Kentucky Mathematics Innovation Practice Profile

Consistently – engages in the behavior each time there is an opportunity to demonstrate
Inconsistently – misses opportunities to demonstrate the behavior

<table>
<thead>
<tr>
<th>Mathematics Teaching Practice 1: Establish mathematics goals to focus learning</th>
<th>Accomplished Use</th>
<th>Developmental Use</th>
<th>Ineffective Use</th>
</tr>
</thead>
</table>
| Effective teaching of mathematics establishes clear goals for the mathematics that students are learning, situates goals within learning progressions, and uses the goals to guide instructional decisions. | 1. Teacher consistently …
   a. establishes clear and detailed goals that indicate the mathematics students are learning.
   b. explains how the mathematical goals contribute to enduring understandings.
   c. uses these goals to adjust instruction.
   d. connects concrete and semi-concrete (representational) activities to the conceptual understanding of the mathematical goals.
   e. uses a concrete--semi-concrete (representational)--abstract learning progression to meet these goals. | 1. Teacher inconsistently …
   a. establishes clear and detailed goals that indicate the mathematics students are learning.
   b. explains how the mathematical goals contribute to enduring understandings.
   c. uses these goals to guide decision making.
   d. connects concrete and semi-concrete (representational) activities to the conceptual understanding of the mathematical goals.
   e. uses a concrete--semi-concrete (representational)--abstract learning progression to meet these goals. | 1. Teacher…
   a. does not establish goals or does not clearly define goals for mathematical understandings.
   b. fails to explain how the mathematical goals contribute to enduring understandings.
   c. fails to use goals to guide decision making.
   d. does not use concrete and semi-concrete (representational) activities or does not make any connections between activities and the mathematical goals.
   e. does not use a concrete--semi-concrete (representational)--abstract learning progression to meet these goals. |

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Updated May 20, 2019
**Mathematics Teaching Practice 2: Implement tasks that promote reasoning and problem solving**

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| Effective teaching of mathematics engages students in solving and discussing tasks that promote mathematical reasoning and problem solving and allow multiple entry points and varied solution strategies. | 2. Teacher **consistently**…

  a. provides opportunities for students to explore and solve problems that build on and extend their current mathematical understanding.

  b. selects tasks that provide multiple entry points.

  c. poses tasks that require a high level of cognitive demand.

  d. provides opportunities for students to discuss tasks without taking over student thinking.

  e. selects tasks that allow students to make sense of and solve using varied approaches and strategies. | 2. Teacher **inconsistently** …

  a. provides opportunities for students to explore and solve problems that attempt to build on and extend their current mathematical understanding.

  b. selects tasks that provide multiple entry points.

  c. poses tasks that require a high level of cognitive demand.

  d. provides opportunities for students to discuss tasks or sometimes take over student thinking.

  e. selects tasks that allow students to make sense of and solve using those approaches and strategies presented in class. |

| 2. Teacher…

  a. does not provide the opportunity for students to explore and solve problems, or provides opportunities that do not build on and extend their current mathematical understanding.

  b. does not select tasks that provide multiple entry points.

  c. poses tasks that require a low level of cognitive demand.

  d. does not provide opportunities for students to discuss tasks or often takes over student thinking.

  e. does not select tasks that allow students to make sense of and solve using varied approaches and strategies or provides one specific strategy or approach for students to use to solve tasks.

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**Mathematics Teaching Practice 3: Use and connect mathematical representations**

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| **Effective teaching of mathematics engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and as tools for problem solving.** | 3. Teacher *consistently*…

a. selects tasks that allow students to choose representations (pictures, symbols, verbal, real-life situations, physical models) in making sense of problems.

b. allocates instructional time for students to use, discuss, and make connections among representations.

c. introduces and models a variety of representations that provide students with choices for making sense of problems.

d. asks students to use multiple representations to make connections, justify their reasoning, and deepen understanding of essential features and structure of mathematical concepts and procedures. | 3. Teacher *inconsistently*…

a. selects tasks that allow students to choose representations (pictures, symbols, verbal, real-life situations, physical models) in making sense of problems.

b. allocates instructional time for students to use, discuss, and make connections among representations.

c. introduces and models a variety of representations that provide students with choices for making sense of problems.

d. asks students to use multiple representations to make connections, justify their reasoning, and deepen understanding of essential features and structure of mathematical concepts and procedures. | 3. Teacher…

a. do not select tasks that allow students to choose representations (pictures, symbols, verbal, real-life situations, physical models) in making sense of problems.

b. do not allocate sufficient instructional time for students to use, discuss, and make connections among representations.

c. introduce and model a single representation that does not provide students with choices for making sense of problems, or introduce and model representations not aligned to the learning goal.

d. does not ask students to use multiple representations to make connections, justify their reasoning, and deepen understanding of essential features and structure of mathematical concepts and procedures. |
**Mathematics Teaching Practice 4: Facilitate meaningful mathematical discourse**

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| **Effective teaching of mathematics facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments.** | **4. Teacher consistently …**<br>a. engages students in purposeful discourse of mathematical ideas, reasoning, and approaches.  
  b. facilitates discourse among students by positioning them as authors of ideas, who explain and defend their approaches.  
  c. makes connections among student approaches and reasoning clearly and explicitly.  
  d. selects and sequences “evidence of student thinking” to highlight mathematical ideas and language for whole class analysis and discussion | **4. Teacher inconsistently …**<br>a. engages students in purposeful discourse of mathematical ideas, reasoning, and approaches, or regular discourse may not always be purposeful.  
  b. facilitates discourse among students by positioning them as authors of ideas, who explain and defend their approaches.  
  c. makes connections among student approaches and reasoning or make vague connections among student approaches and reasoning.  
  d. selects and sequences “evidence of student thinking” to highlight mathematical ideas and language for whole class analysis and discussion | **4. Teacher…**<br>a. does not engage students in discourse of mathematical ideas, reasoning, and approach.  
  b. does not facilitate discourse among students by positioning them as authors of ideas, who explain and defend their approaches.  
  c. does not make connections among student approaches and reasoning.  
  d. does not select and sequence “evidence of student thinking” to highlight mathematical ideas and language for whole class analysis and discussion |

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| Effective teaching of mathematics uses purposeful questions to assess and advance students’ reasoning and sense making about important mathematical ideas and relationships. | 5. Teacher consistently …
  a. advances student understanding by asking questions that build on, but do not take over or funnel, student thinking.
  b. assesses thinking by asking questions that require explanation and justification.
  c. asks intentional questions that make mathematical ideas and relationships more visible for students. | 5. Teacher inconsistently …
  a. advances student understanding by asking questions that build on, but do not take over or funnel, student thinking.
  b. assesses thinking by asking questions that require explanation and justification.
  c. asks intentional questions that make the structure of mathematics more accessible for student learning. | 5. Teacher …
  a. asks questions that take over or funnel student thinking.
  b. asks questions that simply gather information and do not probe thinking or require explanation and justification.
  c. does not ask questions that make the structure of mathematics more accessible for student learning. |
**Mathematics Teaching Practice 6: Build procedural fluency from conceptual understanding**

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| Effective teaching of mathematics builds fluency with procedures on a foundation of conceptual understanding so that students, over time, become skillful in using procedures flexibly as they solve contextual and mathematical problems. | 6. Teacher **consistently** …  
   a. provides students with opportunities to use their own reasoning strategies and methods for solving problems.  
   b. asks students to discuss and explain why the procedures that they are using work.  
   c. connects student-generated strategies and methods to more efficient procedures as appropriate.  
   d. uses an intentional concrete-semi-concrete (representational)-abstract sequence to develop student understanding of the structure within procedural fluency.  
   e. provides students with regular opportunities for practice of procedures that are brief, engaging, and purposeful. | 6. Teacher **inconsistently** …  
   a. provides students with opportunities to use their own reasoning strategies and methods for solving problems.  
   b. asks students to discuss and explain why the procedures that they are using work.  
   c. connects student-generated strategies and methods to more efficient procedures as appropriate.  
   d. uses a concrete-semi-concrete (representational)--abstract sequence to develop some student understanding of the structure within procedural fluency.  
   e. provides students with opportunities for practice of procedures that are brief, engaging, and purposeful. | 6. Teacher …  
   a. does not provide students with opportunities to use their own reasoning strategies and methods for solving problems or provide a preferred strategy.  
   b. does not ask students to discuss and explain why the procedures that they are using work.  
   c. does not connect student-generated strategies and methods to more efficient procedures as appropriate.  
   d. does not develop student understanding of the structure within procedural fluency, i.e., by using automaticity practice too soon.  
   e. provides students with opportunities for rote practice of procedures that are not purposeful. |

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Mathematics Teaching Practice 7: Support productive struggle in learning mathematics

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| **Effective teaching of mathematics** consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships. | 7. Teacher *consistently* …
   a. gives students time to struggle with tasks.
   b. asks questions that purposefully scaffold students’ thinking without stepping in to do the work for them.
   c. helps students develop a growth mindset by facilitating discussions on mistakes, misconceptions and struggles, and acknowledging students for their efforts (rather than an innate ability).
   d. provides specific feedback that supports students with moving learning forward to develop mathematical ideas and/or persevering to solve problems. | 7. Teacher *inconsistently* …
   a. gives students time to struggle with tasks.
   b. asks questions that purposefully scaffold students’ thinking without stepping in to do the work for them.
   c. helps students develop a growth mindset through facilitating discussions on mistakes, misconceptions, and struggles.
   d. provides specific feedback that supports students with moving learning forward to develop mathematical ideas and/or persevering to solve problems. | 7. Teacher …
   a. does not give students time to struggle with tasks.
   b. does not ask questions that purposefully scaffold students’ thinking or step in to do the work for them.
   c. contributes to students’ fixed mindsets through a lack of discussions around mistakes, misconceptions, and struggles.
   d. does not provide specific feedback to support students with moving learning forward with mathematical ideas and/or persevering to solve problems. |
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<td><strong>Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.</strong></td>
<td>8. Teacher <em>consistently</em> …</td>
<td>8. Teacher <em>inconsistently</em> …</td>
<td>8. Teacher …</td>
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<td></td>
<td>a. elicits appropriate evidence of student understanding at strategic points during instructional time.</td>
<td>a. elicits appropriate evidence of student understanding during instructional time.</td>
<td>a. does not gather evidence of student understanding during instructional time or may only gather evidence at the end of instructional time.</td>
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<td>b. uses this evidence to adjust instruction to support and extend student learning.</td>
<td>b. uses this evidence to adjust instruction to support and extend student learning.</td>
<td>b. does not use this evidence to adjust instruction to support and extend student learning.</td>
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<td>c. provides students opportunities to reflect on their work to capture understanding and misconceptions.</td>
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References:


