# NextGen
## Science Exemplar System

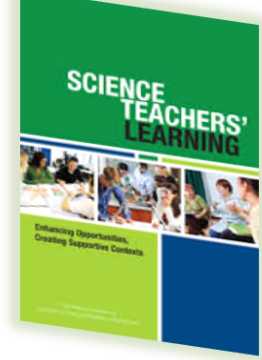# BUILDING AN EVIDENCE BASE FOR A PEER-BASED MODEL OF PROFESSIONAL LEARNING

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# *NRC's Science Teachers' Learning* Provides a Challenge to the Field:



Having teacher leaders occupy leadership roles in professional learning contexts to orchestrate the learning of their colleagues is both under theorized and largely unexplored (NRC, 2016).







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# Challenges include Rethinking Professional Learning for Science Educators

❖ A broader, more expansive view of where and how teachers learn to teach over the course of their careers.

❖ Re-thinking the role of teacher leaders in models of professional learning in science

❖ Continuing to make progress on the challenges of scale-up in professional learning

# Our Research Question:

In order for teacher leaders to be situated as central actors in peer-based PD aligned with the Framework & NGSS,

what knowledge and skills

are necessary?

# NGSX: Next Generation Science Exemplar System for Professional Learning

| Design Principle | Implementation in NGSX |
|---|---|
| Organize PD around teacher sensemaking of classroom video cases. | NGSX participants (teachers & instructional leaders) analyze video cases that follow classroom episodes of students engaged in science practices as well as teachers engaged in NGSX Pathways. |
| Focus on high leverage/core practices - modeling, argumentation, and explanation. | NGSX participants build capacity with core practices in working with phenomena and analyze classroom where students and teachers are doing the same. |
| Teacher study groups working to apply reforms to their own practice – PD has to Connect to Classroom. | NGSX learning experiences encourage & support teachers as they experiment with 3D teaching & learning in their own classrooms. |
| Bring together a focus on science, student thinking, & pedagogy. | Tasks engage teachers in doing science, analyzing student thinking & building classroom 3D aligned pedagogy. |
| Instantiate a high quality, research-based system of Peer-Based Facilitation. | Facilitators orchestrate learning of NGSX study group participants/teachers as they progress through a 3D Science Learning Pathway (30 hrs) |

# What Has Informed Knowledge Building Facilitation & Work of a Facilitator?

- ❖ Analysis of the learning tasks embedded in the NGSX 3D Science Learning Pathway
- ❖ The Three Dimensions put forward in the NRC Framework
- ❖ Research on Adult Learning
- ❖ Research Base on Academically Productive Talk
- ❖ Research on Communities of Practice - Learning as Participation in an Ongoing Practice
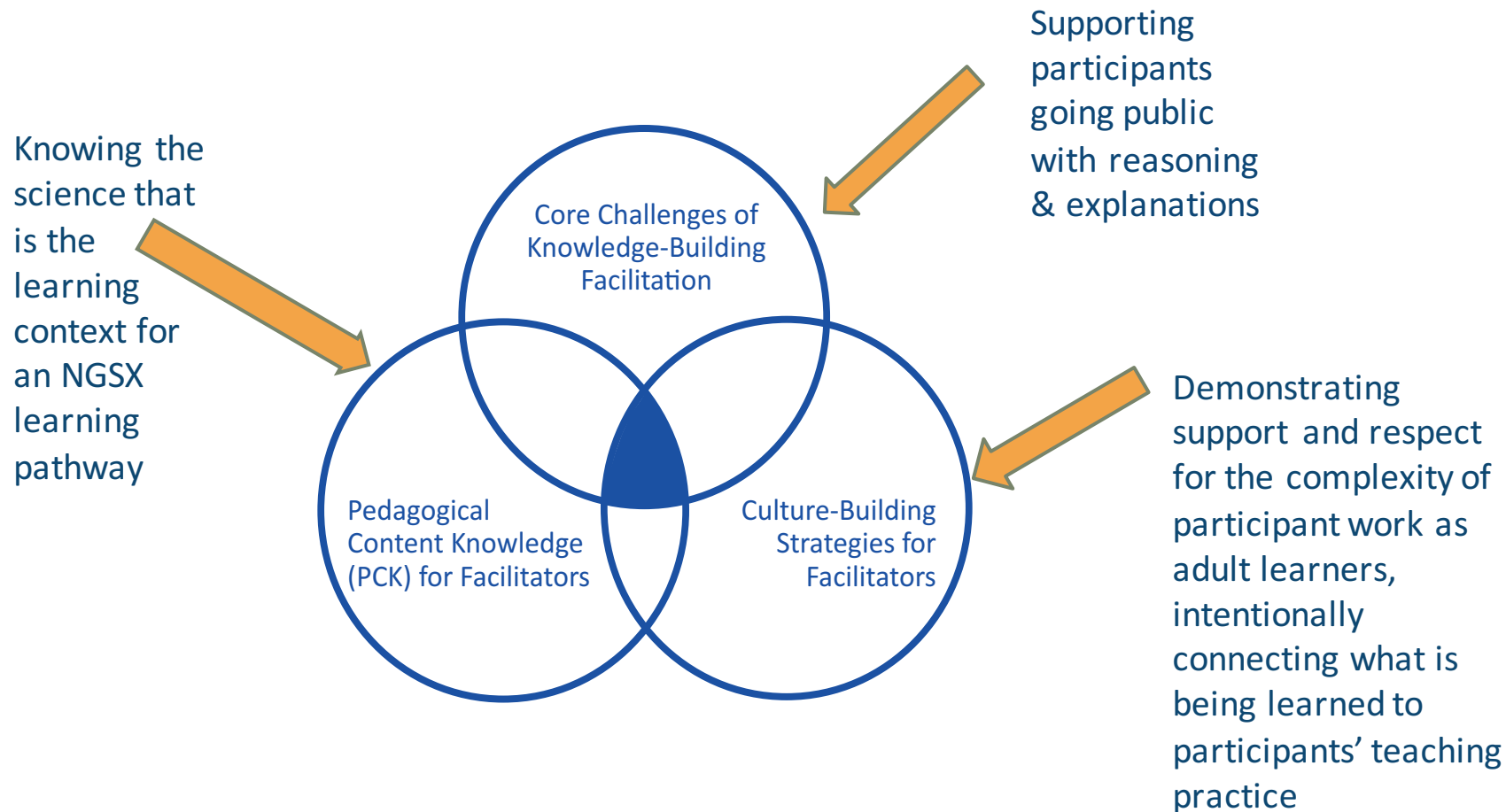
# We Operationalize Facilitation as:

As a _Practice_ - ***The ongoing application or use of particular kinds of skills, applied strategically and purposefully, honed or polished over time.***

❖ _Principled_ but not scripted.
❖ _Framework_ of knowledge that anchors work of a facilitator.
❖ Takes place in a _community_ where learning is viewed as a social and co-constructed process.

# Using the 3 Lenses on the "Trifecta" - Identifying Needed Knowledge & Skills for Facilitators

Knowing the science that is the learning context for an NGSX learning pathway

Supporting participants going public with reasoning & explanations

Core Challenges of Knowledge-Building Facilitation

Pedagogical Content Knowledge (PCK) for Facilitators

Culture-Building Strategies for Facilitators

Demonstrating support and respect for the complexity of participant work as adult learners, intentionally connecting what is being learned to participants' teaching practice

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# Knowledge Building Facilitation (KBF) Rubric - Research Tool

**Knowledge Building Facilitation Rubric: 20104, 20105, 20106 Bottle on the Table**

| Evidence-based Indicators | Beginning (0) | Developing (1) | Advanced (2) |
|---|---|---|---|
| *Purposeful* - Facilitator decision making is based on knowledge of where the group is and where they need to go. **Dig Deeply** - Persistent efforts, on the part of the participants, to work with phenomena until partial or full understanding is achieved. | | | |
| **1** | tegies to support study group participants to *"go public"* with *reasoning from evidence, progressively building explanations, and en* | | |
| **1A** | Facilitator shows *inconsistent* evidence of encouraging participants to justify their claims with reasoning, modeling, or explanations. Facilitator accepts all contributions equally (whether scribing or facilitating discussion). | Facilitator shows *somewhat consistent* evidence of encouraging participants to justify their claims with reasoning, modeling, or explanations. Facilitator *somewhat consistently* acts on participant contributions critical to moving the group forward in their learning. | Facilitator shows *consistent* evidence of encouraging participants to justify their claims with reasoning, modeling, or explanations. Facilitator *consistently* discriminates among participant contributions acts on contributions critical to moving the group forward in their learning. |
| EVIDENCE | | | |
| **1B** | Facilitator may introduce talk moves here or there, but use of talk moves generally *lacks intention and purpose* to the task at hand. When prompting, the facilitator appears to be looking for a "right" answer. | Facilitator somewhat consistently and somewhat purposefully uses talk moves or prompts to support participant sensemaking using the core practices. | Facilitator *consistently* and *purposefully* uses talk moves or prompts to support participant sensemaking using the core practices. |
| EVIDENCE | | | |
| **2** | The facilitator uses prompts, cues and purposeful questioning to model *listening to and taking one another seriously* as *thinkers and* | | |
| **2A** | The facilitator demonstrates *inconsistent* use of facilitator moves and norm setting strategies to guide all participants to respectfully listen to and build upon or question others' ideas or explanations. | The facilitator demonstrates *somewhat consistent* and *somewhat effective* use of facilitator moves and norm setting strategies to guide all participants to respectfully listen to and build upon or question others' ideas or explanations. | The facilitator demonstrates *consistent* and *effective* use of facilitator moves and norm setting strategies to guide all participants to listen respectfully to and build upon or question others' ideas or explanations. |
| EVIDENCE | | | |

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# Role of the Knowledge Building Facilitation Rubric as a Tool

- Gathers data on what facilitators **know**, **notice**, and **do**, based on our KBF Framework.

- Can be used with different data sources, different lenses on knowledge-building facilitation- used in particular with videos of facilitators leading whole & small group discussions in NGSX learning pathways.

- Allows us to gather an evidence base about the progressive development of KBF over time and across facilitators.

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# 4 <u>Dimensions</u> Defining the Work of an NGSX Facilitator

❖ *The facilitator uses strategies to support study group participants to <u>"go public" with reasoning from evidence, progressively building explanations & engaging in modeling</u>.*

❖ *The facilitator uses prompts, cues and purposeful questioning to model listening to, taking one another seriously as thinkers & learners of science, and <u>motivating co-constructing science ideas</u>.*

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# KBF Dimensions - cont'd:

❖ *The facilitator supports and motivates participants to "dig deeper" into puzzling phenomena, informing their use of the practices of explanation, argumentation, and modeling*

❖ *The facilitator demonstrates a range of science content knowledge on "hinge" ideas, demonstrating capacity to work effectively with differing levels of science content knowledge among participants.*

# Rubric as a Tool To Document Progress on Growth in Identified Dimensions

| Evidence-based Indicators | Knowledge Building Facilitation Rubric: 20104, 20105, 20106 Bottle on the Table | | |
|---|---|---|---|
| | **Beginning (0)** | **Developing (1)** | **Advanced (2)** |
| | **\*Purposeful** - Facilitator decision making is based on knowledge of where the group is and where they need to go. **\*\*Dig Deeply** - Persistent efforts, on the part of the participants, to work with phenomena until partial or full understanding is achieved. | | |
| **1** | tegies to support study group participants to *"go public"* with *reasoning from evidence, progressively building explanations, and eng* | | |
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| *EVIDENCE* | | | |
| **1B** | Facilitator may introduce talk moves here or there, but use of talk moves generally *lacks intention and purpose* to the task at hand. When prompting, the facilitator appears to be looking for a "right" answer. | Factilitator somewhat consistently and somewhat purposefully uses talk moves or prompts to support participant sensemaking using the core practices. | Factilitator *consistently* and *purposefully* uses talk moves or prompts to support participant sensemaking using the core practices. |
| *EVIDENCE* | | | |
| **2** | The facilitator uses prompts, cues and purposeful questioning to model *listening to and taking one another seriously* as *thinkers and* | | |
| **2A** | The facilitator demonstrates *inconsistent* use of facilitator moves and norm setting strategies to guide all participants to respectfully listen to and build upon or question others' ideas or explanations. | The facilitator demonstrates *somewhat consistent* and *somewhat effective* use of facilitator moves and norm setting strategies to guide all participants to respectfully listen to and build upon or question others' ideas or explanations. | The facilitator demonstrates *consistent* and *effective* use of facilitator moves and norm setting strategies to guide all participants to listen respectfully to and build upon or question others' ideas or explanations. |
| *EVIDENCE* | | | |

# 4 Major Dimensions - Indicators reflect progressive knowledge & skills of dimension "in action"

| Knowledge Building Facilitation Rubric | | | |
|---|---|---|---|
| **Evidence-based Indicators** | **Beginning (0)** | **Developing (1)** | **Advanced (2)** |
| **1** | The facilitator uses strategies to support study group participants to "go public" with reasoning from evidence, progressively building explanations, and engaging in model building. | | |
| **1A** | Facilitator may introduce talk moves here or there, but use of talk moves generally *lacks intention and purpose* to the task at hand. When prompting, the facilitator appears to be looking for a "right" answer. | Factilitator somewhat consistently and somewhat purposefully uses talk moves or prompts to support participant sensemaking using the core practices. | Factilitator *consistently* and *purposefully* uses talk moves or prompts to support participant sensemaking using the core practices. |
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1A & 1B are progressive indicators of the identified <u>Dimension</u> across 3 levels of development - *Beginning, Developing & Advanced*

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# Our "Very" Preliminary Findings:

- Facilitator development is not uniform – with respect to knowing, noticing, and doing

- Science content knowledge is a critical component of skilled facilitation in the context of NGSX

- The KBF Rubric does provide a multi-dimensional picture of development of KBF over time that reflects the 3 lenses of the Trifecta framework

- Affirms facilitation as a complex PD practice

- Supports data-informed revisions to our NGSX pathways.

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