Preschool to Elementary Transition

What is unique to the early childhood environment that needs to be considered when thinking about 3D science standards implementation?

- Children deserve the opportunity to wonder and make sense of the natural world
- ECE has two big affordances (prob more!): play is already central (and thus it might be easy to engage children around phenomena and design problems) and “content areas” are way more fluid, so science could be integrated with literacy, math, social studies, etc. Children this age are BORN thinkers, wonderers, question askers! We have to be careful as we can to work to promote those skills rather than quench them
- Background of educators is varied depending on site
- There are so many different types of early childhood environments with differences in teacher preparation, use of curriculum, available resources and materials, parent involvement,etc
- Support for play-based learning in this space
- Integrated approaches to learning might be more common
- ECE teachers are brilliant and many of the high quality practices for instructional support arise naturally in science learning
- Agree with the point above but teachers don’t always have connections to the language, structures that would help them value and advocate for what they’re already doing well.
- ECE space is less constrained by testing and offer lots of flexibility
- Orientation to the “whole child” is a very productive frame for thinking about “5-d” that is including interest and identify
- Developmental continuum- student engagement and conceptual understanding will become increasingly more sophisticated, and should be continued in science, not just literacy and math
- Environment must allow opportunities for students to explore, question, and avoid limiting learning
- Integrated is the expectation: Early STEM efforts vs Early Science efforts in states
- Children’s connections to family members/primary caregivers are probably important to capitalize upon.

What needs to be considered when adapting IM and curriculum in this space? Assessment?

- We talked in the Brilliance & Strengths report some about some of the challenges w/ assessment (and instruction) at these ages, including that kids' writing and drawing can be hard to interpret, as can their oral language. Need to be clever in how we work to understand their ideas!
- Adapting curriculum materials: Like i nthe instructional materials session, it seems super important to allow for local adaptations with younger kids -- both to make the instruction more relevant in general, and to better position educators for working toward justice
- Assessment-need to ensure resources, tools, and professional learning support observational data collection that captures students engagement in science
- Assessment does not have to be a test
- Early childhood does not have well defined learning trajectories or learning progressions for science like it does in older grades or in other content areas like math
- Not sure that I agree with the former bullet (this refers to the Assessment bullet).
- Developmental considerations (social, emotional, physical, cognitive, and much more!). Children at this age may still be in the very early stages of becoming familiar with the context of school.
- Importance of multi-modal engagement in learning and sense-making activities.
- Supporting teachers with implementation and with making connections between science learning and learning across disciplines
- Early childhood educators need to understand the foundational building blocks of science and see how ideas progress vertically
- Capitalize on these childrens natural abilities to think, wonder, and ask questions by listening well to them and providing numerous opportunities for each child to use those skills more and in wondrous ways.
- States have developed Kindergarten Readiness Assessments, many of which do not factor in science
- Ditch the worksheets!
- Ability to purchase and implement HQ curriculum is site specific
- Orientations toward what assessment is and does are likely to be very different. EC not as influenced by the large-scale accountability press. Less of an orientation toward grading.
- ECE teachers are underpaid, under-respecte, under supported. We often make unreasonable asks of them and need to provide much better supports (e.g., coaching and job embedded PD)
- Philosophies about play and importance of play are both an asset and a potential constraint

Diversity of learning environments and connection to 3D learning

- Preschool, preK, daycare, publicly funded, privately funded, church-based, etc. etc. -- so many permutations
- Phenomena-centered and exploration-centered learning creates an equitable entry point for all students…learning needs to be outside and active
- Recognize assets of the learning environment to capitalize on the thinking and question asking they may promote i.e. what natural phenomena abound there?! (Not sure this age group is ready to conceptualize constructed aspects of the world around them but, then again, Andres can probably speak to that!)
- The SEPs are particularly suited to this age group.
- Home-school connections and family engagement are critical in early childhood settings
- Practices and crosscutting concepts (learning how to learn science) should be top priority in early years
- How to teachers or facilitators get trained to deliver 3D STEM if they are located or working in different environments?
- What partnerships are established, pursued, nurtured to ensure that students get access to high-quality 3D learning experiences if they don't have access to formal early learning or quality early learning spaces.
- The early childhood landscape is VERY complex. Kids are in lots of different settings, with lots of different regulations, very different prep for teachers/providers. Makes it more complicated to design ways to infuse robust science
- PK teachers may have had limited experience with science-specific professional learning. It would be important to help them build confidence in science.
- Promote the notion that "Science is Everywhere!"

Summary Slide

Strengths

What resources do we have?

- Pre-k is more unconstrained than K-12
- High quality ECE practice is what we strive for in K-12 settings
- ECE has deep connections to community (faith based organizations, home-based care) and diverse ecosystems to support early development.

What is working well?

- Early spaces do a good job using observational assessment (K-12 can learn from this)
- Families are a main driver of early science
- Family participation is common and a central focus

Weaknesses

What resources/tools are we lacking?

- Because there is so much variability in ECE providers its difficult to provide comprehensive PD for all of the audiences
- Pushing down K-12 practices to ECE instead of the opposite
- Lack of science in ECE (teachers sometimes opt into ECE to avoid science)

What improvements are needed?

- Messaging to ECE educators and parents that they have expertise in early science (question asking, inquiry, language modeling) and it only take minor tweaks to create 3D science learning
- Need for policy coherence in the connection between pre-k and k-12 worlds

Opportunities

What are the most immediate needs?

- Practices and crosscutting concepts lend themselves particularly well to high quality ECE instructional practices
- Lots of opportunity to support students identity and build from their cultural funds of knowledge because of the deep connections with families and community organizations
- Parent and family engagement are highly encouraged and there is a lot of thought behind highlighting that science is everywhere and that many of families existing practices are scientific

Major Themes

Early childhood offers the space and flexibility for high quality 3D science learning and many of the existing high quality ECE practices naturally arise during science investigation

However the above is not the reality in all early childhood spaces and there are equity issues around which spaces are having K-12 practices of testing and remediation pushed down on them (disproportionately low-income and black and brown communities)

Huge variability in ECE provisions (faith based, private, public, home-based) which makes providing broad level supports for early educators challenging

The family and community engagement that is common practice in early childhood is a huge strength and creates unique opportunities for meaningful and culturally situated science learning

Urgent and Important

Lack of science happening in early childhood classrooms

Need to support and communicate to families and early educators the science relevant explorations and high quality practices that they are already doing and build from those (potentially connecting to practices and crosscutting concepts)

Often it's only small tweaks or reframing of existing practices that are needed to make science learning more explicit to children. At home it could look like food preparation and cooking routines, in the pre-k classroom it could look like nature walks, class pets, or block play (very common activities in preschool classrooms that are full of science learning opportunities)

Summarizing Thoughts

Early childhood has the opportunity to serve as a model for high quality science education that K-12 spaces can learn from and adopt (the exact opposite of the “push down” that we are seeing more and more).

Family and community engagement are core to the early childhood model which offers tremendous opportunity for engaging in meaningful science learning

Diversity and variability of ECE provisions also creates a huge challenge for providing broad supports to early educators and makes coherence between early childhood policy and K-12 systems very challenging