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| **Nevada Math Series**Session 4 |

Why Problem-Solving and Reasoning?

*Building Math Skills—Problem Solving and Reasoning*

**Generate a list of the benefits of teaching problem solving and reasoning as well as the challenges teachers may face in doing this effectively.**

Excellence in Problem Solving and Reasoning

*Building Math Skills—Problem Solving and Reasoning*

**Criteria of Strong Instruction that Involves Problem-Solving and Reasoning**

* Rooted in **real-world problems and questions** through a **hands-on collaborative process** with teachers and peers
* Includes opportunities for students to **develop questioning, research and communication skills**
* Includes some kind of **guidance and structure** — not just a project or aimless play, but exploration and manipulation that has a purpose or a problem to solve
* Includes both **content and math practice standards**

Excellence In Action

*Building Math Skills—Problem Solving and Reasoning*

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| CRITERIA | EVIDENCE FROM CLIP |
| Rooted in **real-world problems and questions** through a **hands-on collaborative process** with teachers and peers |  |
| Includes opportunities for students to **develop questioning, research and communication skills**  |  |
| Includes some kind of **guidance and structure** — not just a project or aimless play, but exploration and manipulation that has a purpose or a problem to solve |  |
| Includes both **content and math practice standards** |  |

Geometry

*Building Math Skills—Problem Solving and Reasoning*

**Key Ideas**

* **Shape characteristics/attributes**: Noticing what makes each shape different, like knowing that a triangle has three points
* **Matching**: Recognizing common elements of shapes and matching pairs (circles, triangles, and squares)
* **Positioning shapes**: Understanding how shapes fit together and can be combined, like completing a puzzle

**Video Notes**

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| *How can we apply the ideas of building problem solving/reasoning skills into geometry?* | *What connections can you make to the math standards?* |
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Measurement

*Building Math Skills—Problem Solving and Reasoning*

**Key Ideas**

* **The size, length, height, and weight** of people or objects: Like when they describe a baby sibling as “short” and themselves as “tall”
* **The concept of capacity**: As they “fill” and “empty” a container with sand or water
* **The idea of distance**: Whether a favorite toy is “far away” or “close by”
* **The idea of time**: Concepts like before, after, later, soon and “in a minute.”

**Video Notes**

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| --- | --- |
| *How can we apply the ideas of building problem solving/reasoning skills into measurement?* | *What connections can you make to the math standards?* |
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**Create a Developmental Progression chart here:**

Practice

*Building Math Skills— Problem Solving and Reasoning*

**Plan**

* **Imagine** you are modeling a short activity focused on building problem-solving and reasoning skills through measurement or geometry (your choice of what key idea to explore!) for a teacher.
* Use the guided process below to **write** **one activity and at least three related question you could ask of students to build problem-solving and reasoning.**

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| What **age** of students are you working with? |  |
| **Goal**: What problem-solving skills do you want to build with students? |  |
| **What better supports building this skill?** Circle measurement or geometry as your choice. |   Measurement Geometry |
| Select a **key idea** within the topic you chose. |  |
| **Describe the activity** you would plan for this. Be sure to address: What problem will students work to solve?  |  |
| How do you expect students to **collaborate, research, communicate, ask questions** during this activity? |  |
| What THREE **questions will you ask during the activity to build problem-solving and reasoning skills**? |  |
| What **standards** does this connect to? |  |
| How does this connect to **real-life**? |  |

Check your planning using the 4 criteria and standards.

Criteria of Strong Instruction involving Problem Solving and Reasoning (use this also to guide your feedback for your partner)

* Rooted in **real-world problems and questions** through a **hands-on collaborative process** with teachers and peers
* Includes opportunities for students to **develop questioning, research and communication skills**
* Includes some kind of **guidance and structure** — not just a project or aimless play, but exploration and manipulation that has a purpose or a problem to solve
* Includes both **content and math practice standards**

**Partner Feedback**

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| Glow |  |
| Grow |  |

Exit Ticket

*Building Math Skills— Problem Solving and Reasoning*

* What are your next steps for ensuring that you are constantly and intentionally building problem-solving and reasoning with students?
* When and where will you prioritize focusing on problem-solving and reasoning? How will you hold yourself accountable for using these strategies?
* What questions do you still have about what you learned today?
* What feedback to you have about the session for the facilitator?

Next Steps

*Building Math Skills— Problem Solving and Reasoning*

* **Draft sentence starters that will help you remember to use problem solving strategies daily. Post these prompts around your classroom strategically.**
* **Have your prompts posted by PROVIDE DATE.**