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| **Nevada Math Series**Session 3 |

Why Number Sense?

*Building Math Skills—Number Sense and Related Key Concepts*

**Key Study From Science Daily/Johns Hopkins**

* The study posits the idea that math is inborn. The researchers worked with 48 children at 6 months (monitoring their gaze tracking groups to assess their “intuitive number sense”) and then following up with those same children when they were 4 with a set of standardized tests that assessed things like math ability, intuitive numbers sense, understanding of number words, and general intelligence.
* For those 4-year olds, the precision of students’ estimations on the test correlated with their math skills.
* And the children who were in the top 50% on these tests at age 4 had a significantly higher score on their “intuitive number sense” as infants.
* **Key takeaway: If we can develop strong number sense in children by age 4, it potentially could be a huge influencer in their future math skills and success.**

Jot down any notes that you find helpful from the group discussion here:

What is Number Sense?

*Building Math Skills— Number Sense and Related Key Concepts*

**What is Number Sense?**

* Number sense is defined as **an intuitive feel for numbers and a common-sense approach to using them**. It is a comfort with what numbers represent, coming from investigating their characteristics and using them in diverse situations.
* Another way to think about number sense is the **understanding of the relative value of numbers**, the effects of operations on combining numbers, the relationships between numbers, and how to use numbers in a variety of ways including computation, measurement, and estimation.
* Acquiring number sense requires **fluency**. Number sense helps students to be able to more nimbly complete other math tasks and to understand math at a conceptual level.

**Key Idea:** Number sense is not a skill that is taught, mastered, and complete. Rather it’s a skill that is built, refined, and furthered as children develop (from infancy through adulthood).

On the next several pages, you’ve been provided with space to take notes during the gallery walk. Do this in a way that works best for you. You will see a space called out for you to write any key vocabulary you want to keep in mind when coaching teachers and when thinking about math talk.

Key Concepts Gallery Walk

*Building Math Skills—Number Sense and Related Key Concepts*

**Key Concept 1: Object Permanence**

**What’s the key idea?**

*Vocabulary/Math Talk Ideas*

Key Concepts Gallery Walk

*Building Math Skills—Number Sense and Related Key Concepts*

**Key Concept 2: More**

**What’s the key idea?**

*Vocabulary/Math Talk Ideas*

Key Concepts Gallery Walk

*Building Math Skills—Number Sense and Related Key Concepts*

**Key Concept 3: One**

**What’s the key idea?**

*Vocabulary/Math Talk Ideas*

Key Concepts Gallery Walk

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**Key Concept 4: Numeracy**

**What’s the key idea?**

*Vocabulary/Math Talk Ideas*

Effectively Building Number Sense

*Building Math Skills— Number Sense and Related Key Concepts*

**Effective strategies for building number sense in children have a few key hallmarks that all center around what we want students to walk away doing:**

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| For students to… | teachers must… |
| **Accurately use vocabulary** | * Intentionally identify appropriate vocabulary
* Use self or parallel talk or ask questions to build student understanding of vocab
 |
| **Take on the bulk of the “lifting”** | * Plan strategies/activities that are student-focused
* Plan and ask rich questions
 |
| **Be challenged in the work!** | * Check the standards for alignment
* Use student data and milestones to check for DAP
 |
| **Connect the learning to real-life** | * Plan and make explicit real-life connections
* Provide multiple opportunities for students to practice (during the activity and throughout the day)
 |

Planning for Number Sense

*Building Math Skills—Number Sense and Related Key Concepts*

**Key Idea:** As we know, it’s not enough for us to explain a concept to a teacher or child, we need to make the explanation fun and engaging through intentional activities and classroom opportunities.

For your assigned concept, work with your partner to create a poster that includes:

* Child-centered activities,
* For infant/toddler AND pre-k,
* At least 1 example for a math specific activity,
* At least 1 non-math based activity,
* And a clear real-life connection

Use the space below to jot down notes from your planning that you find useful.

Practice

*Building Math Skills—Number Sense and Related Key Concepts*

**Plan**

* **Imagine** you are popping in to multiple classrooms and you know they will be focusing on the concept that matches your post-it from our previous activity.
* Write **a brief explanation of the concept and one question you could ask of students** **in each classroom that would appropriately develop their understanding of the concept you are assigned (same as from our previous activity).**

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| Concept: | *Activity* |
| *Question* |

Consider how your explanation of the concept and question: 1-are developmentally appropriate, and 2-develop math language skills (math talk never disappears!)

*Reminder from Session 2 if you need it:*

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| Math Talk Look Fors |
| **Infused Throughout the Day** | Takes advantage of opportunities that exist: routines such as attendance, lunch distribution, store center (counting money), building center (size and shapes), etc. |
| **Continues the Conversation** | Keep the child talking by asking questions, prompting, and more. |
| **Uses Appropriately Complex Math Vocabulary** | Tier 2 vocabularyChildren communicate accurately and confidently |
| **Promote Problem-Solving and Process, not just Skill** | It’s not just about vocabulary development or getting the right answerChildren explain their thinking and the process/approach they take. |

Leader Planning

*Building Math Skills— Number Sense and Related Key Concepts*

**Take the next several minutes to create a plan for how you will share this content with the center staff that you support.**

* When will you deliver this content to your staff?
* How will you deliver content to your staff? (One whole-group two-hour professional development? Smaller groups? Smaller chunks of time? Direct facilitation vs. small group planning?)
* How will you support your team in implementing math talk? What tools will you create and provide them with?
* What challenges do you anticipate your staff may have with this content?

Do Now

*Practice: Observing for Number Sense*

**Reflect on your experience making time for math observations.**

How have you been able to prioritize getting in to classrooms to observe for math?

What has worked well? What has been challenging?

What have you needed to do to effectively prepare for these observations?

Observation Practice

*Practice: Observing for Number Sense*

Collect data focused on the **Essential Content competency in the rubric in Number Sense** for teacher and student actions.

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Rating on the Rubric Reminder

*Practice: Observing for Number Sense*

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| HOW TO RATE OVERALL PERFORMANCE  |
| 1. Decide on your rating for each indicator.
2. Consider the ratings for all the indicators under a particular competency (i.e.. Essential Content).
3. Using your evidence and indicator ratings, assign an overall rating to that competency: Ineffective, Approaching Developing, Developing, Proficient.
4. Write 2-3 evidence statements that support your overall rating.
5. Repeat for each relevant competency.
 |

How would you rate what we observed on the rubric? Does this teacher’s instruction exemplify what we identified as critical for number sense in essential content?

What is emerging to you as a primary area of development? (*You don't have to fully commit to your area of development quite yet - more evidence is coming!)*

Reflection on Observation

*Practice: Observing for Number Sense*

* 1. What did you find came naturally to you during this observation?
	2. What did you find challenging?
	3. What do you need to do as a leader to be ready to conduct these observations?

3-2-1 Exit Ticket

*Practice: Observing for Number Sense*

What are **3** steps you need to take (before/during/after an observation) to effectively rate Essential Content?

What are **2** concepts you think your staff need the most support in understanding about number sense? Why?

What is **1** way you will ensure they have a deeper understanding of those concepts before the next time we reconvene?

Next Steps

*Closing*

**Prior to our next Math Series training:**

**Teacher Observations:**

* Conduct at least 3 teacher observations using the Math Talk and Number Sense Look-Fors. Observe teachers during any time of the day to get an understanding of when/how math skills are being developed in their classroom.

**Building Number Sense:**

* Implement the teacher training content on Number Sense with at least one small group of teachers (approximately 5 teachers) prior to the Session 5 training. (NOTE: You have two months to facilitate this session to your staff.)
* Collect exit tickets at the end of the Number Sense training session and bring those with you to the Session 5.
* Before and after the training: Observe a small group of teachers who will participate in the training (3-5) to assess if and how number sense development is being implemented in their classrooms before and after the training you provide. Complete the graphic organizer and bring it to the Session 5 training.

**Ongoing:**

**Teacher Observations:**

* Prioritize time in your schedule to conduct observations of teachers each week. Enter those teachers’ ratings into the observation tracker.