Teacher’s Guide

Application Demonstration Lesson

Rationale
- Identify pertinent information.
- Answer all elements of the problem (computation component, modeling/application component).
- Clarity in modeling/application statements – explanation and/or mathematics, use of correct labels.

Goals
- To identify pertinent information within the task
- To learn how to complete the PARCC Type III mathematics items using a process that assures completion of all required elements
- Peer editing through use of item specific rubrics

Objectives
- Students will practice identifying pertinent information.
- Students will identify and complete the elements of the problem - computation and modeling/application components.
- Students will identify common mistakes and discuss strategies for avoiding these mistakes the next time they complete a similar item.
- Students will utilize rubrics in evaluating and improving the quality of their responses.

Teacher/Observer Role
- The consultant is providing professional development for the teacher, by engaging students in a learning experience. The teacher is encouraged to participate in the demonstration by observing the students and assisting as needed.
- Manage the classroom during the demonstration. Students need to be grouped with a partner.
- Please remember that the consultant is not a substitute teacher and cannot be left in charge of a class.
- Take notes as needed and ask the consultant clarifying questions.
- Join a student group. Observe their application of the strategies and listen to their reasoning.
- Avoid “unpacking the questions” and avoid providing guidance with the problem solving. In this setting, it is important for the teacher to observe how students gain entry into each problem and how they proceed in solving the problem by working with a partner.
- Re-enforce the strategies and reasoning throughout the school year. Student Practice B is provided for additional practice.

Consultant’s Role
- Provide professional development for the teacher/observer.
- Model effective problem-solving strategies and suggestions.
- Provide a student-centered learning experience that builds upon strategies students already use.
- Provide further support to the teachers with resources and instructional strategies.
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1 inch = 2.54 centimeters
1 meter = 39.37 inches
1 mile = 5,280 feet
1 mile = 1,760 yards
1 mile = 1.609 kilometers

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts
1 gallon = 3.785 liters
1 liter = 0.264 gallons
1 liter = 1000 cubic centimeters

<table>
<thead>
<tr>
<th>Triangle</th>
<th>$A = \frac{1}{2}bh$</th>
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<tbody>
<tr>
<td>Right Rectangular Parallelipiped</td>
<td>$V = lwh$</td>
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<table>
<thead>
<tr>
<th>Formula/Concept</th>
<th>Description</th>
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<tbody>
<tr>
<td>$a^2 + b^2 = c^2$</td>
<td>Pythagorean Theorem</td>
</tr>
<tr>
<td>$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$</td>
<td>Quadratic Formula</td>
</tr>
<tr>
<td>$a_n = a_1 + (n - 1)d$</td>
<td>Arithmetic Sequence</td>
</tr>
<tr>
<td>$a_n = a_1 r^{n-1}$</td>
<td>Geometric Sequence</td>
</tr>
<tr>
<td>$S_n = \frac{a_1 - a_1 r^n}{1 - r}$ where $r \neq 1$</td>
<td>Geometric Series</td>
</tr>
<tr>
<td>$1 \text{ radian} = \frac{180}{\pi} \text{ degrees}$</td>
<td>Conversion between radians and degrees</td>
</tr>
<tr>
<td>$1 \text{ degree} = \frac{\pi}{180} \text{ radians}$</td>
<td>Conversion between degrees and radians</td>
</tr>
<tr>
<td>$A = A_0 e^{k(t-t_0)} + B_0$</td>
<td>Exponential Growth/Decay</td>
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Approach

Students often use inefficient processes for answering mathematics questions. Therefore, students need practice selecting approaches that are most efficient for them personally. Some students want to use one approach more than another. For instance, when students become anxious (i.e. during test taking), they choose to spend too much time writing out their solution processes on the scratch paper, as if the scratch paper is an assignment. Some students often overuse mental math as an approach and have difficulty when the problem requires numerous steps where they cannot keep track of the information in their minds. Therefore, it is most advantageous when students practice solving problems using multiple approaches and then after time select an approach for each type of item that is the most efficient for them personally.

Daily Practice

Each day students should have the opportunity to try new approaches to complete various styles of mathematics items, to practice their timing, and to consider new ways to complete items. Instructors can select one of the items in the packet that relates to the day's lesson, one that practices a previously learned skill, or one that presents an upcoming concept. Instead of starting the lesson with "how to complete" suggestions, the instructor is asked to provide each student with an item to be completed as quickly as possible while working with their classmates. A discussion should follow the exploration period to allow students the opportunity to present different approaches that were utilized to solve the problem and to discuss which approaches were the most efficient.

Strategies

Students need to learn how to skip and return to unknown items, or when they encounter an unknown item, to use deductive reasoning and select the most likely answer(s). Some students get stuck on unknown items and use up the time they are given during timed tests. This instructional unit provides teachers with the materials they will need to introduce and practice the skill of skipping unknown items, plugging in answers, and eliminating the most obvious incorrect answers.

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