Reflect on your math questioning:









Session Objectives



ONE

Reflect on your own questioning practices.



TWO

Analyze math question types and patterns.



THREE

Generate
examples of high
level math
questions for
your own
classroom.

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Why is Purposeful Questioning Important?

Scaffolding

Provides an avenue for students to build their own understanding of math concepts.

Differentiation

Allows for support and extensions to meet students at all readiness levels and backgrounds.

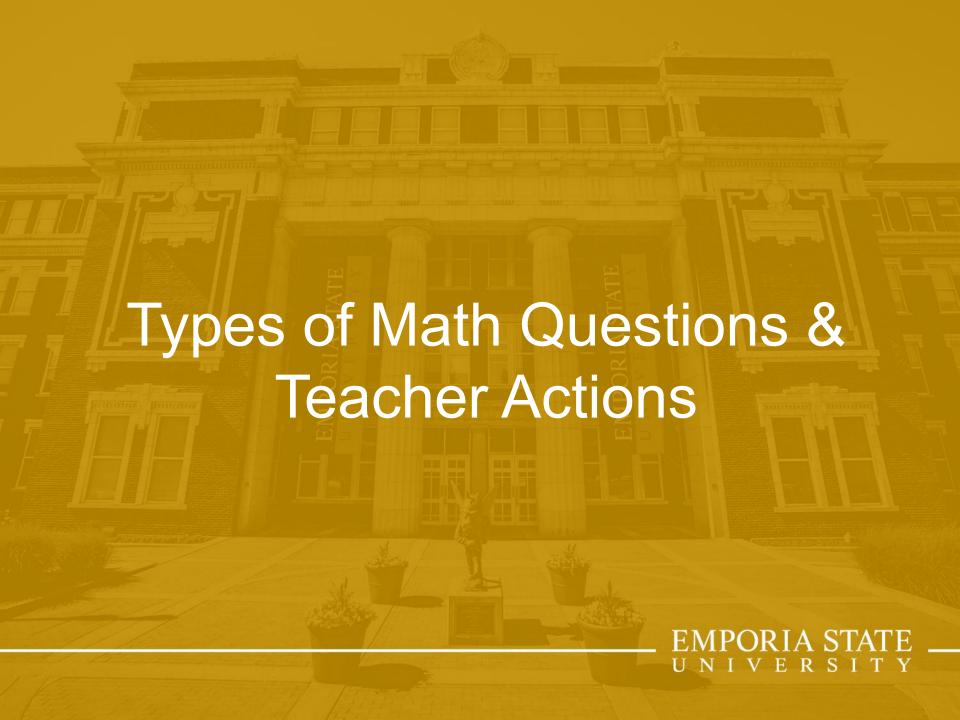
Higher Level Thinking

Provokes deeper understanding by asking students to explain, model, and solve in various ways.

Principles to Actions Eight Mathematics Teaching Practices

- 1. Establish mathematics goals to focus learning.
- 2. Implement tasks that promote reasoning and problem solving.
- 3. Use and connect mathematical representations.
- 4. Facilitate meaningful mathematical discourse.
- 5. Pose purposeful questions.
- 6. Build procedural fluency from conceptual understanding.
- 7. Support productive struggle in learning mathematics.
- 8. Elicit and use evidence of student thinking.





NCTM: Teacher and Student Questioning Actions

Pose	pur	oose	eful (que	stions
Teach	er a	nd st	tude	nt a	ctions

reaction and stade in actions				
What are teachers doing?	What are students doing?			
Advancing student understanding by asking questions that build on, but do not	Expecting to be asked to explain, clarify, and elaborate on their thinking.			
take over or funnel, student thinking. Making certain to ask questions that go beyond gathering information to probing thinking and requiring explanation and	Thinking carefully about how to present their responses to questions clearly, with- out rushing to respond quickly. Reflecting on and justifying their reason-			
justification. Asking intentional questions that make the mathematics more visible and accessible for student examination and discussion.	ing, not simply providing answers. Listening to, commenting on, and questioning the contributions of their classmates.			
Allowing sufficient wait time so that more students can formulate and offer responses.				



Question Type	Purpose	Examples			
Gathering information	These questions ask students to recall facts, definitions, or procedures.	 How many pieces of fruit did the caterpillar eat on Friday? Can you show me how you counted the fruit? 			
Probing thinking	These questions ask students to explain, elaborate, or clarify their thinking, including articulating the steps in solution methods or completion of a task.	 I see you wrote 10 + 5 on your paper. Where did the 10 come from? Tell me about your picture. I see you wrote the days of the week and then drew squares. 			
Making the mathematics visible	These questions ask students to discuss mathematical structures and make connections among mathematical ideas and relationships.	 Marisa wrote 1 + 2 + 3 + 4 + 5 = 15. Is that okay to write an equation with all those plus signs? What pattern do you see in the equations 10 + 2 = 12, 10 + 3 = 13, 10 + 4 = 14, and 10 + 5 = 15? 			
Encouraging reflection and justification	These questions reveal deeper insight into student reasoning and actions, including asking students to argue for the validity of their work.	 I see you put a circle around the 1, 4, and 5. Why did you put these pieces of fruit together? What makes 10 + 5 equal to 9 + 6? 			
Engaging with the reasoning of others	These questions help students gain understanding of each other's solution paths and thinking, and lead to the co-construction of mathematical ideas.	 Who understands Shyanne's explanation and can say it back in your own words? Can you add on to what Nate said? Do you agree or disagree with Anne? Why? 			



Generate Questions for Math Tasks

Select a math task below. Can you generate types of questions using the NCTM model? Use the color coded sticky notes.

Task 1: K-1

- 1. Use the words "plus" and "minus" to say what you see on the five frame.
- 2. What if you made another dot blue? What new math sentences can you say?

Task 2: 2-3

- 1. Use a number line to show 43-27=?. Explain how you know your answer is correct.
- 2. Explain how to find the correct answer to 43-29=? by starting with 43-30.

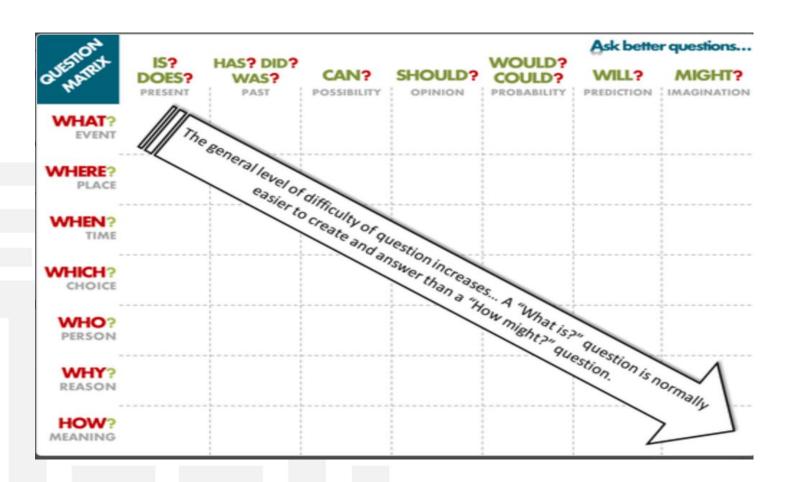
Task 3: 4-5

- 1. Draw a rectangle and shade about % of the rectangle.
- 2. Name three other fractions that are close in size to 5/8. Explain your reasoning.





Questioning Matrix



Questioning Matrix

What Is?	When Is?	Where Is?	Which Is?	Who Is?	Why Is?	How Is?	
What Did?	When Did?	Where Did?	Which Did?	Who Did?	Why Did?	How Did?	
What Can?	When Can?	Where Can?	Which Can?	Who Can?	Why Can?	How Can?	
What Would?	When Would?	Where Would?	Which Would?	Who Would?	Why Would?	How Would?	
What Will?	When Will?	Where Will?	Which Will?	Who Will?	Why Will?	How Will?	
What Might?	When Might?	Where Might?	Which Might?	Who Might?	Why Might?	How Might?	



Set a goal for your math questioning:





Questions?



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