Local Learning Goals:
Title:
Grade Level/Course:
Estimated Time:
Pre-requisite Knowledge:

NCTM Standard(s) (shaded):

<table>
<thead>
<tr>
<th>NCTM Content Standards</th>
<th>Number &amp; Operations</th>
<th>Algebra</th>
<th>Geometry</th>
<th>Measurement</th>
<th>Data Analysis &amp; Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCTM Process Standards</td>
<td>Problem Solving</td>
<td>Reasoning &amp; Proof</td>
<td>Communication</td>
<td>Connections</td>
<td>Representation</td>
</tr>
<tr>
<td>NCTM Content Standard Goal(s)</td>
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Rigor and Relevance Framework (for high school only):

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Materials Needed
- Audio-visual:
- Manipulatives:
- Technology/Software:
- Literature:
- Other:

LESSON DEVELOPMENT

It is beneficial to work collaboratively with colleagues to plan lessons, whenever possible. Also, it is helpful to revisit the lesson just after teaching it, to reflect on the planning and effectiveness of the lesson, and make revisions as needed.

LAUNCH

Provide a brief purposeful introduction to the lesson, typically teacher led.
Develop a situation, discussion, questions that:
- set the stage for the lesson
- motivate students
- engage students
- find out what students know (formative assessment)
- foreshadow the big ideas of lesson
EXPLORE
Get students engaged in investigating important mathematics, typically in teams.
Characteristics:
- Effective guiding questions – in the task and by the teacher
- Student-to-student communication
- High level of student engagement
Teacher will:
- Guide the students to work out the tasks, problems, and activities themselves, instead of the teacher and text presenting already-worked-out examples.
- Be prepared to help students and teams with key points and trouble spots.
- Be prepared to carry out mini-summaries as needed.
- Check for conceptual and procedural understanding (formative assessment).

Possible Components of Explore Planning:

**Guiding Questions**

<table>
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<tr>
<th>Good questions to ask students:</th>
<th>Possible student responses and actions:</th>
<th>Possible teacher responses: What will you do? How will you respond?</th>
</tr>
</thead>
</table>

**Misconceptions, Errors, Trouble Spots**

<table>
<thead>
<tr>
<th>Possible student misconceptions, errors, or potential trouble spots:</th>
<th>Teacher questions and actions to resolve misconceptions, errors, or trouble spots:</th>
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**Key Ideas**

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<th>Key ideas and important points in the lesson:</th>
<th>Teacher strategies and actions to ensure that all students recognize and understand the key ideas and important points (e.g., ask targeted questions, facilitate mini-summary, point out key problems in the lesson, etc.):</th>
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</thead>
</table>

**SUMMARIZE:**
Provide closure and summary for the lesson, typically teacher led.
- Identify the 2-4 main points of the lesson.
- Ask 2-4 questions that get students to review, explain, and synthesize the main points (formative assessment)
MODIFY/EXTEND
Based on students’ different mathematical understandings, learning styles, and academic and social needs, proactively plan to:
  • Modify learning goals and expectations for some students, as needed.
  • Extend the task to promote more complex understanding of the learning goal for some students, as needed.
  • Provide support so that all students increase their understanding of the learning goal. Embed necessary modifications, extensions, and supports into all parts of the lesson – launch, explore, summarize.

CHECKING FOR UNDERSTANDING
(at the end of the lesson, in addition to throughout the lesson as indicated above)
Formative assessment (Assessment for Learning) is used throughout the lesson to promote student learning, as indicated in the above guidelines for each lesson component. Formative assessment at the end of the lesson checks for student understanding of the learning goals by:
  • Looking for evidence that students learned important mathematical concepts and processes by (for example):
    o asking students to apply their learning in a new context
    o posing a brief assessment task
    o asking students to reflect on their learning
    o analyzing a learning checklist
    o conducting a student interview,
    o analyzing student work
  • Documenting all students’ progress toward the goal
  • Using this information in planning subsequent lessons

REFLECTION after teaching the lesson
In general, student achievement increases in classrooms of reflective teachers. Reflecting is not done in a few minutes after class; it is a mindful act done habitually and works well when done with others.
Characteristics:
  • Involves self-deliberation while making sense of one’s teaching
  • Uses past experiences to think about solutions to pedagogical and curricular problems
  • Is done while teaching and after teaching
Teachers will consider questions like:
  • If I teach this Problem-Based Instructional Task again, what would I do the same? Differently? Why?
  • How did I know which students learned mathematics? How can I better assess their learning?
  • What did I do that contributed to student learning? (Be specific, focus on questioning, instructional decision-making, planning, tools used, etc.)
  • How did I support the learning of students who struggle? (Be specific, focus on questioning, instructional decision-making, planning, tools, etc.)
  • How could I revise the lesson to improve student learning of important mathematics?