

## Questions That Nurture STEM Thinking

Productive Question	Effects of Question	Examples of Question Stems
<p><b>Attention Focusing</b></p>	<ul style="list-style-type: none"> <li>Helps children focus on variables they are overlooking</li> <li>Helps to focus children's attention on significant details about objects and/or phenomena</li> </ul>	<ul style="list-style-type: none"> <li>What do you notice?</li> <li>What is your friend doing with her ...?</li> <li>Which one is your friend using?</li> <li>What is happening when ...?</li> <li>Did you see what happened when ...?</li> <li>Have you seen ...?</li> </ul>
<p><b>Measuring and Counting</b></p> <p>Early Mathematics</p>	<ul style="list-style-type: none"> <li>Assists children in putting variables in relationship to each other</li> <li>Helps children become more precise about their observations</li> </ul>	<ul style="list-style-type: none"> <li>How many did you ...?</li> <li>How far did ...?</li> <li>How fast did ...?</li> </ul>
<p><b>Comparison</b></p> <p>Early Mathematics</p>	<ul style="list-style-type: none"> <li>Assists children in noticing what is the same and what is different</li> <li>Helps children analyze and classify</li> </ul>	<ul style="list-style-type: none"> <li>What is different when you ...?</li> <li>What is the same when you ...?</li> <li>How is this different from that?</li> </ul>
<p><b>Action</b></p>	<ul style="list-style-type: none"> <li>Assists a child who seems stumped by giving the answer disguised as a question. Performing the action may help the child to focus on the relevant variables, but without taking away the child's agency.</li> </ul>	<ul style="list-style-type: none"> <li>What happens when you ...?</li> </ul>
<p><b>Problem-Posing</b></p> <p>Never have one right answer</p>	<ul style="list-style-type: none"> <li>Challenges children to find a way to change a variable</li> <li>Helps children plan and implement solutions to problems</li> </ul>	<ul style="list-style-type: none"> <li>Can you find a way to ...?</li> <li>Can you find something that ...?</li> <li>Can you figure out how to ...?</li> <li>How can you ...?</li> </ul>

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<p style="text-align: center;"><b>Reasoning</b></p> <p>Making predictions and generalizations</p>	<ul style="list-style-type: none"> <li>● Asks children to predict (deductive), which can include guessing or nonverbally choosing one of two possible outcomes</li> <li style="text-align: center;">-or-</li> <li>● Asks children to generalize from their experiences (inductive), which can be nonverbal as well as verbal</li> </ul>	<p><b>Predict (deductive)</b></p> <ul style="list-style-type: none"> <li>● What do you think will happen if you ...?</li> <li>● What will ...?</li> <li>● What would happen if ...?</li> </ul> <p><b>Generalize (inductive)</b></p> <ul style="list-style-type: none"> <li>● What have you learned about ...?</li> <li>● Show me how you ...</li> <li>● What can you tell me about ...?</li> <li>● What do you now know about ...?</li> <li>● What do you now know about what happens when ...?</li> </ul>
<p style="text-align: center;"><b>Reasoning</b></p> <p>Causal, only for those children who have demonstrated that they can reason causally</p>	<ul style="list-style-type: none"> <li>● Helps children think about experiences and construct ideas that make sense to them</li> </ul>	<ul style="list-style-type: none"> <li>● I wonder why ...?</li> <li>● Do you think ...?</li> <li>● What is your reason for ...?</li> <li>● What makes ...?</li> </ul>