions

- OER- content authors, service providers, classroom practitioners
- Systems level perspective- interconnectedness of many actors
- Teachers-

Group 2

Opportunities/Challenges

- Challenge: schools don't have resources to do online simulations necessary to reach HS standards, money for teacher training
- Time for professional learning is limited, and the limited time is stretched among even more topics
- Challenge of enacting 3D instruction. Many teachers need more training than provided
- Lack of funding for subs and even lack of subs themselves.
- Difficult to get the time for teachers to attend curriculum specific PL, particularly the amount of time that is often needed

- Opportunity: including social emotional learning within science PL and curricula (not separately)

Goals

- Finding people to sub so teachers can participate in PL
- Curriculum materials should promote passion for students, include information for teachers' enactment
- Need PL that is curriculum agnostic that can help all teachers

Actors and Actions

- Actors: the people in this room!
- science supervisors, coaches (train them to provide 3D teaching/learning PL)
- teacher leaders
- teachers willing to open up classrooms (possibly videos of teachers enacting and students responding). Curating video of model instruction (not behind paywall)
- creating small learning communities (such as NGSS tweeps), learning labs
- Opportunities for teachers to engage, not just watch
- Maximizing PL time, more time for science, integrating with other topics (ELA, math) in order to provide more science time
- Make it specific in curriculum how to integrate science with other topics. Make science the primary lens (rather than having students read about science and call it a day)
- Curriculum should be relevant for various student audiences, geographically, for current times

Group 3

Opportunities/Challenges

- O: OERs have a priority with pilots and teacher feedback and research
- C: Need standards, instructional materials, curriculum, and resources understanding (kits are not a curriculum)
- O: When Ts introed to vision for science ed, it's often received well
- C: Imaginary university courses are hanging over every high school teacher's head; (Need to prep them for college)
- C: Here is what we need know vs this is what we need to get there
- C: Not attending to Earth or both phys and chem
- C: Elementary science is the lowest priority in most districts

Goals

- Prioritizing educating administrators on science education and it's benefit (along with its benefit in literacy)
- Professional learning for teachers focusing on the vision for NGSS: instruction towards sensemaking rather than implementing the standards; even better, using the instructional materials to implement in classrooms so are using the resources as tools

Actors and Actions

- Reconsidering what the school year and school week looks like; time for professional learning, collaboration, etc. Actors will need to be districts, communities, legislation, unions, etc. - districts and school boards and unions
- Rethinking engagement with "substitute" instruction - districts and school boards and unions
- Work with district administrators to train their building administrators . Who: curriculum specialist/director of T & L. Or Ed cooperatives, principals' association.
- Disseminate NASEM to a wider audience. We're not sure how to get people to tune in. How to connect to national administrator and leadership organizations?

Robin Deems (OH), Wendi Vogel (MI), Stacey van der Veen (NJ), John Olson (MN)

Group 4

Opportunities/Challenges

A. need for HQ K-5 materials
B. inequitable access to science materials and opportunities across the country
C. Diff levels of understanding among teachers (maybe only 5% fully understand Framework)
D. Need for local relevance / tension with non-local curriculum development
E. hesitance to trust OERs (“if not hard bound, not real”)
F. hesitance to change topics taught.
G. Lack of coherent scope and sequence available to teachers

Goals

1. Increase teacher workforce knowledge of NGSS/Framework shifts AND available resources
2. Self-assessment/continuum of knowledge of NGSS/Framework vision for districts.
3. Research agenda for efficacy of OERs

Actors and Actions

1. NSTA, NextGenScience, State DOE, District Leadership -
    a. Refine messaging about shifts
    b. Ensuring that ALL teachers and districts are reached
2. Science SCASS group (started with similar tool). BCSSE?
3. Current example: Digital Promise-led research agenda of OpenSciEd

Joy Abbott, Davina Perkins, Jennifer Self, Tad Johnston

Group 5

Opportunities/Challenges

- Opportunities:
  - Display student work
  - Emphasize science specific writing/literacy
    - make explicit connections to ELA standards
  - Quality PL promotes literacy/science connection
  - Simple common messages
  - Standards provide an opportunity to PL that changes classroom instruction
  - Use peer interactions as ways to help teachers manage time/feedback
- Challenges:
  - Lack of clear messaging about science
  - Time for science at the elementary level
  - Administration/leadership support of changes to “good instruction”
  - Ex: Sentence stems “I hope/feel”
  - Gaining acceptance of multimedia versus just “written characters on a page”
  - PD vs PL - the application is PL, the resources might come from PD (Moulding)
  - Teachers having safe space to try out routines/strategies and improve over time

Goals

1. Coherent curriculum presented in ways that engage teachers as learners so that they can translate that opportunity to their classroom.
2. Determine the tipping point (application in the classroom?) for teachers so that their instincts about teaching becomes less of what they experienced and more of what NGSS calls for
   - Learning labs/PLC can be a strategy to debrief

Actors and Actions

1. Framework vision, professional learning standards, support of hybrid & tech supports to continue virtual reach.
   a. Gather information about virtual learning cycles
2. Research and understand how teachers change their instruction - what tools, resources, supports help teachers reach a “tipping point” with their practice
   a. Get administrators on board for time and space to develop practice.

Ideas from each group

Opportunities/Challenges

- **More time for Ts (to learn, implement)**
- **Time for students to engage in all sciences particularly at the elementary sci level.**
- Disciplinary intersections and tensions (cxn to ELA)
- OER possibilities
- All standards with all students
- $ for effective 3D PL
- PL curriculum agnostic
- Develop understanding of vision and standards
- Local vs state level control
- **Inequitable access to opps and materials and inequitable value place on certain knowledge**
- Messaging abt science
- **Leverage virtual work from Covid**

Goals

- **Develop additional educative instructional materials that are, adaptable towards local culturally relevant/sustaining practices and NGSS-aligned instructional that center Ss knowledge, experiences, and cultures**
- Educative scaffolds in instructional materials
- **Protect/add science time for *all* Ss in all grades**
- Educate administrators (why sci, sci & literacy) in all districts
- Educate all teachers of science on the framework vision to ensure all students have the opportunities
- **PL to focus on actualizing the vision of the framework in relevant ways to local classroom contexts including justice-oriented teaching by working with administrators, teachers, PD providers, educators, and students**
- Providing supports adaptability of materials for local contexts and communities

Actors and Actions

Summary Slide

Opportunities/Challenges

- More time for teachers (to learn, implement)
- Time for all students to engage in all sciences particularly at the elementary science level
- Inequitable access to opportunities and materials and inequitable value place on certain knowledge
- Leverage virtual work from Covid

Goals

- Develop additional educative instructional materials that are adaptable towards local, culturally relevant/sustaining practices and instruction that center students' knowledge, experiences, and cultures
- Protect/add science time for *all* students in all grades
- PL to focus on actualizing the vision of the framework in relevant ways to local classroom contexts including justice-oriented teaching by working with administrators, teachers, PD providers, educators, and students

Actors and Actions

- Curriculum developers & PL/PD providers
- Administrator and instructional coach education
- Communities and students

- Systems perspective–each point should have actors with a clear vision for actions
- PL → teacher action

Pitch

Pitch thoughts:

Tad Johnston- It's not reasonable to expect teachers to teach in NGSS ways (3-D) if
They haven't seen it (need examples, so class videos of practice needed across the grades)
They don't have the tools (need good materials available so development of curriculum materials needs support)
They haven't been shown how or why (need pre-service and inservice professional learning on NGSS)
They don't have collaborative support and feedback as they develop (time for PLC and coaching)
They have to sell it to stakeholders (it's easier to do the status quo, public demand for better ways of learning science needs to be fostered so teachers are responding to desires of the community rather than having to fight community expectations)
Equity – this needs to be wide-spread and easily available so it is not just happening in pockets of excellence.
All communities need to be supported in recognizing the strengths of their children as learners and that they do not have to fit within the dominant paradigm to be successful.

Cari- I wonder if it would be possible to create a bank of videos and other resources that teachers could use in order to see the how and why of NGSS 3D learning. This is something Linnea mentioned yesterday. Funding would provide server space, content creators, and keep it from being behind a paywall.

Research for progressions around developing teacher capacity and materials with affordances and scaffolds to engage in 3D instruction, justice oriented, locally based.

How do we become more place-based community based– recommendation 10 from NRC report science and engineering in elementary

Time, opportunities (structures), funds to do this work in partnership with various experts- local, research etc
Exemplars with affordances for adaptability to local context and a framework that helps local adapation– must have serious supports for this

recommendations related to curriculum materials from the Brilliance & Strengths report

RECOMMENDATION 10: Curriculum developers should work in partnership with researchers, teachers, school or district leaders, and families and community leaders to develop preschool through elementary science and engineering curriculum materials that are coherent and equitable, that build toward the vision of the Framework, and that:

- provide opportunities for children's sensemaking around investigation and design;
- build on children's interests and repertoires of practice;
- provide educative supports for teachers;
- provide opportunities for teachers to make productive adaptations to meet contextual needs;
- provide supports for teachers to make meaningful connections to communities and families;
- explore integrating science and engineering with other domains in ways that benefit children's learning and use instructional time effectively;
- are manageable for use in preschool and elementary settings;
- align preschool and elementary instruction; and
- show evidence of effectiveness.

RECOMMENDATION 11: State and district leaders should rely on a robust evidence-based review, selection, and implementation process when making decisions about preschool through elementary curricular programs to adopt to ensure that the science and engineering units build toward the vision of the Framework and are grounded in investigation and design, coherent, flexible, adaptable, and equitable.

RECOMMENDATION 12: State and district leaders should provide teachers with sustained professional learning opportunities for using and adapting curriculum materials, and should ensure that they have adequate access to materials, equipment, and other physical and digital resources needed for children to engage in investigation and design.

RECOMMENDATION 13: As materials become available, state and district leaders should ensure that every school has the curriculum materials and instructional resources needed for engaging in science and engineering teaching that works toward equity and justice.

https://nap.nationalacademies.org/catalog/26215/science-and-engineering-in-preschool-through-elementary-grades-the-brilliance

Instructional Materials Pitch

Critical: Teachers need dedicated/protected time to engage students in meaningful science education with a focus on comprehensive, frequent, and consistent instruction.

Motivation: Current gap (opportunities and challenges)

Three concurrent progressions

CENTERING STUDENTS

3D routines and practices that center students' cultural and linguistic resources, ways of being (lived experiences) , ways of knowing (ideas)

LOCAL ADAPTATION

Adaptation to local context and community assets

JUSTICE ORIENTED

Adaptation Justice oriented

Instructional Materials with these affordances and scaffolds, including (manageable) educative features to support teacher growth

Professional Learning programs and supports with these affordances

Systems alignment and support for these affordances as well as adoption & dissemination

Needs:

1. Funding to support building, developing, and disseminating resources (IM, PL, and adaptation tools) to support the system in engaging with these goals
2. Funding to support additional research around these progressions for IM and PL
3. Need policies that support this approach (including more time)
4. Need structures and funding to support partnerships between researchers, teachers, and community experts